



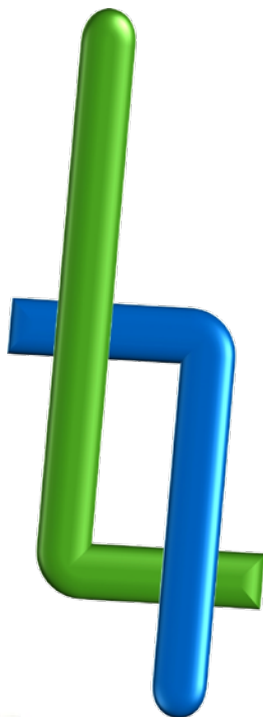
NUTRITION

May 2023

# The Natural Sign

extraits de plantes standardisés objectivés  
objectivized standardized plant extracts

## BECARRE Natural



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**becarre**  
the natural sign

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• REGULAR NEWS • DETAILED PRODUCTS • SUMMARIZED STUDIES • FULL ASSISTED SEARCH •



Becarre Natural represents, distributes and develops natural actives supported by sciences for nutrition, cosmeceutical and pharmaceutical purposes from manufacturers selected for their seriousness, quality and competencies.

Becarre Natural acts as the centralized sales and marketing organization for selected manufacturers of plants extracts,



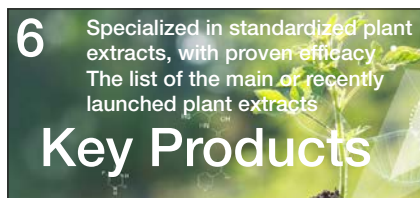
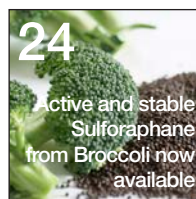
either as your local contact or through appointed distributors who are then in direct contact with the manufacturers but followed up by Becarre Natural.

Because industrials are more looking for reliability and know-how than an immeasurable list of products, Becarre Natural focuses on a specific origin of activities: standardized actives extracted from the nature under very strict process of production, with proven efficacy and sustainable resources. As per today, Becarre Natural represents by agreement different manufacturers, including Sabinsa, Nektium, Ingood by Olga, Iso-cell, GVB, ... besides few others specific extracts from reputed sources.

As the right note at the right time makes the music, the right product in the right formulation makes your success. 'Becarre' - that you may pronounce 'be care' - is the French word for the musical mark which cancels the alterations such sharp sign or flat signs. The English translation is 'the natural sign'.

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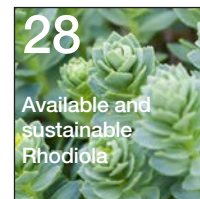
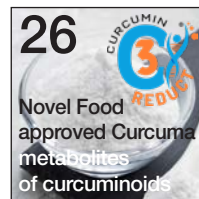
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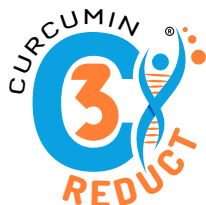
A selection of our previous news and innovations / studies

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Process and terms about extraction

### 1 Opposite: cosmeceuticals

We also offers plant extracts for the cosmetics and nutricosmetics



## The curcuma extract Novel Food approved

Three of the excellent reasons to use C3 Reduct® :

- It is derived from *Curcuma longa*
- It is authorized (novel food publication June 2022), in these difficult times for turmeric extracts
- It allows to provide directly the metabolite of curcuminoids, therefore :
  - without the need to increase the (poor) bioavailability of curcuminoids, often by NF processes or formulations,
  - and being sure of the quantity provided whatever the metabolism of the individual since the conversion is already effective.



Sabinsa has obtained Novel Food approval (published June 20, 2022) for its Curcumin C3 Reduct® extract - 95% tetrahydrocurcuminoids (THCs) from *Curcuma longa*, thus providing direct metabolites of curcuminoids extracted from *Curcuma longa*. Curcumin converts enzymatically into THC inside the intestine, and C3 Reduct® allows to bring directly the metabolite, whatever is the inter individual metabolism.

## BeTheanine® 40% L-Theanine, 100% Green Tea, Ethanol 25%, EGCG<0.05%

BeTheanine® is our extract 100% from selected green tea, without any carrier or compounds other than from the extraction (low Ethanol) of green tea.

- 40% L-Theanine (HPLC) from green tea,
- less than 0.05% of EGCG (so, no issue with regulation 1925/2006)
- low caffeine

BeTheanine® is the result of over a year and a half of research and testing.

Indeed, in order to comply with the extraction protocol recommended in Europe (low ethanol), a specific supply chain has been set up:

- precise selection of the collection area and teas,
- definition of the level of leaf maturity,
- suitable drying system to preserve the assay,
- Implementation of a selection protocol according to the active ingredient content
- carefully worked on and optimized process - nearly a year of pilot production with various origins of leaves - water and 25% ethanol

all this in order to maintain the optimum levels of L-Theanine in the green tea leaf, and to make it possible to obtain a rich extract in compliance with regulatory - and customer's - requirements.

BeTheanines® is a free flowing powder, showing a good solubility.

## Be sure to bring the real active from broccoli

Sulfodyne® is the unique extract to offer stabilized broccoli providing the active sulforaphane and not a precursor.



In nutraceuticals, it is important that sulforaphane is provided by a **titrated and stable extract** (which does not oxidize), without having to be transformed via an endogenous or added enzyme.

The bioavailability study of Sulfodyne® and its associated cost per dose demonstrates the much better bio-efficiency of this source of Sulforaphane versus extracts titrated in Glucosinolates, or even in Glucoraphanine + myrosinase.

**Sulforaphane (SFN), Glucoraphanin (GFN), or even glucosinolates should not be confused:**

- 10mg of Glucoraphanin correspond to max. 4.06mg of Sulforaphane (by chemical conversion).
- 10mg of ingested GFN leads to on average 0.45mg of SFN in the body
- 10mg of GFN with external myrosinase leads to 2.15mg of SFN in laboratory (optimal condition)
- 10mg of GFN with external myrosinase, ingested, provides 1.22mg of SFN in the body
- 10mg of ingested Sulforaphane (Sulfodyne®) provides 7.1mg of Sulforaphane in the body

Glucoraphanine		Sulforaphane	
10 mg GFN (437.5)	Chemically	4,06 mg (117.28)	Theoretical maximum ratio
10 mg GFN	In vivo	0,45 mg (0,1-1)	Depends on person
10 mg GFN + Myrosinase	In laboratory	2,15 mg	Not all is converted, Even in laboratory
10 mg GFN + Myrosinase	In vivo	1,22 mg (1,0-1,48)	Myrosinase helps
10mg Sulforaphane Sulfodyne®	In vivo	7,1 mg	The effective intake eg. 60mg GFN+myro or 160mg GFN



## Platinum Sponsor NBD 2023

As the Platinum Sponsor, Becarre Natural is waiting for you at Nutriform Business Days 2023, the 7th international congress of dietary supplements & innovation.

June 6th, 7th & 8th 2023  
Antibes Juan-les-Pins, France

Again 3 days of sharing and discussions, inspiring conferences and round tables dedicated to the dietary supplements market, scientific and marketing solutions to develop your business.

## Available and Sustainable Rhodiola CITES / Cultivation

**Work confidently with Nektium rhodiola!**

Nektium has always been at the forefront of sustainable, responsible sourcing for its *Rhodiola rosea* materials.

The recently announced cultivation program for Rhodiola® is the most significant response to *Rhodiola rosea* sustainability in the market today.



In February 2023, The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listed *Rhodiola*

spp. in their Appendix II. As a result, the trade of the botanical will be largely monitored and subject to export permits moving forward.

However, **Nektium has obtained substantial volumes** of raw material considered pre-CITES. This material will ensure a seamless transition until the processes which will be adopted by the respective authorities of each country are fully in place.

For the upcoming crop, Nektium is already processing the corresponding raw material permits, which will provide peace of mind for customers as shipping the Rhodiola® ingredient on an intracommunity level within the EU, will hence not require further permits.

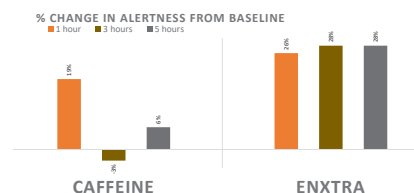


The steps Nektium has taken over the last 5+ years to ensure the sustainable harvest (and cultivation) of *Rhodiola rosea* are aiding immensely in the permitting process and, as a result, Nektium does not anticipate any challenges with complying with all requirements nor do they expect any disruption in the value chain for Rhodiola®.

## enXtra® again finalist for NI award 2023

After winning 3 awards in Geneva, Singapore and USA, enXtra® has been selected as a finalist in this year's NutraIngredients Europe Awards for the category Ingredient of the Year: 'Cognitive Function'

A new possible award for the unique enXtra®, aqueous extract of highly selected origins of *Alpinia galanga*. This extract from Omniaactive is associated with several clinical trials in humans at only 300mg / day. enXtra® is caffeine-free, GRAS, Vegan, non-dopant, water soluble,... and highly effective.





## CBD now from stock in Europe (GVB) Quality and reactivity

To supply the food supplement, cosmetic and pharmaceutical markets, Becarre Natural now delivers hemp extracts from stock in Europe, available even from 1KG packages.



**Vertical integration** is a key operational strategy at GVB Biopharma, and starts with the quality control of the seed from a selection of seeds, cultivation areas, and continues at each stage of processing and development. Using proprietary extraction processes, in collaboration with Biosylx group for even more secured sourcing network and long-term supply-chain, GVB Biopharma is recognized to offer stable and high quality extract (Isolate, distillate, crude oil, water soluble).

**The origin you can trust from the leading and trusted historical supplier.**

### European regulation

The use of Hemp (*Cannabis sativa*) in food supplements varies in Europe. All countries consider a limit on the THC content (0.2% generally). Although Cannabinoids are not authorized in FS (at of today), member states are nevertheless trying to adapt to the growing evolution of this market, and a number of applications for authorization are underway. Thus, the French authorities have authorized the registration of products including less than 50mg of CBD, even if this registration does not mean authorization.



## The complex situation of turmeric extracts

Several Member States in EU are re-working the Novel Food catalogue. Even if we believe that the situation sometimes goes beyond the initial need of Novel Food, it is clear that this creates questions for our market.

Indeed, it is often not easy to demonstrate that the current extract is in every way similar to the extract present on the market before May 1997, and – what is more – sold in significant quantities (the size of the food supplement market in 1997 had nothing to do with that of 2022).

After the first alerts that led to a reduction in the intake of *Curcuma longa* extract (to 210 mg, ie. 3mg / kg of body weight referring to JECFA – even though many toxicity studies have demonstrated safety at much higher doses, we see new twists and turns since and especially in June 2022, with Italy and its call for data, and ANSES which refers to 85% of the daily dose of 3mg/kg, for an adult of 60kg, ie. 153mg of Curcumin / day.

**Hopefully, C3 Reduct® is authorized !**

Turmeric, but also many other plants (article 4 on pelargonium, griffonia extract considered as selective - without clearly indicating this notion of selectivity, reconsideration of the Belgian Royal Decree, etc...) demonstrates the complexity of our market to position itself with respect to the authorities and scientific bodies.



## LactoSpore® and abdominal gas / distension

**A new study showing the efficacy of LactoSpore® to reduce gas and bloating symptoms.**

Gas and bloating symptoms are common signs of gastrointestinal disorders affecting a larger population. In this randomized, double-blind, placebo-controlled study, LactoSpore® - the room-temperature-stable probiotic developed and produced by Sabinsa, with already numerous published studies - was significantly effective in alleviating the symptoms of gas and bloating in patients in the absence of other functional gastrointestinal disorders, so an effective and safe approach to reduce the symptoms of gastroin-

testinal symptoms in adults with abdominal gas and distension : LactoSpore® *Bacillus coagulans* MTCC 5856 at 2 billion CFU per day (ie. 130mg of LactoSpore®) was significantly effective in alleviating the symptoms of gas and bloating in patients in the absence of other functional gastrointestinal disorders

The study and its brief are available on our website.



## Oral C<sup>3</sup> Reduct® treats gingivitis & canker sore with chewable tablets

In a recent prospective, open label, two arms, clinical trial showed that oral THC<sub>s</sub> decrease the symptoms of canker sore and gingivitis.



C3 Reduct® treatment led to excellent abatement of pain, numbness, ulcer formation, dryness with no staining or allergic symptoms. [Majeed et al.]



## Nektium : Lemon balm, and *Harpagophytum procumbens* confirmed by 8pCHG Index

**3 new ranges of products enter the catalogue of extracts processed by Nektium.**

- Organic Harpagophytum, 2% harpagoside HPLC, Inflammation management for joints: source of iridoid glycosides and especially harpagoside - tested by HPLC - to relieve pain and inflammation

Guarantee 100% *H. procumbens* sp. by DNA and ID testing + application of the 8pCHG Index as specie identification ( $p \leq 12 = H. procumbens$  species)

Sustainable harvesting practices  
Supports local communities

- Organic Elderberry 6% & 10% anthocyanins
- Lemon Balm : 6% & 10% rosmarinic acid, natural remedy to balance mood and cognitive functioning, thanks to its main actives which are phenolic acids



## Diabetes : Amla extract Saberry® better than Metformin

**The efficacy of *Emblica officinalis* extract containing 10%  $\beta$ -Glucogallin was compared against Metformin in newly diagnosed subjects with diabetic dyslipidemia.**

Saberry® - the amla extract by Sabinsa – has been compared at 1g and 2g to 500mg Metformin (daily dose) for 90 days. Saberry® contains  $\beta$ -Glucogallin from *Emblica officinalis*, processed by cold press extraction. The study shows that it significantly decreased fasting blood sugar and postprandial blood glucose (FBS and PPBS), hemoglobin A1c (HbA1c) and lipid levels in all three treatment groups. Type 2 diabetes mellitus (T2DM) is a metabolic disease characterized by hyperglycemia, caused mainly by insulin resistance or inadequate insulin production.

The present data provide strong evidence that Saberry (EOE standardized for 10% BGG) at 1g and 2g/day is safe, well tolerated and even showed superior antidiabetic and anti-dyslipidemia activities compared to the pharmaceutical drug, Metformin.

The study and its brief are available on our website.



# KEY PRODUCTS

## Sulfodyne® allows you to bring the bio-available sulforaphane, the effective active from broccoli rather than its precursor



Sulfodyne® is your guarantee to get the real sulforaphane from broccoli, and nothing less. The active with thousands of studies available on pubmed.

Sulforaphane is an organosulfur compound found in crucifers, such as **broccoli**, Brussels sprouts or cauliflower. It is formed when its precursor, glucoraphanin, is hydrolyzed by an enzyme called myrosinase.

Its benefits are based on 3 main mechanisms of action:

- **Antioxidant** activity
- **Anti-inflammatory** activity
- **Cellular protection** (sulforaphane is a so-called epigenetic molecule), including **elimination of xenobiotics** from the body and **chemopreventive** activity in the initiation of carcinogenes. Consuming broccoli does not necessarily provide the effective dose of sulforaphane for health benefits. Indeed, the amount of sulforaphane ingested depends on several criteria such as the quality of the broccoli and its storage conditions, the type of cooking, or the capacity of the intestinal flora - which is specific to each individual - to hydrolyze glucoraphanin. This is why adding myrosinase does not allow to convert with the same efficacy than in laboratory trials.

**Sulfodyne® provides free, stabilized, standardized and active sulforaphane, and not its precursor glucoraphanin, even with myrosinase**

Sulfodyne® is the only active and natural ingredient from broccoli seed extract on the international nutraceuticals market **that offers sulforaphane in its active form: 7 times more available** than in a broccoli extract containing glucoraphanin, and so ... much less expensive to use. Thanks to a **patented extraction process** and its **unique stabilization also patented**, Sulfodyne® provides **sulforaphane in its active and free form, directly assimilated** by the body and without the need for an enzymatic transformation which is sometimes uncertain.

This research begins with the **selection of the raw material** (European origin) and the harvest stage, its **process** applied on an industrial scale, its stabilization by encapsulation - otherwise SFN would complex very easily and very quickly with unsaturated fatty acids, sugars, proteins, ... depending on the matrix and the conditions (temperature which makes it volatile, humidity which transforms it into a dimer or trimer, etc.)

## BeTheanine®, and your extract with L-Theanine matches EU regulation



**Mental focus and better sleep with natural Theanine from green tea.**

**BeTheanine® it's an extract, not a substance**

- **100% Green Tea**
- **Extracted using ethanol 25%**
- **40% Natural L-Theanine**
- **low EGCG (max. 0.05%)**

BeTheanine® is an extract **100% from selected green tea, without any carrier or compounds** other than from the extraction of green tea, **using low ethanol**.

In order to comply with the extraction protocol recommended in Europe (low ethanol), a **specific supply chain** has been set up:

- **precise selection** of the collection area and teas,
- **definition of the level of leaf maturity**
- **suitable drying** system to preserve the assay,
- Implementation of a **selection protocol** according to the active ingredient content
- etc...

all this in order to maintain the optimum levels of L-Theanine in the green tea leaf, and to make it possible to obtain a rich extract without the risk of external intake, and in compliance with regulatory - and customer's - requirements.

The **extraction ratio** allows you to provides 140mg of L-Theanine with 11g of plant equivalent. The Xanthine content (caffeine and theophylline) is controlled as well as EGCG (max. 0.05%) : out of regulatory constraints or warnings linked to EGCG, thanks to the low EGCG. The **process has been carefully worked on and optimized** - nearly a year of testing - so that the extraction can be carried out using only **water and 25% ethanol**.

## Zynamite®, formulated to deliver mental and physical stimulation



**Innovative, multi award-winning and studied: Energy, Mental and Sports Performance, Nootropic**

Zynamite® is the **patented extract of Nektium** from the mango leaf *Mangifera indica* (in the BelFrlt list), standardized in mangiferin, launched at Vitafoods 2018. It obtained the first Nutraingredients 2018 and 2019 prize, and twice ESSNA awards (Best free from product and Game Changer in sport nutrition), e-gaming 2020. Zynamite® is doping-free.

Zynamite® **provides sustained mental and physical energy and concentration without negative side effects** (anxiety, nervousness, heartbeat, blood pressure, crash caffeine), even providing better results than caffeine.

Zynamite has been studied in-vivo & in clinical studies : 8 internal studies including 6 clinical studies and toxicology study.

**Different grades are available :**

- **Zynamite® [ZYN60]** : the original extract, providing 60% Mangiferin
- **Zynamite® PX [ZYNPX]** : Zynamite® and quercetin, for sport
- **Zynamite® [ZYN15]** : the aqueous extract, soluble, with even improved bio-availability

Zynamite® ZYN15 is our new aqueous extract of mango leaves, with even improved pharmacokinetics, and fully soluble in water, so that your concepts have no limits.

**Natural and clean label ingredient, side effect free, this patented ingredient supports faster reaction times, speeds up mental activation and helps to increase performance and recovery.**



## Rhodiolife®, not only the best adaptogen : clinically studied branded ingredient for stress & cognitive health



The benchmark brand: Stress, memory, attention, energy, immunity,... adaptogen

Rhodiolife® generates sustained energy and promotes wellness including psychological, emotional and physical conditioning.

Rhodiolife® is a **powerful adaptogen** that produces a non-specific state of adaptation and resistance in the body to physical, emotional and environmental stress - even a single dose.

**Nektium historically extracted from very high quality Rhodiola rosea only**, the result of many years of collaboration in order to guarantee sustainability and maximum traceability. As one of the world's leading producers, Nektium is sourcing the roots directly from the **Altai mountains - collect and cultivation** - and regularly inspect the crops. This allowed them to have access to the roots, even during shortage (or war), working also against speculation.

- **High quality and traceability : DNA and ID testing**
- **Only the three real Rosavins** : no rosidin or even sometimes tyrosol involved in the HPLC analysis
- **Dried at low temperature** to retain the bioactivity

- Processed in **GMP approved unit, "doping free" by BSCG**
- Unique "fingerprint" as found in the root of the plant

Rhodiolife® corresponds to the extract used in numerous studies, external or internal:

- **Mental energy** - similar for caffeine, Guarana and Ginkgo biloba
- **Memory** : increases Long-Term Potentiation (LTP), spatial and temporal memory and helps athletes to automate coordination skills
- **Mood** : reduce Hamilton Anxiety Rating Scale (HARS). Other studies suggest a possible antidepressant action of *Rhodiola rosea* extract.
- **Neuroprotection** : The effect of Rhodiolife® on genes related to neurodegeneration and neuroprotection was tested
- **Sport, ATP, HSP70** : Rhodiolife® **protects muscle cells** against oxidative stress, improves **physical work capacity**
- **Anti-inflammatory** : it decreases inflammation and reduces COX-2. CRP (C-reactive protein), returned to normal levels much faster.
- **Efficacy and safety**, genotoxicity performed on Rhodiolife itself
- **Immune defenses** : Rhodiolife® protects against virus replication.

*Nektium anticipated very well before the introduction in the CITES list of Rhodiola rosea roots, in addition to offer the pioneering cultivation program initiated years ago (the plant grows slowly) Nektium takes steps to ensure the long-term sustainability of its Rhodiola rosea extract Rhodiolife®*

## C3 Reduct® Novel-Food approved Curcuma



**"First to deliver curcumin as a metabolite"**

The power of 'curcumin reductive metabolites' - **Tetrahydrocurcuminoid: the directly active form of turmeric, novel-food approved and white**

C3 Reduct® allows to use the **active form of natural turmeric curcuminoids**, and **move away from the myth of bio-availability**. Colorless and highly stable, suitable for gummies, gels, bars, tablets, premixes etc...

Curcuminoids exert their effects through gastrointestinal as well as systemic routes. They are metabolized to Tetrahydrocurcuminoids (THCs), depending also on their bio-availability. Many 'improved' curcuma extracts include new technologies, new process or formulations with chemical, said to "improve the bio availability", in the serum and sometimes to the detriment of the real bio-active forms. Besides, there's the challenge to be considered as novel foods since they have been developed after may 1997.

**Innovative, Allowed, Efficient... Curcuma longa**

**C3® Reduct overcomes the bioavailability limitation** of the parent curcuminoids in the most functional way since directly providing the active metabolite. Research has shown that C3® Reduct is a **remarkable anti-oxidant, superior even to curcumin** itself in this respect. The beneficial impact of THCs on colonic health also has received strong scientific reports. THCs are also an **excellent anti-inflammatory** agent.

C3® Reduct, which so contains directly the curcuminoids metabolites - THCs - **has obtained Novel Food approval from the EFSA (june 2022)**, daily dose up to 140mg. This may well be the first time a metabolite of a nutrient has been approved as a Novel Food.

It's a **Creamy-white crystalline powder** (cf. easier cleaning of equipment), with a total content of 95% THCs, the hydrogenated derivatives of yellow curcuminoids (mainly curcumin, demethoxycurcumin, and bisdemethoxycurcumin) from the rhizomes of turmeric.

**Besides the ones with C3® Complex, regular studies** are performed with tetrahydrocurcuminoids ("Efficacy for the Treatment of Canker Sore and Gingivitis", "Curcumin activates AMPK and suppresses gluconeogenic gene expression").

In cosmetic, it brings a strong skin whitening, is found to have anti-inflammatory, antioxidant and tyrosinase inhibitory effects. Also against mycosis on skin, hair and nails (antifungal) - see our TetraPure®.

The only extract from Curcuma longa officially novel food approved

## Hemp extracts - CBD The quality you can trust



**Isolate, distillate, crude oil - CBD, CBC, THC free Water soluble powder**

Main non-psychoactive cannabinoid extracted from hemp, the cannabidiol or CBD molecule (identified in 1963) is derived from Cannabis sativa which contains more than 100 chemical compounds (mainly Cannabidiol [CBD], Cannabinol [CBN], Cannabichromene [CBC], Cannabigerol [CBG]). Also, CBD is rapidly becoming the focus of many uses in the pharmaceutical, cosmetic and of course dietary supplement fields.

Studies show that it seems to modulate the action of endocannabinoids naturally produced by the brain, and intervenes on the regulation of the concentration of anandamide: the quantity of anandamide increases, which supports the innate endocannabinoid response of the body. Its action at the level of the endocannabinoid system (which regulates many biological processes) leads to various properties: digestion, metabolism, memory, regulation of stress and emotions ... and thus occupies a key role for the proper functioning of the human body.

GVB Biopharma is a leading and trusted historical supplier of cannabinoid extracts, fully integrated to offer high quality products, continuously controlled, optimal traceability and price competitive. Their extracts (CBD-I / CBD-C) are renowned for their high quality and stability : their hemp cannabinoid products are most probably behind the product you know.



## enXtra®, *Alpinia galanga* Energy, alertness and focus



Clinically proven to improve energy, alertness and focus up to 5 hours with and without caffeine  
**Non-doping**



enXtra® is extracted from the rhizomes of *Alpinia galanga* – the food spice - selected and cultivated on a hilly terrain away from industrial pollution, without pesticides, authenticated by DNA, natural drying on high altitude, stony land near farm, for responsible sourcing. enXtra® is obtained by gentle, solvent-free extraction to have an optimal concentration of bioactives.

enXtra® is associated with **several clinical trials** in humans:

- A DBPC study showed that enXtra® can partially or completely **replace caffeine by providing a boost of energy** (including mental), and **increase the benefits of caffeine** while reducing its side effects (suppression of the caffeine crash).

- In another DBPC clinical trial, enXtra® **improved alertness** and **mental acuity for up to 5 hours**, without increasing heart rate or blood pressure.

- **Increase in vigilance** by more than 100% from 1 hour - 5 hours
- **Lower error rate** than placebo and even caffeine
- A **molecular study** has also shown the **regulation of dopamine** concentration and inhibition of the AchE protein, ie. nootropic agent.

enXtra® does not exhibit any habit-forming tendencies increases calmness, reduces nervousness and anxiety and increases alertness, which makes it especially ideal for sportspersons and athletes

**Recommended dose** (clinical studies): 300 mg / day

Ideal for students, e-gaming, athletes, etc ... anyone who needs a boost of energy and to stay focused.

**Completely soluble** in water with a mild taste and a beautiful tea color. enXtra® won the **nutraingredients award** in Geneva and Singapore, and in USA as "Ingredient of the year – Cognitive Function" in 2021.

## The original, and most studied Curcuma C3® Complex



**Antioxidant, Preservative, Antimicrobial, Immune system, Anti-inflammatory, Metabolic Syndrome**

**FREE Curcuminoids** (3 fractions) - and not the inactive salts. Use with possibly 5mg BioPerine® (safe, not novel-food and long history of use).

Grades : Standard, Direct Compression, 80 mesh (softgels) C3® Complex, it's the curcuma 95%

- **Historically used** (billions of doses ww), since 1995 in EU.

- Not Novel food
- Its own safety data,
- More than **150 publications**, ca. **80 Clinical studies**
- **4 awards**

- 100% Natural - no synthetic curcumin (<sup>14</sup>C verified)

Sabinsa is processing in their **dedicated plant** (2 continuous batch extractors with food solvents), processing roots from their contracted fields. They control the 3 curcuminoids to prevent adulteration with synthetic curcuminoids (a 95% extract includes curcuminoid (70-75%), demethoxy (15-25%) and bis-demethoxy (2.5-6.5%).

THE MOST CLINICALLY STUDIED CURCUMIN BRAND  
THE ORIGINAL 95% PATENTED EXTRACT

Curcumin C3® Complex contains the three **free curcuminoids** only, and no inactive metabolites (glucuronide or sulphates for instance), because **all form of curcuminoids are not equal** : some forms can be bioavailable, but unfortunately inactive. It's probably the **most studied curcuma extract** (hundreds studies incl. colorectal cancer prevention), and usually referred as the highest quality (and the lowest oxalic content, causing kidney stones, heavy metals).



4  
AWARDS



150  
PUBLICATIONS



79  
CLINICAL  
STUDIES



100%  
NATURAL  
<sup>14</sup>C VERIFIED



## LactoSpore®, stable probiotic at room temperature, with numerous clinical studies: IBS, diarrhea, depression, gas and bloating...



**Microbiote, Irritable bowel syndrome, Diarrhea, major depression**

LactoSpore® is a probiotic containing **6 to 100 billion spores** of *Lactobacillus sporogenes* (also called coagulans), stable at room temperature and indicated in the EFSA list.

Like most probiotics, it has multiple activities because it interacts with the whole body, including digestion, cholesterol management and the health of the intestinal system. LactoSpore® brings *Bacillus* in **sporulated form, therefore asleep**.

After ingestion (medium allowing it to wake up), **all the spores are revived and will produce L (+) Lactic acid**, for a positive action on other micro-organisms.

Almost 100% of the spores are revived, one of the reasons for the choice of *Bacillus coagulans*, and the method of drying. The spores will not multiply during their action, and will disappear naturally after working, hence the need for regular intake.

Sabinsa offers an EC 'grade of LactoSpore® 15 Billion (EC' for Enteric Coated), a protected form for even more targeted action. It is used in food supplements, in dairy products (studies being finalized), bread products, or in vaginal tablets or ova.

Studies in 2020/2021 even demonstrated the **stability of LactoSpore®** in products such as **tea, ice cream, alcohol, bars, candies and gums**. Widely used for years, LactoSpore® has been the subject of numerous studies, such as:

- Management of **major depression with irritable bowel syndrome (IBS)**
- **Anti-diarrheal** activity and its effects on **gastrointestinal motility**
- Reduce gastrointestinal symptoms - **gas bloating and distension**
- Supplementation in management of **IBS predominantly in diarrhea**
- Assessment of the **cholesterol-lowering** activity of the strain
- Balance of **vaginal flora**

**Recommended dose:** 100 to 500 million spores per dose, 2 to 3 times per day. (100 million spores = 7 mg of LactoSpore® 15Bil)

## Organic Anthocyanins / Elderberry The winter season herbal remedy



**Extract of *Sambucus nigra* (fresh fruit) from European origin.**

**Bio-active ingredients :** anthocyanins by HPLC (from 6%)

Extracts standardized in anthocyanins by HPLC have shown **antimicrobial activity against** some **Gram-positive** and **Gram-negative** bacteria in liquid cultures, plus **inhibitory activity** on the propagation of the **influenza virus**. A DBPC study showed a significant improvement of symptoms of those taking a *Sambucus nigra* standardized extract. In another one with patients suffering from influenza-like symptoms, those taking Elderberry reported symptomatic relieve 4 days earlier than those on placebo. The German Commission E reports that constituents of *Sambucus* provide effective relief for **colds, fever, and catarrh**.

**Also reported :** Used for its antioxidant activity, to lower cholesterol, improve vision, boost the immune system, improve heart health and for coughs, colds, flu, bacterial and viral infections and tonsillitis. Elderberry juice was used to treat a flu epidemic in Panama in 1995.

## Cirpusins®

### The innovative winning properties in the management of weight

#### Winning properties in the management of weight and health

Cirpusins® is the **new objectivized extract** developed by Sabinsa of *Cyperus rotundus* standardized to contain min. 6% stilbenes in the form of **piceatannol**, a resveratrol-like polyphenols with a considerable biological application, scirpusin A (dimer of resveratrol and piceatannol) and scirpusin B (dimer of piceatannol). Cirpusins® has been the subject of several studies proving its unique properties, well beyond many products on the market (simple burner or even draining). This innovative extract intervenes at several basic levels:

- **Adipogenesis** : Cirpusins® showed a **dose dependent reduction in adipogenesis**
- **Inhibition of weight gain and visceral fat** : The weight gain induced by HFD was significantly reduced by Cirpusins® (61.7%), with a significant reduction (53%) in visceral fat.
- **Normalizing effect on lipid profile, liver enzymes profile and blood sugar levels** : further study showed a significant decrease in all lipid parameters such as total cholesterol, low-density cholesterol and total triglycerides, and an improvement without reported side effects of the liver enzymes.
- **Leptin** : a study focused on the normalization of the endocrine functions, including leptin and corticosteroid levels.

**Cirpusins® helps to tackle visceral fat - the hardest to lose - and promotes weight loss, maintains healthy lipid and blood glucose levels, and normalized the liver enzymes : the winning properties in the management of weight and health.**

The last human in-vivo study (DBVP, 90 days, 500mg of Cirpusins®) confirms those great results, with a **weight loss of 10%** at the end of the trial, a **decrease in BMI** (8.9%), in **waist circumference** (8.6%), in TC/TG/ LDL and VLDL when HDL increased. Serum Biochemistry, vital measurements were normal, and CRE was safe in human volunteers.

**Recommended dosage** : 1 x 500mg to 2 x 500mg (first in-vivo study at 2x500).

## Ready-to-use multi enzymes complex - DigeZyme®

#### The reference with numerous clinical studies

DigeZyme® is a formulation developed by Sabinsa comprising 5 enzymatic activities, from strains of *aspergillus*, *bacillus* and *trichoderma*: **alpha amylase, lactase, protease, lipase and cellulase**. Its formulation designates it for any use induced by the digestion, to the **optimization of the catch of the nutrients** or the **problems related to the digestion** (regurgitation, sleep, skin, etc.).

The recommended dose is usually 50 to 100mg per capsule, and 1 to 2 capsules before meals. For athletes, the dose is 100mg to 200mg per dose mixed in the protein complex, for example. DigeZyme® is often combined with BioPerine® or even capsaicin for athletes. The highest dose currently used on the market is 3x500mg per day (a product for intolerant people in this case). Its use is not a problem in production or mixing units (see MSDS), especially since enzymes need time, a certain pH, and water to function. EFSA has indicated a list of microorganisms and then its positive opinion for lactase activity, which allows use of DigeZyme® while referring to this opinion for the digestive aid part.

Many studies have been published with this complex that has proven itself. **The latest study demonstrated its potential for faster recovery of delayed muscle pain (DOMS).**

Sabinsa also developed DigeZyme® EC, with an higher lactase activity versus no beta amylase (cellulase)

- **DigeZyme®** : 24 000 DU (alpha amylase) / 6 000 PC (neutral protease) / 4 000 ALU (lactase) / 200 FIP (lipase) / 1 100 CU (cellulase)
- **DigeZyme® EC**: 24 000 DU (alpha amylase) / 6 000 PC (neutral protease) / 30 000 ALU (lactase) / 200 FIP (lipase)

## Echinacea angustifolia, EU origin

### echinacosides + dodecatetraenoic acid



#### Immune system

**Bio-active ingredients**: Echinacosides ≥ 4% (HPLC), Dodecatetraenoic acid isobutylamides (≥ 0.1 %)

Traditionally used to support the **immune system** and **strengthen the body's resistance** against bacterial and viral diseases (historically by Native Americans to treat infections of the upper respiratory tract and urinary system). Publications have reported Echinacea stimulates the specific immune response, strengthens the immune system and reduces pain related inflammatory processes.

*E. angustifolia* has often been overlooked in favor of *E. purpurea*, in spite over 100 published reports assessed by the EMA for *E. angustifolia* - non-clinical and clinical safety and efficacy.

This high quality extract produced meets many criteria:

- **Soluble** in water
- **100%** made in **EU** ingredient and origin
- Standardized in **Echinacosides** and **Dodecatetraenoic isob. acid**
- Accredited European raw material supplier
- Tested by **"ID testing"** and ADN
- **GMP** certified factory production in the Canary Islands

## Nigellin® : immunomodulatory and antimicrobial activity of Nigella



#### A time honored remedy

Extracted by supercritical fluid from the seed of cumin (*Nigella sativa*), the black cumin is traditionally used in cases of **inflammation, immune deficiency** (and anti-cancer action) of the liver, or still **nasal congestion or headache** / throat / tooth. Sabinsa studied various activities including **antimicrobial and antifungal** activity (synergy with various antibiotics) as well as anti-parasitism, activity on the **respiratory system** (natural anti-elastase), and more recently anti-inflammatory and analgesic.

Black cumin is also traditionally used in patients with diabetes. Rachid H and col. have shown that cumin seed has an effect on insulin secretion. Another activity reported is the **help with digestion**: Carminative activities facilitate digestion and relieve gas problems in the stomach and intestines. It helps peristalsis and therefore elimination.

A study has been published on end 2018 on the anti-inflammatory and immunomodulating properties, where Nigellin® is among the most valued in anti-asthma herbal products. Nigellin had the highest effects in suppressing the release of cytokines IL-2, IL-6 and PGE2 in T-lymphocytes and also in monocytes hindering the expression on IL-2 and PGE2. These are among the most active cytokines involved in asthmatic conditions. The investigators noted a positive relationship between the TQ level in the preparations and its inhibitory potency on IL-6 and PGE2... besides existing and proved properties : glycemic control, healthy blood pressure, lipid profile, male fertility.

**Nigellin® is available as :**

- **Oil** (Amber),
- **Black powder** (Onyx, with nigella fibers) and **white powder** (Pearl)



## Boswellin® SUPER 30% AKBBA

### The famous and historical name for Boswellia with proven efficacy



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#### Powerfull and natural anti-inflammatory

Sabinsa is the historical manufacturer, starting with Boswellin® early 92'. They have been the **first to promote** the extract, and the **first to isolate the potent bioactive AKBBA**. Various books have been edited, and numbers of studies have been performed. Choosing Boswellin® means choosing safety, proven efficacy, history, and a well-known name - a guarantee of quality and know-how.

Several grades are available. The grades are not titrated in "total boswellic acids" - which does not mean anything in itself since all the acids would be included - but in beta-boswellic and more

specifically in AKBBA.

In our range of different grades, Boswellin® SUPER:

- Provides a **complete profile**, especially in other beta boswellic acids besides AKBBA
- Has a **sales history** (only Boswellin® existed before May 97) and its own books
- Has **numerous own internal studies** (for example, "Effect of Boswellin® SUPER on knee pain..." or recently in Nilin®).
- Has a **well-known name** - Boswellin® - can be used with TMLA
- Is the only Boswellia extract to have **several own safety studies** (last end of 2020: "Mutagenic, Genotoxic and Sub Chronic Oral Safety Analysis of Boswellia Serrata Extract (Boswellin® Super)")

Leukotrienes are fatty acids which are formed from arachidonic acid by an enzyme called 5-lipoxygenase (5-LO). In research, the presence of a specific AKBA-binding site on 5-lipoxygenase was determined. In addition, other studies reported the inhibition of acetylcholinesterase (AChE) and of human leukocyte elastase (HLE). In cosmetics, the inhibition of those two pro-inflammatory enzymes supports skin texture and integrity, and a specific study against psoriasis has been recently published.

## Enhance the bio-efficacy of SOD with the most studied - GliSODin®



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#### First orally effective SOD supported by 25 studies (oral Skin protection, Immunity, Oxidative stress)

The great properties of SOD are well-known, but the enzymatic activity of oral free SOD in the body is mainly to totally destroyed within few minutes, despite the source, and can so not promote the production of the SOD cascade by the cells (incl. endogenous SOD, glutathione peroxidase and catalase). For this reason, **usual studies based on free SOD cannot prove the efficacy, or at an incredibly high use (in-vivo).**

Thanks to its gliadin matrix, GliSODin® is **orally effective unlike most existing SOD supplements**. The gliadin is not an enteric protection - what should not be enough - but a real vehicle for the SOD, due to its **specific bio-adhesive properties** with the epithelial cells in the small intestine.

GliSODin® - specifically - got the claims from Sante Canada : "Clinically proven to reduce the damage due to free radical activity. Clinically proven to help protect against damage caused by oxidative stress. Helps raise antioxidant defense levels and may protect DNA from oxidative damage."

GliSODin® is supported by **close to 30 - mostly published - studies**, with multiple health benefits :

- **Comparison of the bio active SOD** after oral intake of GliSODin versus SOD alone
- **Protection of cellular DNA** subjected to intense oxidative stress induced by pure oxygen in a hyperbaric chamber
- **Increase of the MED** (resistance to UV induced erythema or redness), and redness resolved more quickly, Skin's protection against UV rays
- **Help prepare the skin for sun exposure** and improved tanning speed and quality
- **Regulation of inflammation** and decreases oxidative stress
- **Significant decline in lactic acid** levels (patients treated with GliSODin® for 4 weeks before strenuous exercise)

Those are only a few of the studies available and additional studies are in development. Last studies have shown the efficacy on immunity on children.

## SELENIUM SELECT®

A BIOAVAILABLE AND SAFE FORM OF SELENIUM SUPPLEMENTATION

### Selenium SELECT®

#### Bioavailable safe form of Selenium



#### L-Selenomethionine, Immunity, Cognitive decline, Hair, Antioxidant

**Bio-active ingredients:** 5000ppm to 39% of elemental Se  
**Dose :** 50 - 200 mcg a day of elemental selenium

Selenium as **L-Selenomethionine** is completely bio-available, **created by Sabinsa:** the Selenium in the protein structure protects DNA from oxidation more efficiently than the original sulfur in methionine. The carbon-selenium bond is more easily broken during photochemical reactions than the carbon-sulfur bond.

- Complexed with the **amino acid methionine**
- **Preferred form** of selenium due to organic nature
- More and **readily absorbed** than inorganic forms
- Sodium content less than 0.1%.

Selenium is a vital trace element nutrient with multiple roles in the growth and functioning of living cells in higher animals and humans. Selenium has various properties:

- **Immune** (selenoproteins). A study published in 2021 with Sabinsa's selenium shows that selenium supplementation may be helpful in reducing the effects of the virus COVID 19 (SARS-CoV-2)
- **Anti oxidant**, as an indispensable element of many enzymes such as glutathione peroxidase, and Selenomethionine form is more effective
- **Anti- Aging** (greater protection of the skin against UV due to the effect of light on the Selenium / Meth link)
- For its **action against cancer** (claims FDA work with the Sabinsa's).

## Gugulipid®, well-known but always so efficient Guggul



#### Cholesterol, Thyroid stimulation Alternative to red yeast extract

Gugulipid® is an historical product launched years ago by Sabinsa, but always so efficient that it's now more and more suggested as the alternative to red yeast extract and its limitations. Clinical studies have shown **improvement in the lipid profile** in the blood, lipoprotein levels and markers of inflammation.

Sabinsa also **highlighted the mechanism of action of guggulsteronnes** to improve the **elimination of cholesterol** and the inhibition of its biosynthesis. It also improves thyroid functions (increase of peroxidase and proteolytic activities).

## Bromelain 5 000

### Deodorized and carrier-free



#### Inflammation, Allergy, Digestive aid

**Bio-activity:** 1 200 to 5 000 GDU / g ≈ 2,4 to 10 FIP / mg

**Units:** 1 FIP/mg ≈ 500 GDU/g

**Dose:** 200 mg to 2g

Bromelain is a cysteine protease isolated from pineapple stem, Ananas comosus. Bromelain is a mixture of different thiol endopeptidases and other components like phosphatase, glucosidase, peroxidase, cellulase, escharase, and several protease inhibitors. In vitro and in vivo studies demonstrate that bromelain exhibits various fibrinolytic, antiedematous, antithrombotic, and anti-inflammatory activities. When given to treat pain, it must be administered away from food, because it will act as a protein digestive enzyme if consumed with food.

## Shagandha®

### Ashwagandha from monograph



Adaptogen, Rejuvenative tonic, also Antispasmodic and Anti inflammatory, Psychological endurance (NSIR), Hair

**Bio-active ingredients:** Withanolides [HPLC]

**Dose :** 300 mg per day

Ashwagandha, *Withania somnifera*, is one of the best-known Indian botanicals that has been used in Ayurvedic preparations: ashwagandha is classified as a rasayana, meaning "rejuvenative tonic". Also referred to 'Indian ginseng' (but nothing to see with).

Ashwagandha have multiple therapeutic properties: **tonic action, reduce stress and relieve anxiety**, neurons protection, **increase GABA A** receptors activity, delay the process of cellular aging, reduce blood sugar levels, improve libido and decrease the activity of acetylcholinesterase and slow down development of tumor cells. Strengthen the cerebral cortex, the adrenals, the hypothalamus, the heart and the liver.

With **Shagandha®**, Sabinsa assure the authenticity of its ashwagandha extract by **complying with the US Pharmacopoeia** - National Formulary monograph (USP-NF), verified by Alkemist Labs.

## Stilbens and C-glycoside from pterocarpus: pTerosol® / Silbinol®



Cholesterol, blood sugar

Cardiovascular and peroxidation

**pTerosol®** - "the miracle cure for diabetes" in Ayurveda literature - is a **new alternative for blood sugar and cholesterol** management, besides other properties, from *Pterocarpus marsupium*. pTerosol® has put in evidence the efficacy of **C-glycoside**. C-glycosidic linkages are found to be **SGLT2 inhibitors** (SGLT2 catalyses the active transport of glucose into the blood stream and plays a key role in re-absorption of glucose in the kidney).

- **Serum glucose level** : significant reduction, dose-dependant. After 12 weeks, 69% patients showed significant control of blood glucose (fasting and postprandial level)
- **Plasma Insulin** : significant increase, dose-dependant. 36 week study found that *P. marsupium* extract gives similar results to tolbutamide (a standard antidiabetic agent), without the known side effects
- **Total cholesterol**, TG, and LDL level : significantly decreased
- **HDL level** : significantly increased
- **Glycosylated hemoglobin (HbA1c)** : significantly reduced, close to the normal value
- Significant reduction of TNF- and IL-6

**Silbinol®** is the extract of *Pterocarpus marsupium* standardized in Pterostilben (5%, 30% or 90%) and catechins. Stilbens are known for their antioxidant activity (well above resveratrol against peroxidation) and cardiovascular (such as resveratrol, viniferin, etc ...). The Pterostilbens present in addition to many other properties such as analgesic (Remsberg et al), anti-diabetic (Satheesh and Pari), antimicrobial (5 to 10 times the resveratrol), UV protection, hyperlipidémie (by induction PPARα, anti-inflammatory (anti-COX2), etc ....

## Resveratrol Natural, emodin-free



Inflammation, Allergy, Digestive aid

**Bio-activity:** 50% to 98% resveratrol [HPLC]  
max 1ppm Emodin

Resveratrol is a natural compound found in red grape skin, Japanese knotweed (*polygonum cuspidatum*), as well as in peanuts, blueberries and some other berries. It is a **powerful antioxidant** produced by some plants to protect them against environmental stresses. This polyphenolic phytoalexin has a number of scientifically proven health-promoting properties associated with a positive effect on the cardiovascular system, lowering the concentration of low-density lipoprotein, and the ability to inhibit the cyclooxygenases activity. Additionally, it has **antiproliferative, anti-angiogenic, anti-inflammatory, antioxidant, and antimicrobial** properties.

According to regulation 2021/468 (march 2021), it brings less than 1ppm emodin.

## Positive mood, naturally MoodReal® matches the science Organic available



For relaxation, positive mood and emotional balance



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Because of Satiereal®, Inoreal - and now Natac - is a very important player in the saffron market - undoubtedly the leading European user for food supplements and Saffron extracts. Based on this experience, **Moodreal®** is the extract that provides **safranal (2%)** as well as crocin and picrocrocin.

**Moodreal® matches exactly the extract described in studies** to which all extractors refer, including those describing activity against stress and depression, by Akhondzadeh et al. (Comparison of *Crocus sativus* L. and imipramine in the treatment of mild to moderate depression, and *Crocus sativus* L. versus fluoxetine (i.e. Prozac), etc...). For example, published clinical studies confirm that:



- The **effectiveness is similar to fluoxetine** (the Prozac molecule) or imipramine (a tricyclic antidepressant), without any side effects.
- **Iranian Saffron Sargol** significantly **relieves anxiety and depressive symptoms**, at a dose of 30 mg of extract per day and within one week.
- **About 10 studies** have been published, especially from Akhondzadeh and al. and Noorbala and al.

And in addition to those, we may confirm the **efficacy specifically of Moodreal® as a SSRI** (Selective Serotonin Reuptake Inhibitor) :

- **Internal study:** Moodreal® showed an inhibition potency of Serotonin re-uptake **equivalent to 63% of Imipramine**, the standard SSRI used as an antidepressive medication. An Inhibition over 50% of Serotonin reuptake in this test that demonstrates a significant effects of SSRI.

Moodreal® is patented and corresponds to the natural extract mentioned in the scientific data. It is extracted from the Sargol vintage saffron, with a process that preserves its active ingredients and its natural composition, and without heat treatment to strengthen the safranal content.

## Zinc Monomethionine The most potent Zinc

Common cold and other airway infections.

Antioxidant and protection against oxidative stress.

Skin, nails, hair and bones health



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**Bio-active ingredients:** 20 to 22% of elemental Zn

**Dose :** 5 mg up to 3 times a day of elemental Zn

Zinc is supplemented in humans as sulfate, acetate, gluconate, picolinate, histidine, methionine... salts. Zinc is **needed for DNA synthesis, immune function, metabolism** and growth. It may reduce inflammation and your risk of some age-related diseases. In the study "Comparative In Vitro Oxygen Radical Scavenging Ability of Zinc", **zinc methionine was found to be the most potent** free radical scavenger compared to all other zinc salts tested. Besides to have higher bioavailability, it also resist binding with dietary fiber and phytate which usually inhibit zinc absorption.

The results indicate that zinc DL-methionine provided excellent chemoprotection against oxygen free radicals and TPA-induced LDH leakage from cultured neuroactive PC-12 cells, and was comparable to vitamin E succinate with respect to these effects; what makes it a preferred source of Zinc.

## Satiereal® suppresses snacking for weight losses



Patented, natural and safe appetite suppressor  
Weight losses and good mood



**Bio-active ingredients:** Specific and studied unique profile of crocin, picrocrocine and safranal - it's more than a saffron extract

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The **daily dose** is 176.5mg (2 X 88,25mg/d) used in tablets, capsules, beverages and instant drinks, confectioneries, ...

Satiereal® is the **patented clinically proven satiety** ingredient from saffron. The satiated feeling induced by Satiereal® encourages **weight loss while eliminating frustration**. This product has a **unique mechanism** that not only creates satiety but helps avoid snacking and compulsive eating behaviors, which in turn leads to reduction in weight and inches. Satiereal® is a Serotonin Reuptake Inhibitor (SRI), working so on the general good mood. New studies regularly published.

## BioPerine®



**Ultimate Nutrient Enhancer**

**Easy to use, well-known and efficient booster**



Very well documented and firstly patented, the BioPerine® **increases the bio availability** / bio adsorption of most of liposoluble compounds.

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Many studies are available especially versus **curcuminoids** (> 10 times), **beta caroten** (+160%) and thereof other carotenoids, CoQ10 (+150%), **Resveratrol** (> 200% and > 10 times in serum), **liposoluble vitamins** (B6: +250%), **Selenium** (+145%), etc...

Although some competitors try to discredit BioPerine®, it's today **the most effective**, the **cheapest** and **most safe** way (hundreds billions of doses sold since 1995) to enhance bioavailability. It's the only piperine confirmed non novel foods (2011) and not subject to EFSA since it's a « nutrient enhancer ». The process uses exclusively ethanol (also for the oleoresin production).

## Amla Saberry™



**Digestion, Blood sugar and Adaptogen**  
**Nutricosmetics : Melanogenesis inhibition,**  
**UV Protection, Hair care**



**Bio-active ingredients:** 10% b-Glucogallin, 50% gallates/tanins  
**Dose :** 90mg three times a day



Water extract of *Emblica officinalis* (Amla). The extract is widely used in digestive support and immune support applications (adaptogen). Blood sugar level. Liver support - **β-Glucogallin has been studied by Sabinsa** (metallo-proteinase inhibitor, studies : detoxification, e.g. heavy metals, pesticides).



Amla helps in maintaining the anti-oxidant enzyme levels in the system.



A beautiful fruit, well known for its rejuvenative properties .

**Saberry®** is specifically a light-colored powder prepared from the fruits of *Emblica officinalis*, commonly known as amla, and standardized to contain 10% **β-glucogallin**. Benefits of this component can largely be attributed to its potent antioxidant capabilities which is substantiated by its oxygen radical absorbance capacity (ORAC) value.

## ElimReal®



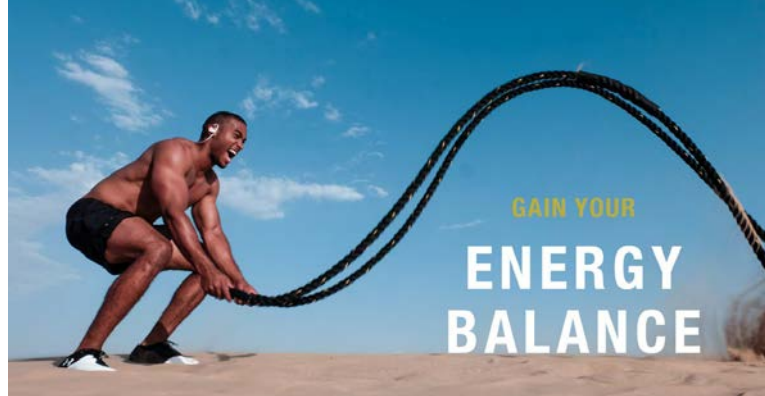
**Water elimination and detox, weight management**



Elim'Real® is a patented extract of different plants with complementary activities in detoxifying the body and assisting the renal elimination , which has clinically demonstrated its effectiveness (**study** on 95 women over 28 days, DBPC) and allows **healthy allegations** thanks to some of its components. It's a plant formulation from Carvi's seeds (*Carum carvi*), Meadowsweet Flower buds (*Spirea ulmaria*), Guarana's seeds, Goldenrod's plant (*Solidago virgaurea*), Fennel's fruits (*Foeniculum vulgare*) and Dandelion's leaves (*Taraxacum dens leonis*).

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ElimReal® is covered by a **patent for slimming applications**, and promotes renal elimination functions (excretory function of the kidneys) / urinary elimination /urinary volumes, so works on detoxification and slimming. ElimReal® is **easy soluble in water**, and may be used in any form of dietary supplements.



## Balance your Energy with Forslean®



**Helps to increase lean body mass, while decreasing body fat**

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Forslean is the patented extract from *Coleus forskohlii* **developed and proved by Sabinsa**.

2 awards / 5 patents / 7 clinical studies, it's a very well documented extract, and subject of numerous studies showing the

**increase of the Lean Body Mass**, and the use of fat by its action on the Adenylate Cyclase. It is used in nutrition, cosmetics or nutra cosmetics (toning of skin).

*Coleus forskohlii* is the only known plant source of forskolin, a natural compound which gives it its slimming properties and protects the skin. This diterpene is a non-adrenergic stimulator of adenylate cyclase, an enzyme that plays a role in thermogenesis and the use of fat cells for energy. It's also why it's used in anti-cellulite cream and – indirectly – for tanning.

## Berberine



**Statin-like, Prostate, antimicrobial**



**Bio-active ingredients:** Berberine HCl,



**Dose :** 50mg three times a day



Berberine is a golden yellow alkaloid present in the roots and also in stems from *Berberis aristata* or more commonly known as barberry. Used and recognized for more than 2500 years in Chinese pharmacopoeia and Ayurvedic medicine for its **immune-stimulating**, antifungal, antibacterial properties, the berberine (processed here by crystallization and not purification) was traditionally recommended to reduce **blood sugar levels** and to lose weight. But berberine also has many other benefits, including acting on the cardiovascular system and intestinal flora.

The therapeutic effects of statins and berberine on the hyperlipemia have been widely studied.

## Venocin®, escine from Horse Chestnut



**Anti-inflammatory, Blood/venotonic circulation**



**Bio-active ingredients:** Escin (or aescin), Dose: 250mg

Venocin features this unique compound known as **aescin** or **escin**, a mixture of saponins that is known to help **maintain healthy blood circulation** and strengthen the capillaries and veins. Horse chestnut extract is clinically proven to be beneficial to people suffering from varicose veins, spider veins, hemorrhoids and related circulatory problems or "chronic venous insufficiency" (CVI).

## Centella asiaticoside and/or triterpens



**Respiratory, Stress, Blood circulation incl. brain**



**Bio-active ingredients:** Terpens and asiaticosides

Traditionally used (also known as Gotu kola). Recent studies have validated its uses, especially as a **psychotropic** in the treatment of various **mental disorders**, such **mental fatigue**, **epilepsy** and **hysteria**. *Centella asiatica* could significantly improve the IQ of children and **reduce the level of anxiety** in adults. Venotonic activity linked to triterpens.

**Topical:** the healing and anti-wrinkle effect is the best known, but centella extracts are also used for skin irritation. Many studies exist on these applications (esp. by Sabinsa).

## Bacopin®



### Attention, stress, memory, circulation

**Bio-active ingredients:** min. 20% total Bacosides (as A & B), ethanolic extract.

**Dose :** 3 x 50 mg (children) to 3 x 100 mg (adult)

- Bacosides can **revitalize the intellectual functions** in children and calm down the stressed mind, allowing for better brain function
- Can be effective in **elevating brain function** by increasing concentration and more finely honing mental focus
- **Anti-Convulsant** and anti-cataleptic. Anxiety Neurosis

Ayurvedic uses : Memory Enhancing, Anti-inflammatory, Analgesic, Anti-pyretic, Sedative, Anti-ulcerogenic, Anti-epileptic.

The bacopa is a plant subject to high PAH (even the fresh leaves contain - we proved it with a french lab), and Tricyclazole contamination - reason why non EU solvents can be sometime used (methanol, 2 propanol, chloroform). In order to provide a clean product, we carefully control those parameters.

## Fucoxanthin



### Support healthy body weight / liver, Antioxidant

In nutrition, fucoxanthin **has been tested on adipocyte cells** (type 3T3 L1) and **activity in obesity** has been tested in Japan in mice. It also helps (trait) reduce the level of sugar in the blood

due to the decrease in the accumulation of visceral fats. The scavenging activity of fucoxanthin is almost 8 times higher than that by fucoxanthinol, and more than 13 times higher than that by alpha-tocopherol. Addition of Fucoxanthin to the diet in rats significantly **suppressed the peroxidation** level by 7-85% (plasma) and 24-72% (liver) as compared to beta-carotene (51-76%, 33-65%) over a period of 8 h. Fucoxanthin given topically or orally to mice once a day and UVB irradiation was applied for 14 days. Its topical application (1%) significantly suppressed mRNA expression of inflammation mediators. Oral application of fucoxanthin (10 mg/kg) significantly suppressed expression of COX-2, p75NTR, EP1 and MC1R.

Also related : anti-inflammatory, anticancer, anti-obese, antidiabetic, anti-angiogenic and antimalarial activities.

## So effective GarCitrin® & Citrin®



### Slows conversion of carbohydrates to fat

**Bio-active ingredients:** up to 60% Hydroxy citric acid, Garcinol, **Dose:** 250mg of (-) HCA before meals

Citrin® and GarCitrin® are two grades extracted from the fruit *Garcinia cambogia*. Sabinsa has been the first to highlight the active (-HCA) and its use several years ago already.

Citrin® is a salt of the Hydroxycitric acid, named (-) HCA, and reduces the conversion of carbohydrates in stored fat and increasing the use of fat. Sabinsa has conducted **numerous studies under the name Citrin®**, proving its **effectiveness and safety**. After initial use in the field of sports products (induced action on amino acids, detoxifying the liver, etc ...), its properties have led to **slimming and weight management**. Another reported activity of the Citrin® is the prevention of urinary tract stones. A **beverage grade is available** : Citrin K BG (potassium salt), totally **soluble** when the usual garcinia extracts are based on Calcium salts, and are so possibly used in beverages or instant powders.

Sabinsa has highlighted another molecule from *Garcinia cambogia*: the Garcinol, showing at a first glance anti-oxidant, anti carcinogenic or anti-microbial properties. Sabinsa has shown that the use of combined HCA and garcinol improves further the efficiency of HCA, the garcinol acting as a vector for the HCA to target cells.

## Fenusterols® / Fenufibers®

### Digestion, Blood Sugar, Sport, Men's health



**Dose :** 25g (Fenufibers), 1-5g (Fenumannans), 100-200mg (Fenusterols)

Sabinsa extracts different products from fenugreek (*Trigonella foenum graecum*) :

- **Fenusterols** steroidal saponin (men & women, muscles,...). a clinical study has shown immunostimulatory activity and increased levels of testosterone and spermatogenesis (as well as male libido).
- **Fenumannans Galactomannan** (blood sugar), what corresponds to the water-soluble components of FenuFibers® which are prebiotic..
- **Fenufibers** provides a minimum of 50% fiber, used primarily for weight management and the regulation of blood sugar and / or cholesterol levels (digestion, serum cholesterol, TGL, VLDL) : nutritive & restorative properties, stimulates digestive process

## Pomegranate P40P®



### Cardiovascular health, Antioxidant, Inflammation

**Bio-active ingredients:** Total punicosides  $\geq 40\%$ , Punicalagins A+B  $\geq 30\%$ , Total polyphenols  $\geq 50\%$

**Dose :** 2 x 100mg to 300mg (based on the spectrum of the fruits). **Study published**

Pomegranate is lauded since old ancient times as having many health benefits. Pomegranate's potential benefits span many areas such as cardiovascular disease, diabetes, and cancer to name a few. It is widely accepted nowadays that the beneficial health effects of fruits and vegetables in the prevention of disease are due to the bioactive compounds they contain.

Pomegranates contain significant amounts of said substances, such as phenolic acids, flavonoids, and tannins assuring them considerable nutritional value. Nektium extracts from mashed fruits taking care to preserve the Punicalagin - as in the fruit - and not Ellagic in the P40P (one molecule of punicalagin is hydrolyzed to two ellagic acids).

Additional studies show a stimulation of the growth of healthy bacteria in the gut, and a anti-inflammatory properties (action on COX-2 and li-poxigenase)

## Tinofolin® for visual memory “Capture memories forever”

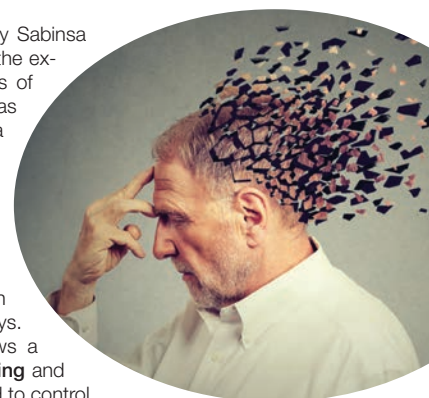


### Memory and Focus

Tinofolin® is the new extract by Sabinsa of *Tinospora cordifolia*, one of the extremely valued medicinal plants of Ayurveda, commonly called as “Guduchi”.

It's to be used at a **dose:** 3 x 100 mg to 500 mg

Tinofolin® was evaluated for its **ability to improve visual memory**, logical memory, verbal memory, attention span and concentration in a double-blind, placebo-controlled study in 30 human volunteers aged 18 to 30 years for 21 days. Supplementation (500 mg / day) allows a significant improvement in **verbal learning** and memory and **logical memory** compared to control.



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See page...



Antioxidant



Adaptogen



Energy, Vitality



Stress, Sleep



Sport



Men's health



Women's health



Mental, Brain



Digestion, Biotic



Inflammation



Liver, Detox



Weight



Cardio, Blood circ.



Cholesterol



Blood sugar



Sun, After-sun



Immunity



Minerals



Nutricosmetics



Soluble



Bio-availability



Brightening



Hydration, Sensitive



Skin integrity



Acne, Antimicrobial



Hair, Nails



Anti-aging



Oral care



Feed, Pet-food

The Natural Sign  
extraits de plantes standardisés objectifs  
**BECARRE Natural**

## L-Theanine *BeTheanine*®

L'apport 100% thé vert sans contraintes

— Just naturally —

*BeTheanine*®

**40% L-Theanine**

**100% Naturel**

**EGCG < 0,05%**

**Caféine <1%**

**Ethanol 25%**

*BeTheanine*® is a  
product by  
**becarre**  
the natural sign

Déclaration simple:  
extrait de thé vert

# ingood

INGREDIENTS BY **olga**

## SULFODYNE®

The only active and natural  
form of sulforaphane.

# Let's celebrate nature's power

SULFODYNE® can play a role in 5 health benefits  
demonstrated by several clinical studies :



Detox



Immunity



Glucose regulation



Joint health



Women health

**becarre**  
the natural sign

Pour plus d'informations sur SULFODYNE®  
BECARRE Natural - [www.becarre-natural.com](http://www.becarre-natural.com)  
+33 [0]6 86 54 83 48 / +33 [0]7 86 08 47 93

Ingood by Olga is the new  
Triballat Ingredients

[ingoodbyolga.com](http://ingoodbyolga.com)

# Range

## STANDARDIZED PLANT EXTRACTS



# MENTAL, STRESS, ALERTNESS

			Cognition, Memory, Concentration	Stress management, Good mood	Better sleep	Headache	Internal studies
<b>Zynamite®</b>	<i>Mangifera indica</i>	Nutraingredient award 2018, alertness, focus and concentration, faster reaction time, caffein-like with no jitters, nervousness, agitation	●				●
<b>BeTheanine®</b>	<i>Camellia sinensis</i>	40% natural L-Theanine from only green tea obtained by low solvent extraction. Amino acid analogue, improves mental focus, better sleep quality. Helps the body to deal with stress.	●	●	●		
<b>EnXtra®</b>	<i>Alpinia galanga</i>	Caffeine amplifier, focus and mental energy, alertness (sharpens alertness and focus for upto 5 hours), dopamine release	●				●
<b>Moodreal®</b>	<i>Crocus sativus L. stigmas</i>	Positive mood, Naturally... Comparison to Imipramine, acts on the production of neurotransmitters and hormones (serotonin, melatonin and dopamine) Serotonin Reuptake Inhibitor		●	●		●
<b>Rhodioli®</b>	<i>Rhodiola rosea</i>	Improves cognitive function under stress and fatigue, antidepressant effects, good mood, prevents the degradation of serotonin, dopamine, catecholamines in the brain, adaptogenic	●	●			●
<b>Lemon balm</b>	<i>Melissa officinalis</i>	Natural remedy to balance mood and cognitive functioning, thanks to its main actives which are phenolic acids (rosmarinic acid), volatile compounds, triterpenes and flavonoids	●	●	●		
<b>CBD, Hemp extracts</b>	<i>Cannabis sativa</i>	Studies have suggested that CBD has pain-relieving and anti-inflammatory properties, as well as sleep improvement and/or anxiety reduction		●	●		
<b>Sulfodyne®</b>	<i>Brassica oleracea</i>	neuroprotective effect on brain and by improving behavior and social responsiveness in autism	●	●			
<b>Tinofolin®</b>	<i>Tinospora cordifolia</i>	Improve visual memory, logical memory, verbal memory, attention span and concentration	●				●
<b>GliSODin®</b>	<i>Curcuma longa L. + Gliadine</i>	Prevents impairment memory induced by stress, promotes antioxidant defences in the brain		●			●
<b>Centellin®</b>	<i>Centella asiatica</i>	Increases memory and concentration while reducing anxiety, slows brain aging and helps regenerate neurons (neuroprotective against cognitive impairment)	●	●			●
<b>Ashwagandha</b>	<i>Withania somnifera</i>	increase GABA A receptors activity, reduces stress and relieve anxiety, neurons protection		●	●	●	
<b>Bacopa</b>	<i>Bacopa monieri</i>	Memory and neurotransmission enhancer (stimulating the arborization of dendritic cells), decrease anxiety level, increase dopamine level, neuroprotector effect	●	●			
<b>Mucuna</b>	<i>Mucuna pruriens</i>	Natural source of L-dopa, precursor of dopamine, action on the nervous balance (mood disorders, age-related tremors, sleep ...)	●	●	●		
<b>Curcumin C<sup>3</sup> Complex®</b>	<i>Curcuma longa</i>	Protective action due to its ability to reduce inflammation in the brain, a factor associated with Alzheimer's disease and depression improvements	●	●			●
<b>Saberry® / Amla</b>	<i>Emblica officinalis</i>	Excellent brain tonic, helps improve the central nervous system	●				●
<b>5-HTP</b>	<i>Griffonia simplicifolia</i>	Serotonine precursor (the 'happiness hormone'), involved in the regulation of sleep, appetite and mood		●	●	●	
<b>SelenoMethionine</b>	<i>Synthesis</i>	Low plasma Se status has been associated with selenity and cognitive decline	●				

# SPORT, PERFORMANCE

			Performances, Muscles	Inflammation, Immunity	Nutrition, Weight	Recovery	Internal studies
<b>Zynamite®</b>	<i>Mangifera indica</i>	Nutraingredient award 2018, higher peak power output, VO2 max and oxygenation, no change in blood pressure or heart rate, and no jitters, nervousness, agitation	●				●
<b>Rhodiolife®</b>	<i>Rhodiola rosea</i>	Immunity post-exercise, protects muscle cells, improves endurance & recovery, adaptogenic, reduces fatigue, neurotransmission	●	●		●	●
<b>enXtra®</b>	<i>Alpinia galanga</i>	Energy booster by blocking adenosine (caffeine-like without side effects or amplifies caffeine benefits without the “crash”), release of dopamine, increases blood flow	●				●
<b>DigeZyme®</b>	<i>Enzymes</i>	Improves proteins intake, benefits on delayed onset muscle soreness	●	●	●	●	●
<b>GliSODin®</b>	<i>Curcumis melo, Gliadine</i>	Strong action on immune system, protects against inflammation, DNA damages and induced lactate production, promotes production of anti-inflammatory cytokine IL-10		●	●		●
<b>Rhaponticum</b>	<i>Rhaponticum carthamoides</i>	Natural ecdysteroid, increase muscle mass while decreasing fat mass, anabolic effects similar to those of some steroids - without producing harmful side-effects. Humoral activity	●	●	●	●	
<b>Fenusterols®</b>	<i>Trigonella foenum graecum</i>	Use of proteins in muscles rebuilt (increase deposition of prot., increasing muscle mass), increases muscle power, helps maintain the libido	●		●		
<b>C3 Complex®</b>	<i>Curcuma longa</i>	Anti-inflammatory, reduces muscle damage during exercise, optimizes recovery processes, weight and cholesterol (body fat and interleukin-1β)	●	●	●	●	●
<b>BioPerine®</b>	<i>Piper nigrum</i>	Ultimate nutrient enhancer, only 5mg per dose to boost by 150% to 1 000% the bio assimilation (Curcuminoids, Minerals (Mg <sup>2+</sup> , Ca <sup>2+</sup> , Se <sup>2+</sup> , ...), vitamins					●
<b>Promond®</b>	<i>Prunus amygdalus</i>	50% protein from Indian almonds, 100% natural and vegan, free-flowing powder, good taste. Glutamate, arginine, aspartate, and phenylalanine			●		
<b>Cococin®</b>	<i>Cocos nucifera</i>	Unique profile of nutrients from tender coconut, isotonic nutrients, blood circulation			●	●	
<b>RedNite®</b>	<i>Beta vulgaris</i>	Natural nitrate, betalains & polyphenols (no nitrites nor synthetic nitrates), performance during heavy resistance exercise, stress tolerance, increased mean peak EMG amplitude	●			●	●
<b>Boswellin®</b>	<i>Boswellia serrata</i>	Decrease of inflammation, stimulation of immunity after exercise, muscle recovery, acts on 2 pro-inflammatory enzymes : 5-Lipoxygenase, Human Leukocyte Elastase		●		●	●
<b>Capsaicin</b>	<i>Capsicum annuum</i>	Aches & pains in muscles / joints (TRPV1), sport endurance (mitochondrial biosynthesis), increases muscle protein synthesis and adrenaline secretion	●	●	●	●	
<b>Bromelain</b>	<i>Ananas comosus</i>	Protein digestion, muscle repairment, inflammation management		●	●	●	
<b>Resveratrol</b>	<i>Polygonum cuspidatum</i>	Antioxidant, reduces inflammation, detoxifying		●		●	

# Inflammation, Protection, Immunity

			Inflammation, Joint, Gut	Immunity / Antimicrobial	Allergies / Asthma	Tumor	Internal studies
<b>Sulfodyne*</b>	<i>Brassica oleracea</i>	Acts on both innate (phagocytes) and adaptive (lymphocytes) immunity. Inhibition metalloproteinases and inflammation markers, reduction in cartilage destruction, role in cancer mechanisms	●	●		●	●
<b>Echinacea</b>	<i>Echinacea angustifolia</i>	Potent immune-modulator, rich in echinacoside - the active polyphenol from the root - and of dodecate-traenoic acid isobutylamide - alkamide for immunomodulation. Immune, respiratory, Ig, .... see EMA.	●	●			
<b>Nigellin®</b>	<i>Nigella sativa</i>	Anti-inflammatory, positive effect in the context of asthmatic (studies), anti-bacterial (Gram + germs), anti-fungal but also anti-parasitic and anti-viral	●	●	●		●
<b>Boswellin®</b>	<i>Boswellia serrata</i>	Inhibits the synthesis of leukotrienes, participate in the constriction of the bronchi in response to allergens, AKBBA reduced viability and proliferation of leukemic cells	●	●	●	●	●
<b>C3 Complex® C3 Reduct®</b>	<i>Curcuma longa</i>	Anti-inflammatory (COX-2 inhibitor, without gastrointestinal side effects unlike NSAIDs.), increases the speed of remission of cancerous cells (NF-κB). C3 Reduct® brings directly the metabolites	●	●		●	●
<b>Elderberry</b>	<i>Sambucus nigra</i>	Boosts immune system, sinus pain, excellent sources of antioxidants, helps reduce inflammation and oxidative tissue damage	●	●			
<b>GliSODin®</b>	<i>Curcumis melo, Gliadine</i>	Strong action on immune system, induction of Th-1, INF-α and IL-4 , regulate cytokines productions, DNA damages, red. allergic asthma and house dust	●	●	●	●	●
<b>SeleniumSELECT® L-Selenometh.</b>	<i>Synthesis</i>	Protective effect of selenium in viral diseases including human immune-deficiency virus. Low doses of Selenium results in augmentation and/or restoration of immunological functions, study vs. Covid	●	●		●	●
<b>Rhodiolife®</b>	<i>Rhodiola rosea</i>	Stimulates and protects the immune system (homeostasis), increases the natural killer cells (NK), balance the body's stress-response system (new study), adaptogenic		●			●
<b>LactoSpore®</b>	<i>Bacillus coagulans</i>	Improves Gut Microflora, production of Short-chain Fatty Acids, beneficial activities in gastroenteritis or irritable bowel syndrome	●	●			●
<b>CBD, Hemp extracts</b>	<i>Cannabis sativa</i>	Pain-relieving and anti-inflammatory - Cannabinoids, including CBD, are anti-inflammatory. Studies report the inhibitory action of the eicosanoid enzyme called COX2 + action on cytokines	●				
<b>Shilajit</b>	<i>n.a.</i>	Fulvic acid has anti-inflammatory and antimicrobial properties and strengthens the immune system	●	●			
<b>Harpagophytum</b>	<i>Harpagophytum p.</i>	Inflammation management for joints : source of iridoid glycosides and especially harpagoside - tested by HPLC - to relieve pain and inflammation	●				
<b>Zinc Methionine</b>	<i>Zinc Monomethionine</i>	Benefit for the common cold and other airway infections. Antioxidant and protection against oxidative stress. Skin, nails, hair and bones health.		●			
<b>Andrographis</b>	<i>Andrographis paniculata</i>	Stimulates effects on the immune system, anti-inflammatory and antipyretic properties	●	●	●		
<b>Amla</b>	<i>Emblica officinalis</i>	Studied on growth of cancer cells in mammary, pancreatic or prostate tumors (confirmed, in vitro, on several human cancer cell lines A549, HepG2, HeLa, MDA-MB-231 etc...)				●	
<b>Resveratrol</b>	<i>Polygonum cuspidatum</i>	Antioxidant, anti-inflammatory effects (inhibition of NFκB and AP-1), mitochondrial activation via sirtuins and PGC-1, activation of the PPARγ pathway (target of thiazolidinediones)	●				
<b>Capsaicin</b>	<i>Capsicum annuum</i>	Relieves pain by activating the TRPV1 receptor in the brain by «subst. P», triggers apoptosis of cancer cells in the stomach, pancreas and colon	●		●	●	
<b>Ginger</b>	<i>Zingiber officinale</i>	Anti-inflammatory effect thanks to leukotrienes and prostaglandins	●	●			
<b>Ashwagandha®</b>	<i>Withania Som-nifera</i>	Adaptogenic, delay the process of cellular aging, decrease the activity of acetylcholinesterase and slow down tumor cells dvlpt		●		●	

# Cardio, Blood Sugar

			Diabete / Blood sugar	Cholesterol / Lipidemia	Hypertension, Blood flow	Internal studies
<b>GlisODin®</b>	<i>Curcumis melo</i> , Gliadine	Reduces risk factor of cardiovascular disease, decrease carotid intima-media thickness			●	●
<b>Gugulipid®</b>	<i>Commiphora mukul</i>	Inhibits cholesterol biosynthesis, Improves the rate of cholesterol excretion and rapid breakdown. The cardiovascular response for cholesterol regulation, reduction of stored fat, and inflammation		●		●
<b>Venocin®</b>	<i>Aesculus hippocastanu</i>	Helps maintain healthy blood circulation and strengthen the capillaries and veins			●	●
<b>pTerosol®</b>	<i>Pterocarpus marsupium</i>	New alternative for blood sugar and cholesterol management. significant reduction fo serum glucose level, and increae of plasma insulin.	●	●		●
<b>Curcumin C<sub>3</sub> Complex®</b>	<i>Curcuma longa</i>	Effect of curcuminoids on Metabolic Syndrome: reduces serum concentration of LDL-C, non-HDL-C, total cholesterol, TG and Lp(a), helps cells with glucose absorption. C3 Reduct® brings directly the metabolites	●	●		●
<b>Sabbery®</b>	<i>Emblica officinalis</i>	Hypocholesterolemia (reduction of LDLc and TH, with high increase in HDL), improves glucose metabolism in Type II , reduces biomarkers of oxidative stess and inflammation	●	●		●
<b>Gymnema GS4+®</b>	<i>Gymnema sylvestre</i>	hypoglycemic effect by promoting the bodies production of insulin, clinical studies on Type I and II, hypolipemic effect (improves lipids metabolism)	●	●		
<b>FabenoI®</b>	<i>Phaseolus vulgaris</i>	Alpha-amylase inhibitory that blocks the digestion of dietary starch, permits maintenance of healthy blood sugar levels	●			●
<b>Berberine</b>	<i>Berberis aristata</i>	Reduced blood sugar levels in people with Type II diabetes (inhibition of α-glucosidase), and lowering blood pressure by acting on AMPK, reported as statin	●	●	●	
<b>LactoSpore®</b>	<i>Bacillus coagulans</i>	Production of Short-Chain Fatty Acids, used as substrates for lipogenesis and gluconeogenesis, controls insulin-glucose through glucagon-like peptide 1	●	●		●
<b>Fenumannans®</b>	<i>Trigonella foenum graecum</i>	Fibers or Glucomannans - Regulation of blood glucose levels in type 2 diabetes, improves the blood profile: reduction of LDL cholesterol and triglycerides	●	●		●
<b>Nigellin®</b>	<i>Nigella sativa</i>	Regular consumption of black cumin can reduce blood sugar levels and insulin resistance, making it an effective remedy for avoiding Type II diabetes	●			
<b>Capsaicin</b>	<i>Capsicum annuum</i>	Increases the level of nitric oxide, reduction of sodium retention by the kidneys			●	●
<b>Hesperidin</b>	<i>Citrus sinensis</i>	Vasodilator action, improves the integrity of the blood vessels			●	
<b>Ginger</b>	<i>Zingiber officinale</i>	Decreases fasting blood glucose and hemoglobin-glycated levels, and improves insulin resistance	●			
<b>Centellin®</b>	<i>Centella asiatica</i>	Triterpenic fraction has beneficial effects in people with venous insufficiency and varicose veins, venotonic activity			●	
<b>Cinnamon</b>	<i>Cinnamon cassia</i>	Work on the sugar level, avoid the peak of sugar for longer satiety	●			
<b>Resveratrol</b>	<i>Polygonum cuspidatum</i>	Permits reduction of serum concentration of LDL, anti-oxidant effect		●	●	
<b>Ellagic acid</b>	<i>Punica granatum</i>	Decreases the oxidation of LDLc, antioxidant effect, prevents the formation of atherosclerotic plaque by increasing the activity of paraoxonase (PON 1)		●	●	
<b>Alpha Lipoic</b>	<i>Synthesis</i>	Sugar level, prevents from retinopathy and cardiopathy	●		●	

# Weight, Detox, Digestion

			Slimming, Fat Burner	Satiety effect	Elimination, Detox	Digestion	Internal studies
<b>Cirpusins™</b>	<i>Cyperus rotundus</i>	New objectvized extract standardized in Scirpusins A & B, to tackle visceral fat and promotes weight loss, maintains healthy lipid and blood glucose levels, and normalized the liver enzymes	●				●
<b>Sulfodyne*</b>	<i>Brassica oleracea</i>	Eliminate xenobiotics from the body thanks to its detoxifying and chemoprevention properties, therefore acts by modifying the metabolism of xenobiotics			●		
<b>Digezyme®</b>	<i>Multi-enzyme complex</i>	Multi enzyme complex with key and studied enzymatic profile: α-Amylase + Protease + Lipase + Cellulase + Lactase				●	●
<b>Satiereal®</b>	<i>Crocus sativus</i>	Moderate appetite, reduce compulsive snacking, significant and progressive reduction of weight	●	●			●
<b>LactoSpore®</b>	<i>Bacillus coagulans</i>	Improves gut microflora, production of Short-Chain Fatty Acids, beneficial activities in gastroenteritis or irritable bowel syndrome	●			●	●
<b>Forslean®</b>	<i>Coleus forskohlii</i>	Decreased Body Fat, increased Lean Body Mass by increasing the production of Adenylate cyclase enzyme - cAMP, acts on respiratory and cardiovascular health	●				●
<b>Citrin® Garcitrin®</b>	<i>Garcinia cambogia</i>	Reduction of carbohydrates in stored fat (slow down the conversion of carbohydrates), increases the use of fat	●	●			●
<b>Fucoxanthin</b>	<i>Undaria pinnatifida</i>	Increase fat metabolism, detoxify the digestive system, facilitating transit, helps reduce appetite	●	●	●		●
<b>Elim'Real®</b>	<i>Formulation</i>	Help to detoxify the body, assist renal elimination, increase urinary elimination and volume	●		●		●
<b>Bromelain</b>	<i>Ananas comosus</i>	Proteolytic activity, helps to better digest., reduces gastric acidity, reduces swelling and flatulence, reduces cellulite associated with water retention (anti-oedematous)	●		●	●	
<b>Papain</b>	<i>Carica papaya</i>	Proteolytic activity, helps digest proteins and fats, diuretic and antioxidant properties	●		●	●	
<b>Fabenol®</b>	<i>Phaseolus vulgaris</i>	Alpha-amylase inhibitor activity, «starch bloker», potential benefits in the maintenance of healthy blood sugar levels and optimal body composition	●				●
<b>Licorice DGL</b>	<i>Glycyrrhiza glabra</i>	Decreases the acidity of the stomach, calms the irritation of the lining of the stomach				●	
<b>Gymnema GS4+*</b>	<i>Gymnema Sylvestre</i>	Promotes the bodies production of insulin, also works on weight management ("sugar blocking" property), gymnemic acids are sweetness inhibitors	●				●
<b>Berberine</b>	<i>Berberis aristata</i>	Indolent ulcers, stomach concerns (supports the healthy bacteria)				●	
<b>Lemon fiber</b>	<i>Citrus limon</i>	Dietary fiber, prebiotic, prevents and relieves constipation, normalizes bowel movements	●	●			
<b>Nigellin®</b>	<i>Nigella sativa</i>	Draining effect helps in the elimination of toxins in the intestines and lungs, stimulates the digestive and intestinal systems			●	●	●
<b>Saberry® / Amla</b>	<i>Embllica officinalis</i>	Improve the stimulation of gastric juices and also support detoxification, possess antisecretory, antiulcer, and cytoprotective properties			●	●	●
<b>Ginger</b>	<i>Zingiber officinale</i>	Antiemetic effects by reducing the movements of the stomach				●	
<b>Capsaicin</b>	<i>Capsicum annuum</i>	Stimulates metabolism, increases fat burning, decreases appetite by increasing the secretion of GLP-1 , anti-inflammatory effects on H. pylori-induced gastritis	●	●		●	●



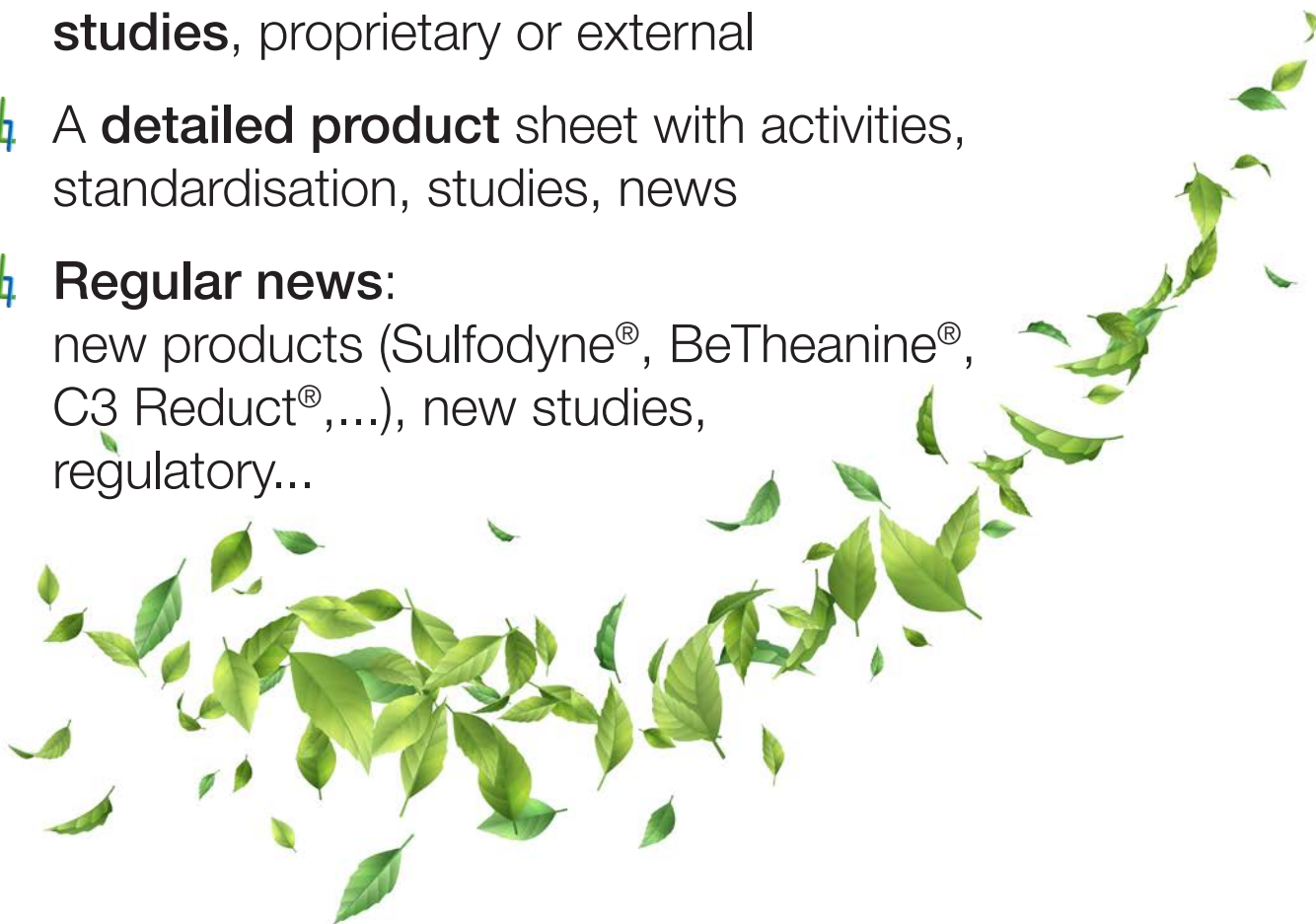
# Cosmeceuticals

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Because you are looking for information rather than a list of products, BECARRE Natural has worked on a new website concept, linked to regularly updated internal databases.

- 📌 **Assisted or keyword search** in all databases: studies, plants, actives, sectors, descriptions... with cross-links between each result
- 📌 Nearly **600** indexed, summarized and categorized **studies**, proprietary or external
- 📌 A **detailed product** sheet with activities, standardisation, studies, news
- 📌 **Regular news:** new products (Sulfodyne®, BeTheanine®, C3 Reduct®,...), new studies, regulatory...



# Natural L-Theanine

100% Green tea, 25% ethanol, EGCG <0.05%

**L-Theanine occurs naturally in green tea and is also available in BeTheanine®, 100% extracted from Green tea using low ethanol process, and providing so little EGCG**

**B**eTheanine® is an extract 100% from selected green tea, without any carrier or compounds other than from the extraction of green tea.

In order to comply with the extraction protocol recommended in Europe (low ethanol - 25%), a specific supply chain has been set up:

- precise selection of the collection area with traceability,
  - definition of the level of leaf maturity
  - suitable drying system to preserve the assay,
  - Implementation of a selection protocol according to the actives content
  - improved extraction multi-stream process using 25% EtOH and Water
- all this in order to maintain the optimum levels of L-Theanine and obtain a rich extract in compliance with regulatory – and customer's – requirements.

## L-Theanine as a Functional Food bioactive

### Mental focus and Cognitive performance

The researchers found that people who took 100 milligrams (mg) of L-theanine made fewer errors in an attention task than those in the placebo group. Drinking 50 mg of caffeine or combining the L-theanine and caffeine also improved people's focus.

A 2016 meta-study concluded that this L-Theanine could benefit a person's mental and physical health, thanks to the neuroprotective effects, which improve brain function. On its own, L-theanine may improve a person's attention and reaction times. In combination with caffeine, it may lead to improvements in their number skills and alertness. L-Theanine also prevents the development of THC-induced behavioral aberrations<sub>2</sub>.

### Improved sleep, Relaxation

Studies have suggested that L-theanine could help people relax before bedtime, get to sleep more easily, and sleep more deeply, even when participants had generalized anxiety disorder and were taking antidepressants. The authors noted that there were no reported improvements in anxiety or insomnia severity. L-theanine may also contributed to the feeling of relaxation as it can lower the heart rate (help to reduce stress). In turn, this may help lower blood pressure.

### Immune System

Several studies have suggested that taking L-theanine could boost a person's immune system. Its potential anti-inflammatory effects could also help fight illness. A pilot study, and a small clinical trial suggest that the enhancement of T lymphocytes may play a role in the observed decrease in cold and influenza symptoms.

Other researchers have evaluated effect of L-cystine and L-theanine on the immunologic response to vaccinations in the elderly and health care workers and to exercise in athletes, as well as in rats, and suggest an enhanced immunologic response.

### Reliable sourcing and process

Besides the specific production process, sourcing was essential in order to be able to offer a L-Theanine extract with the guarantee of a respectful process, without the addition of any external compound and while respecting the solvents and the PER in accordance with the regulations.

BeTheanine® is processed from leaves collected in a specific part of the chines mountainous region, in the majestic nature of Sichuan, Hunan and Hubei provinces ("province of a thousand lakes"), which is distinguished in particular by its excellent green teas, rich in trace elements and above all in selenium and theanine. Our research has shown how important the stage of leaf maturity and how it is dried is for preserving L-theanine.

## Product Features

BeTheanine® is standardized to 40% L-Theanine (by HPLC). Low caffeine and Catechins By implementing the various constraints observed, BeTheanine® is produced on a contract basis, in order to meet your technical and regulatory constraints.

Contraindications : None well established. Dosing : 45-200mg [EFSA 1104, 1117, 1222, 2004, 2005], L-theanine crosses the blood-brain barrier, with effects evident within 30 minutes and measurable up to 5 hours after administration. BeTheanine® is supplied in powder form.

# BeTheanine®

## L-Theanine

Research shows that L-theanine can provide different health benefits, and improve mental focus and better sleep quality. Indeed, L-theanine may affect the levels of certain chemicals in the brain. These include serotonin and dopamine, which influence mood, sleep, and emotion, and cortisol, which helps the body deal with stress.

## Digestion and metabolism : donor of glutamate to the body

As a structural analog of glutamate and glutamine, the theanine in preparations (teas, pure supplements, etc.) is absorbed in the small intestine after oral ingestion, where its hydrolysis to L-glutamate occur. Glutamate can be metabolized to glutamine in astrocytes.

## Pharmacodynamics

L-Theanine is structurally similar to the excitatory neurotransmitter glutamate, and in accordance, binds to glutamate receptors. In addition, it inhibits glutamine transporters and glutamate transporters, and thus blocks the reuptake of glutamine and glutamate. L-Theanine increases serotonin, dopamine, GABA, and glycine levels in various areas of the brain, as well as BDNF and NGF levels in certain brain areas.

## Safety of L-Theanine

Theanine is sold in the US as a dietary supplement and has been granted GRAS (generally recognized as safe) status by FDA. In Energy drink, Health Canada does not consider the addition of L-Theanine to BECs up to 300 mg / day of each to be of concern. The median lethal dose (LD50) of L-theanine is suggested to be 5 g/kg bw. Mutagenicity, acute and subacute toxicity tests have failed to show toxicity. A toxicological study in rats showed no effect on behavior, morbidity, mortality, body weight, hematology, or urinalysis.

## Mechanisms of action on the CNS

Several researchers have proposed a number of mechanisms by which it may act on the CNS. These include the inhibition of glutamate receptors, increasing the concentration of gamma-aminobutyric acid (GABA), increasing dopamine and serotonin in specific brain regions, inhibition of glutamate-induced effects including apoptosis and amyloid beta toxicity, hippocampal neurogenesis and enhanced memory, and neuroprotective blockage of multiple glutamate receptor subtypes in the hippocampus, suggesting a potential role in Parkinson and Alzheimer diseases.

## EGCG

With less than 0.05% of EGCG, BeTheanine® does not need the warnings linked to regulation 1925/2006).



1. "Assessing the effects of caffeine and theanine on the maintenance of vigilance during a sustained attention task", John J Foxe, Kristen P Morie, Peter J Laud, Matthew J Rowson, Eveline A de Bruin, Simon P Kelly. *Neuropharmacology* 2012 Jun
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8. "The effects of L-theanine, caffeine and their combination on cognition and mood", Haskell CE, Kennedy DO, Milne AL, Wesnes KA, Scholey AB. *Biol Psychol*. 2008
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# Active sulforaphane

Cruciferous vegetables are well known for their health benefits, also thanks to their high content in sulphur compounds, namely glucosinolates what includes the glucoraphanin, and, more specifically, their hydrolysis products - isothiocyanates - including sulforaphane. Today, nearly 2,500 articles referenced in Pubmed relate to sulforaphane, including 500 articles for the past two years.

**But all products do not lead to the same bioavailability in sulforaphane.**



**BIOAVAILABILITY STUDY on Sulfodyne® and its related cost per dose**

## What is Sulforaphane ?

Sulforaphane (sometimes sulphoraphane) is a compound within the isothiocyanate group of organosulfur compounds. It is obtained from cruciferous vegetables such as broccoli, Brussels sprouts, and cabbages. It is produced when the enzyme myrosinase transforms glucoraphanin, one of the glucosinolates, into sulforaphane.

**Sulforaphane is the active, and Sulfodyne® contains this active, with an excellent bio-availability.**

## Glucosinolate, Glucoraphanin or sulforaphane ?

**Glucoraphanin is biologically inactive** and must be hydrolyzed by the action of an endogenous enzyme, myrosinase, released by crushing or chewing vegetables, to turn into sulforaphane, the active molecule. However, eating broccoli does not guarantee an efficient and constant supply of sulforaphane to the body, since the amount ingested depends on:

- The quality of the broccoli,
- Storage conditions for broccoli,
- The preparation method (cooking or not),
- Enzymatic hydrolysis via myrosinase which is released by chewing or is present in the intestinal flora (person dependent dose).

**Thanks to a patented extraction process and its unique stabilization, Sulfodyne® makes possible to provide sulforaphane in its active form**, which can be directly assimilated by the body: 200 mg of Sulfodyne® provides 10 mg of sulforaphane, i.e. the equivalent of 380 g of raw broccoli.

A bioavailability study (Fahey et al., 2017) shows different level of bioavailable sulforaphane depending on its sourcing.

## Sulforaphane (SFN), Glucoraphanin (GFN), or glucosinolates should not be confused

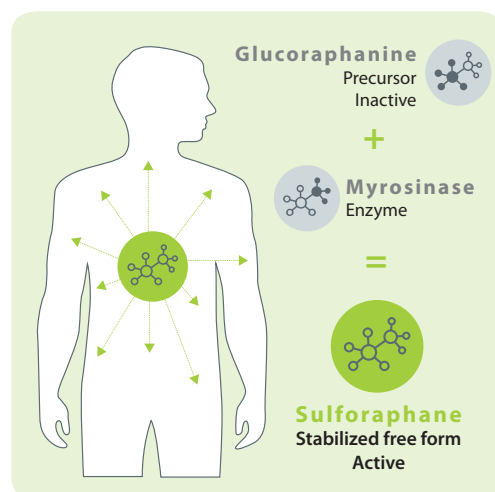
- 10mg of Glucoraphanin correspond to max. 4.06mg of Sulforaphane (by chemical conversion).
- 10mg of ingested GFN leads to on average 0.45mg of SFN in the body
- 10mg of GFN with external myrosinase leads to 2.15mg of SFN in laboratory (optimal condition)
- 10mg of GFN with external myrosinase, ingested, provides 1.22mg of SFN in the body
- 10mg of ingested Sulforaphane (Sulfodyne®) provides 7.1mg of Sulforaphane in the body.

Sulfodyne is the **first and only extract** of broccoli seeds with a **standardized** concentration of 5%, **stabilized** and with **bioavailable sulforaphane**.

**Sulfodyne® is the guarantee to get the real sulforaphane, and nothing less.**

**Titrated and stable extract without having to be transformed via an endogenous or added enzyme**

5mg - 20mg Sulforaphane  
100mg - 400mg Sulfodyne®  
Formulation with Vitamins, minerals or other plants for claims



## Detoxification

Sulforaphane has a detoxifying action on the body, in addition to its direct antioxidant activity: it can indeed help eliminate xenobiotics from the body by inhibiting the expression of phase I enzymes responsible for the activation of certain toxic substances, and it induces the expression of phase II enzymes involved in the process of detoxification and elimination of these toxic substances.<sup>(1)</sup>

## Anti-inflammatory & Joint health



Sulforaphane inhibits markers of inflammation and reduces cartilage degradation in models of osteoarthritis, gout and rheumatoid arthritis. These actions of sulforaphane are mediated by its effect on the activation and migration of leukocytes in the joints, on IL-17, TNF-alpha, prostaglandins PGE2 and the production of nitric oxide.<sup>(2)</sup>

## Immunity



Sulforaphane increases the activity of NK cells and phagocytosis of macrophages involved in the innate immune system. It also increases the acquired immune response by improving circulation and antibody production, and also modifying the autoimmune response via T cells.

Studies have thus shown the value of sulforaphane in increasing

the response of the immune system against the influenza virus. Numerous studies also show the interest of sulforaphane in *Helicobacter pylori* infection (reduction of bacterial infection and protection of the stomach mucosa).<sup>(3)</sup>

## Glucose regulation



Sulforaphane causes the dissociation of the Keap1-Nrf2 complex thus allowing the activation of the expression of Nrf2, and the associated mechanisms such as the increase in anti-oxidant capacities, the decrease in inflammation, the increase in the regulation of glucose in liver cells and prevention of pancreatic beta cell death.

Via this action, in particular on hepatic and pancreatic cells, sulforaphane is involved in the regulation of hyperglycemia.<sup>(4)</sup>

## Women health

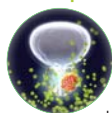


Beside the studies on chemoprevention (women's cancer, especially breast, ovarian cancers), Sulforaphane epigenetically stimulates osteoblast activity and diminishes osteoclast bone resorption<sup>(5)</sup>. It's also a good way as a new adjuvant therapeutic approach for the treatment of preeclampsia<sup>(6)</sup>. Then, research also shows it positively acts on polycystic ovary syndrome a potential application in assisted reproduction cycles by improving the quality of granulosa cells and the embedded oocyte<sup>(5)</sup>.

# SULFODYNE®

## The active form of Broccoli rather than its precursor

### Chemoprevention



Sulforaphane may play a role in cancer mechanisms, through chemopreventive activity in the initiation of carcinogenesis. Sulforaphane is believed to have the ability to inhibit the malignant transformation of different cell types (prostate, lung, breast, colon, bladder, liver, etc.) and limit cancer progression following exposure to carcinogens. More than a thousand studies on Pubmed refer to this action, including nearly 150 for the prostate.<sup>(6)</sup>

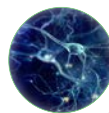
### Endometriosis



Even though the exact etiology of endometriosis is not known, estrogen and inflammation seem to play an important role in the physiopathology of this disease<sup>(7)</sup> and different publications shows the interest of using sulforaphane in endometriosis

sis specially for its role in inflammation process : in a rat models, sulforaphane can attenuate endometriosis through PI3K/Art signaling pathway<sup>(7)</sup> (also known in the field of cancerology<sup>(6)</sup>) and interfering with the NF-KB inflammatory response. More precisely, Sulforaphane may inhibit ectopic endometrial tissue growth in sciatic endometriosis (rat), shown as the shrinkage of lesion size and decreased VEGF levels<sup>(7)</sup>.

### Others



Sulforaphane supplementation could be of interest for brain health by having a neuroprotective effect (Jisung et al, 2017) on brain and by improving behavior and social responsiveness in autism (Singh K et al. 2014, Bent S et al.,

2018) or in mood disorder like depression, and such more....

1. S. Barcelo, et al., 1996 ; K. Mahéo et al., 1997 ; Kensler et al., 2005 ; Riedl et al., 2009 ; Boddupalli et al., 2012 ; Kensler et al., 2012 ; Herber et al., 2014
2. Kong et al., 2010 ; Fragoulis et al., 2012 ; Davidson et al., 2017 ; Rodrigues et al., 2018 ; Yang et al., 2018
3. Nourooz et al., 2016 ; Geisel et al., 2018 ; Wu et al., 2017 ; Suganuma et al., 2011 ; Johansson et al., 2008 ; Qu et al., 2015 ; Müller et al., 2016 ; Kesic et al., 2011 ; Wu et al., 201
4. Van Belle et al., 2011 ; Rosmalen et al., 2012 ; Jiménez-Osorio et al., 2015 ; Tabak et al., 2012 ; Allende-Vigo, 2015 ; Uusitupe & Schwab, 2013
5. Zhou A et al., 2019 ; Barra Fat et al., 2018 ; Liu et al., 2020
6. Tortorella et al., 2015 ; Jeong et al., 2017 ; Liu et al., 2017 ; Wang et al., 2017 ; Burnett et al., 2017 ; Fisher et al., 2017 ; Zhu et al., 2017
7. Zhou et al., 2019 ; Burney et al., 2012 ; Liu et al., 2020, Endometriosis...
8. Lin et al., 2014 ; Raut et al., 2019 ; Thaler et al., 2016 ; Chen et al., 2021 ; Luo et al., 2021
9. Eslandyari et al., 2021 ; Taheri et al., 2021

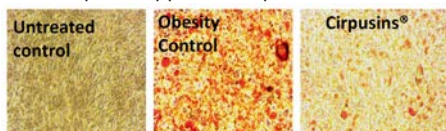
Cirpusins® is a standardized extract prepared from dried roots of *Cyperus rotundus* and contains Stilbenes (Piceatannol, Scirpusin-A and Scirpusin-B). Clinical findings showed significant body weight control (study 2022)

Cirpusins® is the new objectivized extract developed by Sabinsa of *Cyperus rotundus* standardized to contain min. 6% stil-benes in the form of piceatannol, a resveratrol-like polyphenols with a considerable biological application, scirpusin A (dimer of resveratrol and piceatannol) and scirpusin B (dimer of piceatannol). Cirpusins® has been the subject of several studies proving its unique properties, well beyond many products on the market (simple burner or even draining).

- in vitro : Anti-adipogenesis model
- in vivo : Lipid profile, visceral fat, Leptin, BMI, Waist

Cirpusins® intervenes at several levels of action for combined effectiveness :

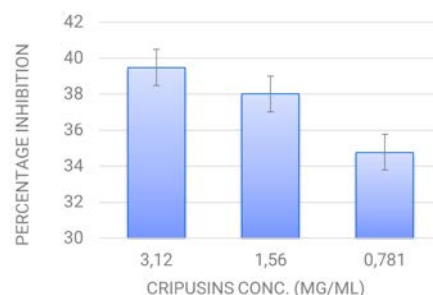
- **Adipogenesis** is a process in which pre-dipocytic cells or precursor cells proliferate and undergo differentiation to become mature adipo-cytes or fat storage cells, so a key therapeutic approach. Cirpusins® showed



## Power of Stilbenes of Cirpusins® for weight management

a dose dependent reduction in adipogenesis. It's important since it is a **key step in determining the number of fat storage cells**, and therefore a **therapeutic approach to alleviating obesity**.

- **Inhibition of weight gain and visceral fat:** the results of the in vitro study were then confirmed in a study on an animal model at different doses along with HFD (High fat diet). The **weight gain induced by HFD** was significantly **reduced by Cirpusins® (61.7%)**, with a significant **reduction (53%) in visceral fat** which is often contributing to the appearance of "belly fat".
- **Normalizing effect on lipid profile**, liver enzymes profile and blood sugar levels : further study of the lipid profile showed a **significant decrease in all lipid parameters** such as total cholesterol, low-density cholesterol and total triglycerides, and an improvement without reported side effects of the liver enzymes.
- **Leptin:** Since fat cells are not only fat storage cells but also have an endocrine function that decides metabolic health, a **study focused on the normalization of the endocrine functions**, including leptin secreted by white adipose tissue and positively correlated with the amount of body fat as a gauge for energy reserves and satiety – but their action becomes limited in case of overweight. The Cirpusins® group showed an improvement in leptin levels, so the potential role of the com-



Preadipocytes differentiate into adipocytes in 9 to 10 days in culture. Adipocytes accumulate large fat deposits which can be visualized by staining with Oil Red O (ORO)

bination in normalizing metabolic function and a significant advantage in over-coming leptin resistance. Similarly, a decrease in corticosteroid levels, thereby reducing the obesogenic effect of stress

Study : The Anti-Obesity Potential of *Cyperus rotundus* Extract Containing Piceatannol, Scirpusin A and Scirpusin B from Rhizomes: Preclinical and Clinical Evaluations, Muhammed Majeed et al., 2022

**Cirpusins differs from burner/slimming products because of its unique mechanism of action, which includes correction of abnormal endocrine function; this is the key to healthy weight management.**

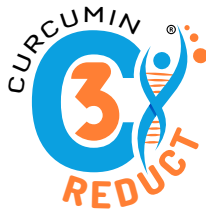
# C3 Reduct®

## Novel Food approved Curcuma

### The power of curcumin reductive metabolites

**C**3 Reduct® overcomes the bio-availability limitation of the parent curcuminoids in the most functional way.

The extensive metabolism of curcuminoids has resulted in the rapid proliferation of many commercial curcuminoid products in the market, often with unsubstantiated or hyperbolic claims of enhanced bioavailability. It has been generally believed that limited systemic bioavailability of curcuminoids might limit the realization of the full potential of curcumin. The knowledge that gut resident bacteria metabolize curcumin to THC – a highly powerful and stable reductive metabolite, which confers similar



yet stronger benefits than the parent curcuminoids, propelled Sabinsa to explore these reductive metabolites in greater depth.

Sabinsa has obtained Novel Food approval from the European Food Safety Authority (EFSA) for Curcumin C3 Reduct®, which contains the curcuminoid metabolites Tetrahydrocurcuminoids (THCs). This may well be the first time a metabolite of a nutrient has been approved as a Novel Food.

Curcumin C3 Reduct® is the hydrogenated derivative of the curcuminoids from Curcumin C3 Complex®. It contains a minimum of 95% of Tetrahydrocurcuminoids (THCs) namely Tetrahydrocurcumin (THC), Tetrahydrodemethoxycurcumin (THDMC) and Tetrahydrobisdemethoxycurcumin (THBDMC).

#### Pharmacokinetics

Preliminary studies have shown that THC has a much higher bioavailability than curcuminoids. Indeed, for the same quantity provided (0.5%), curcumin is only found in small quantities in the blood serum (0.6 nmol/L of curcuminoids and 14.4 nmol/ml of THC) while THC is found at 43.4 nmol/ml in blood serum, but also in liver in free (2.5) and conjugated form (7.9) [Okada et al., 2001].

THC has better stability at physiological pH than curcumin itself that may also be aiding its transportation in the biological system.

#### A stronger antioxidant than curcumin

A series of studies conducted by Sabinsa Corporation proved that **THC was more effective than curcumin** in the ability to scavenge free radicals using the DPPH (2,2-diphenyl-1-picrylhydrazyl) method [Majeed, et al., 1995].

THC shows **greater antioxidant activity** than Trolox – tests carried out in the model of linoleic oxidation and hemolysis of red blood cells induced by AAPH.

Similar results were obtained for the trapping of ROS in a concentration-dependent manner, and is effective in preventing peroxidation of lipids membrane [Prabhu et al., 2011] and tissue [Murugan and Pari, 2006].

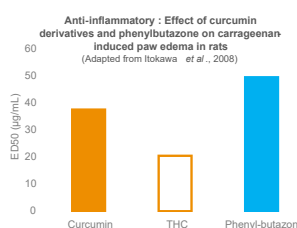
#### Anti-glycation

An anti-glycation agent such as THC can prevent the formation of AGEs (e.g. free radicals, α-dicarbonyl species, protein cross-links etc.) in a streptozotocin-

cin- and nicotinamide-induced diabetes model. The anti-glycation activity of THC was suggested to be due to its antiperoxidative activity [Pari and Murugan, 2007].

#### Anti-inflammatory

THCs even possessed a better safety profile than curcumin with an LD50 value greater than 10,000 mg/kg. Also, THC suppressed the tissue levels of IL-1β, IL-6, TNF-α and PGE2, indicating that THC could alleviate acute inflammation by mitigating the production of pro-inflammatory mediators. In addition, THC significantly inhibited the expression of COX-2, while it exerted no obvious influence on the expression of COX-1. Importantly, **THC showed superior effects in inhibiting the levels of pro-inflammatory mediators and suppressing the expression of COX-2, when compared with curcumin.** The results suggest a better effect than curcumin in selectively inhibiting the COX-2 activity. [Zhang, 2018]



#### Anti-Aging

THCs may regulate the aging process via a pathway that includes O-type forkhead domain transcription factor (FOXO) and silent information regulator 2 (Sir2). FOXO is involved in process such as aging, oxidative response. THC was able to increase the life span of Drosophila melanogaster by attenuating the oxidative stress response and aging process via FOXO [Xiang et al., 2011].

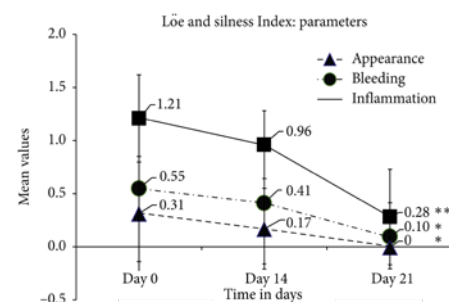
#### Oral Health : Gingivitis – leukoplakia – Canker sore (Clinical study)

**THCs is effective in decreasing the symptoms of canker sore and gingivitis.**

### C3 Reduct® - Novel Food Approved

#### The directly active form of turmeric

- Novel Food approved by EFSA
- Direct input of the metabolites
- Higher bio availability and efficiency than curcuminoids
- Only 140 mg/ day
- Better stability
- Colorless, tasteless (no more long and tedious washes)
- Can be used in In and Out, alone or formulated



Effect of THCs on gingivitis such as appearance, bleeding, and inflammation before (day 0) and after treatment (days 14 and 21)

Clinical trial involving 30 canker sore patients and 29 patients with gingivitis, treatment with C3 Reduct® (two 100 mg chewable tablets/day) over a three week period showed remarkable results.

At the end, **all canker sore patients were completely cured** of their painful ulcerous lesions. C3 Reduct® treatment led to excellent abatement of pain, numbness, ulcer formation, dryness with no staining or allergic symptoms. [Majeed et al., 2020].

In a previous study, patients with lesions of the oral mucosa (leukoplakia) applied a 2% THC gel - because C3 Reduct® may be used in topical products as well as a perfect nutraceutical - 5 times a day for 12 weeks. The burning sensation reduced within 3 weeks, and completely disappeared at 12, with reduction in the size of the lesion [Chhaparwal et al., 2018].

#### AMPKinase and anti-diabetic

This study demonstrates an increase of the phosphorylation of AMPK, and its downstream target ACC in cells with 400 times for C3 Complex® to 100,000 times for THC C3 Reduct® the potency of metformin [Kim et al., 2009], so a potential mechanism mediating glucose-lowering effects of curcuminoids and THC.



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- Kim et al., Curcumin activates AMPK and suppresses gluconeogenic gene expression in hepatoma cells, BBRC 388

# CBD by GVB: the quality you can trust !

Fully integrated, GVB is widely regarded as a best-in-class operator with an estimated 15% share of the hemp-derived active ingredients

## Credibility, consistency, traceability

### Quality & Compliance

### Buffer stock in Europe

### MOQ 1KG

### Excellent stability (ICH)

### Certifications

- 🌿 ISO 9001:2015 Certification NSF-GMP
- 🌿 SQP Achievement
- 🌿 CCOF Organic Certified
- 🌿 Kosher Certification
- 🌿 FDA Registered

## Rigorous Testing and traceability

Every GVB product is continuously tested throughout the production process.

This begins with seeds from a reputable supplier tested rigorously to ensure that GVB grow only the finest hemp. After seed testing, quality control takes place in the field to ensure they are developing high levels of cannabinoids that are free of all contaminants, such as heavy metals and pesticides.

After harvesting, they test again to confirm the final cannabinoid levels and to again ensure that the material is contaminant-free. After extracting the cannabinoid oil from the flower using ultralow-temperature ethanol, they test the resultant oil before distilling it and testing it again. The distillate is then formulated into products such as tinctures and balms. These formulations are then tested once again to verify accurate formulation and adherence to product specifications. All of the products are tested a minimum of five times before they reach our customers. This exacting degree of detail ensures the finest possible quality of all our final products—our highest priority.

## How is CBD Isolate made ?

Extractions begin with a large batch of raw hemp biomass, what first goes through a series of grinding processes to prepare it for extraction. It's then processed through a cold ethanol extractor to begin the extraction process, followed by a filtration which removes all particulates and provides a clean crude extract. Now the extract is distilled and collected in preparation for isolation. During isolation, solvent is added to the distilled liquid and chilled to ultra low temperatures to cause the CBD to precipitate out of the reaction. All solvent that is recovered during the reaction is recycled to be reused during the next round. The chemically pure crystalline CBD Isolate is then sent to quality control for formal

The company is a trusted supplier to leading CBD and cannabinoid brands, including Cookies, NuLeaf and Canaxis Pharma, and , working in collaboration with Biosylx group involved in establishing secured sourcing network and long-term supply-chain. GVB's formulation capabilities and GMP certified facilities are uniquely suited to manufacture vastly improved pharmaceutical and consumer goods products that leverage 22nd Century's proprietary plant genetics and research capabilities.



- **CBD Isolate**  
white to lightly off-white crystalline powder,  
≥ 99% CBD, THC <LOQ
- **Broad Spectrum Distillate**  
light golden viscous crystalline oil  
85-92% CBD, 2-6% minor cannabinoids,  
THC <LOQ
- **CBD Crude**  
dark brown thick oil  
≥ 55% CBD, THC <LOQ
- **CBC Isolate**  
golden to light orange fine-coarse powdered crystal  
95-99% CBC, THC <LOQ
- **Water Soluble CBD Powder 10%**  
fully soluble, fully transparent, and virtually tasteless  
9-11% CBD, 0.1-0.5% minors, THC <LOQ

analysis (in house as well as by an accredited ORELAP laboratory) to ensure that the quality and potency passes the highest quality standards.

CBD Isolate is a pure, crystalline, flavorless pharmaceutical grade powder. The degree of purity makes it extremely easy to dose accurately. Since it is flavorless, it can be easily introduced into products without altering the flavor profile.

## Cannabidiol

The cannabidiol or CBD molecule (identified in 1963) is derived from Cannabis sativa which contains over 100 chemical compounds. CBD is second only to THC in concentration. Cannabidiol has no reported psychoactive

## Full Vertical Integration

Vertical integration is a key operational strategy at GVB Biopharma !

It starts with seed-to-shelf quality control from select hemp genetics and continues through every stage of processing and product development for wholesale and retail customers. This is especially critical in products produced for pharmaceuticals and nutraceuticals markets.

effect (different receptors in the brain). Studies show that it seems to modulate the action of endocannabinoids naturally produced by the brain, and intervenes on the regulation of the concentration of anandamide: the quantity of anandamide increases, which supports the innate endocannabinoid response of the body. CBD also counteracts the action of THC on an endocannabinoid receptor, thus countering the psychoactive effects of the molecule and its side effects.

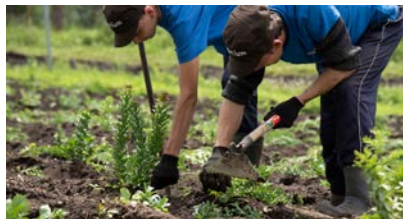
Its action at the level of the endocannabinoid system (which regulates many biological processes) leads to various properties: digestion, metabolism, memory, regulation of stress and emotions ... and thus occupies a key role for the proper functioning of the human body.



## Regulation

Derived from seed or seed oil, the regulatory use of Hemp (*Cannabis sativa*) in food supplements varies in Europe. All countries consider a limit on the THC content (0.2% generally). Although Cannabinoids are not authorized (at the date of this brochure), member states are nevertheless trying to adapt to the growing evolution of this market, and a number of applications for authorization are underway.

The notification of CBD-based food supplements is now possible on Télécare (France). For the authorities, openness to declaration aims in particular to have visibility on the products marketed. However, this declaration does not constitute authorization (as of April 2023) and the authorities insist that CBD is and remains an unauthorized novel food - leading to a potentially confusing situation: opening of the possibility of declaring these products but prohibition of marketing them (Novel Food not allowed).



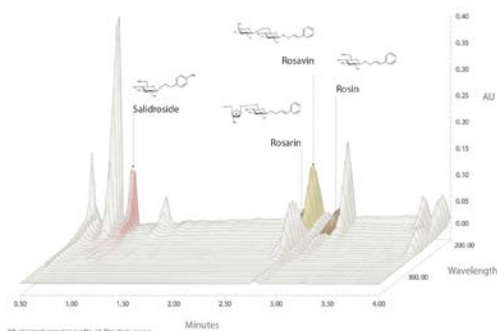
### Pioneering cultivation program boosts adaptogen sustainability

Nektium is taking steps to secure the long-term sustainability of its Rhodioliife® *Rhodiola rosea* extract by switching a significant proportion of its raw material sourcing to cultivated plants. The move – an industry first on such a large commercial scale – will reduce reliance on under-pressure wild-grown supplies.

*Rhodiola rosea* grows wild in the remote Altai mountains in south and central Asia at the intersection of Russia, Kazakhstan, Mongolia, and China. The rapidly growing market for adaptogens has increased demand for *Rhodiola rosea* roots, leading to concerns about over-harvesting.

In response, Nektium has worked with its long-standing local partner to establish fields that offer conditions optimal for the controlled growing of *Rhodiola rosea*. Together, they have converted barren land in undeveloped, unpopulated locations, ensuring minimal impact on communities close by. After a successful trial, initial exploratory fields were extended to provide full-scale sustainable cultivation sufficient to satisfy market demand at an industrial level.

The plant material used to grow Nektium's cultivated *Rhodiola rosea* for Rhodioliife® was originally taken from wild-harvested Siberian plants growing near where the fields have been established. This means there are no physical or phytochemical differences between Rhodioliife® produced from wild-harvested roots and that produced from cultivated raw materials.



## Rhodiola: Memory, Immunity & Energy

A wide array of human health benefits related to mental health and physical performance has been clinically demonstrated using the unique phytomedicinal form of *R. rosea* extract specifically standardized to rosavins. *Rhodiola rosea* possesses valuable anti-fatigue, anti-stress, and anti-depressant properties; it stimulates the bioelectrical activity of the brain and improves memory and mental performance. In addition, it also increases stamina and accelerates the physical recovery processes after intense training workloads; it stimulates muscle energy status, improves glycogen synthesis in the muscles and liver, and increases muscle protein synthesis and anabolic activity.

### The right product from the right place at the right time

While *Rhodiola* as a genus may have originated in the mountainous regions of Southwest China and the Himalayas, botanists have established that *Rhodiola rosea* naturally display a circumpolar distribution in the higher latitudes and elevations of the Northern Hemisphere. In central and Northern Asia, the genus is distributed from the Altai Mountains across Mongolia into many parts of Siberia. Altai Mountains represents a preserved pristine area free from contamination.

### Active Ingredients

Activities related to *Rhodiola rosea* have been traditionally attributed to the presence of four principal active ingredients: salidroside, rosin, rosavin and rosarin (Sokolov, 1985; Furmanowa, 1998).

The root of *R. rosea* shows six distinct groups of chemical compounds. The Phenylalkanooids are the main contributors, incl.:

- **Phenylpropanoid : Rosavins** (ie. rosavin, rosin and rosarin) are products of the phenylpropanoid metabolism, specific to the root from *Rhodiola rosea* as the constituents most often selected as the marker compounds for standardization of extracts, although they are not necessarily the only pharmacologically active ingredients for its medicinal properties.
- **Principal phenylethanoids** consist of glycosides, and salidroside as the most active tyrosol glycoside, being associated together with rosavins to the anti-depressive and anxiolytic effects (Maslowa, 1994; Tolonen, 2003). Other phenylethanoids have also been isolated but with today limited scientific literature (Jiménez 1994).

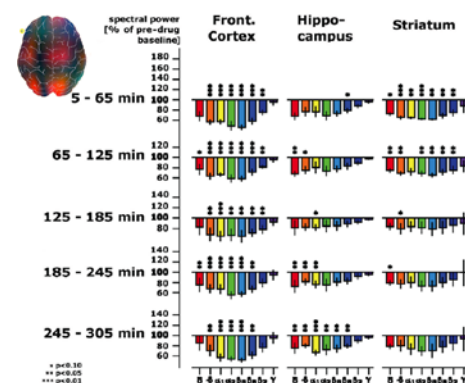
*Rhodiola rosea* is the most popular traditional phytomedicine used to increase physical endurance, work productivity, longevity, memory and attention, resistance to high altitude sickness, fatigue, depression, and disorders of the nervous system. Simply the best adaptogen!

### Attention and Memory Cerebral activity

*Rhodiola rosea* is known to improve attention and cerebral performances.

On 2017, Nektium has conducted new studies: Electroencephalic studies (EEG) showed that animal supplemented with Rhodioliife® have an increased neurotransmitter production in the studied areas. This effect lasts at least for 5 hours until the end of measurements, and so even more.

Besides of a stimulatory effect, the results indicate an improve of memory and an increased activity in brain regions related to motivation and reward.



*R. Rosea* increases the bioelectrical activity of the brain which improves memory and brain energy. Another study also described the Acetylcholine Esterase Inhibitors in *Rhodiola rosea*. It helps the body adapt to stress by affecting the levels and activity of serotonin, dopamine, and norepinephrine, neurotransmitters found in different structures in the brain and influencing the central nervous system.

### CITES : Work confidently with nektium available and sustainable Rhodiola

In February 2023, the Convention (CITES) listed *Rhodiola* spp. in their Appendix II - the trade of the botanical will be largely monitored and subject to export permits moving forward.

Nektium has always been at the forefront of sustainable, responsible sourcing for its *Rhodiola rosea* materials - the recently announced cultivation program for Rhodioliife® is the most significant response. As a result, Nektium does not anticipate any challenges with complying with all requirements nor do they expect any disruption in the value chain for Rhodioliife®.



## Immune System

The *Rhodiola* extract Rhodiolife® has clearly demonstrated its ability to **protect cells** from viral infection. This is the first time shown to be effective in the activation of the human immune system (launch and human in-vivo study April 2015 - Ahmed M, et al (2015) «*Rhodiola rosea* Exerts Antiviral Activity in Athletes Following a Competitive Marathon Race». Front Nutr. Jul 31;2:24.).

It stimulates and protects the immune system (homeostasis), and increases the natural killer cells (NK) in the stomach and spleen. This action may be due to its ability to normalize hormones.

**Cardiovascular :** Linked to the anti-stress action (and decrease of catecholamines and corticosteroids released by the adrenal glands during stress), *R. rosea* decreases the amount of cyclic-AMP (c-AMP) released into cardiac cells, and so assist the uptake of free intracellular calcium for greater heart muscle contraction (regular beat).

*Rhodiola* extract reduces levels of C-reactive protein, an inflammatory marker, and creatinine kinase, a marker of muscle damage (Abidov M & al., 2004). An other study from Nektium suggests that *Rhodiola* extract protects against peroxide-induced oxidative stress through the modulation of HSP70 (heat shock protein) in C2C12 muscles cells.



## Response to Stress

*Rhodiola rosea* balance the body's stress-response system. Adaptogenic plants naturally increase the body's non-specific resistance and normalise the functions of the body, with a more resourceful manner when facing stressful situation. *R. rosea* impacts central monoamine levels.

*R. rosea* is said to assist the transport of serotonin precursors, tryptophan and 5-HTP into the brain. (Studies shows that serotonin brain neurotransmitter is involved in many functions such as pain perception, behavior, smooth muscle contraction, temperature regulation, appetite, etc...

Case studies have reported that *R. rosea* helps with depressive syndromes, memory loss, anxiety, cognitive dysfunction and menopause related symptoms.

## Oxidative stress

*Rhodiola rosea* root extract protects skeletal muscle cells against chemically induced oxidative stress by modulating heat shock protein 70

(HSP70) expression. «The aim of this study was to analyze the efficacy of a *Rhodiola rosea* extract (Rhodiolife) in protecting murine skeletal muscle cells (C2 C12 myotubes) from chemically induced oxidative stress and to establish whether modulation of HSP70 expression is observed. C2 C12 cells treated with Rhodiolife did not experience any loss of viability ( $p > 0.05$ ) at concentrations of 1-100 µg/mL for up to 24 h. In control cultures, viability decreased 25% following exposure to 2 mM H<sub>2</sub>O<sub>2</sub> (1 h). HSP70 protein levels were maintained in pre-treated cell cultures compared to controls but was significantly lower (~50%) in cells lacking treatment exposed to H<sub>2</sub>O<sub>2</sub>. The present results indicate that Rhodiolife protects C2 C12 myotubes against peroxide-induced oxidative stress through the modulation of the molecular chaperone HSP70.». Hernández-Santana et al (2014), Phytother Res. 2014 Apr;28(4):623-8.

## Anti-inflammatory

Studies in healthy volunteers demonstrated that supplementation with Rhodiolife® has an anti-inflammatory and protective effect on muscle tissue during exercise. Abidov M, et al (2004)



**ESSNA award: Best Targeted Sports Nutrition Product**  
Doping free (BCSG certified)  
ID & DNA Testing

# Rhodiolife®

**Bacosides extracted from *Bacopa moniera* (Brahmi) can revitalize the intellectual functions (in children) and calm down the stressed mind, allowing for better brain function.**

In India, *Bacopa monniera*, known as «Brahmi», is revered in the indigenous system of medicine as a nerve tonic. The traditional use of the plant, of particular relevance to contemporary medicine, is its validated efficacy in promoting memory functions and providing relief to patients with anxiety neurosis. In Ayurveda, Brahmi is described as «medhya rasayana» or brain tonic with the ability to promote mental functioning along with providing general rejuvenative effects. In early literature, the name Brahmi was also used to refer to another plant species, *Centella asiatica*, but both are distinctly different.

## Bacopa revitalizes intellectual functions

### Chemical constituents

The pharmacological effects of *Bacopa monniera* are attributed to the presence of a number of biologically active compounds, including alkaloids, saponins and sterols. The compounds responsible for the memory enhancing effects of are triterpenoid saponins called «bacosides» (Bacoside A3, bacoside 1, bacoside 2, jujubogenin, bacosaponine C).

### Properties

The biological effects of *Bacopa monniera* are well documented in traditional as well as scientific literature. The most important of these are the effects of the plant, plant extracts and isolated bacosides on cognition and memory functions, their anxiolytic effects and their role in the management of convulsive disorders. On receiving signals, receptors of the hippocampus trigger an electric pulse, mediated through a

change in protein composition

The pulse is transmitted to the next neuron through the synapse. The process continues till the bond between neurons becomes strong and the memory is created. However, continuous electrical activity wears out the synapses, impairing a new memory creation and causing loss of memory. The bacosides help in restoring the synaptic activity of neurons.

Bacopa is a **cognitive enhancer** in cases of :

- ❑ Declining Memory
- ❑ Poor Concentration
- ❑ Attention Deficit Hyperactivity Disorder
- ❑ Anti-convulsive or Anxiety Neurosis

**Dosage :** 15 to 30 mg of Bacosides 3 times daily for 20% extract (dosage must be adapted to the grades 20% or 50%)

# Zynamite® ZYN15, Aqueous extract, water soluble

**Z**ynamite® ZYN15 is our new aqueous extract of mango leaves, water soluble. The pharmacokinetics studies even showed an improve efficacy.

In the view of pursuing the global success Zynamite® (ZYN60), and also its regulatory clearance in some countries, Nektium has developed Zynamite® soluble ZYN15.

Beside the regulatory aspect, the studies showed that Zynamite® ZYN15 also had a superior application performance.

This was important to demonstrate the efficacy of this new Zynamite® ZYN15 versus the multi award original Zynamite® ZYN60.

Key aspects are :

- **clinical study to demonstrate bio-equivalency** to Zynamite® (ZYN60, 60% mangiferin)
- application trials to demonstrate the **technical performance of Zynamite® (ZYN15)** in selected applications next to dietary supplements, also in food and beverages.

Based on the Pharmacokinetic study (PK) conducted, **Zynamite® ZYN15 water extract is up to 4 times more bio-equivalent than Zynamite®**. Therefore, it could be concluded that 300 mg of Zynamite® ZYN15 is equivalent to 300 mg of Zyna-

*... therefore, it can be concluded from PK studies that 300 mg of aqueous extract Zynamite® ZYN15 is similar to 300 mg of Zynamite® ZYN60.*

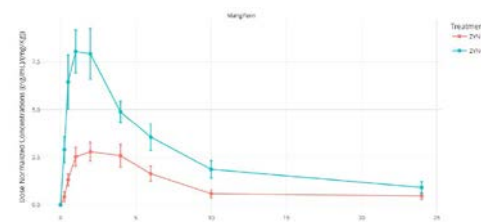
mite® and thus provides the same efficacious dose to the human body. A bio-equivalence study was commissioned by Nektium. The pharmacokinetic study report is available under the terms of a signed NDA.

A **second study to prove the PK** has been performed, what reconfirmed this PK of circa. 3.5-4.5.

Results obtained after analyzing the pharmacokinetic curves revealed that ZYN15 yielded higher normalized AUC<sub>0-24h</sub> than ZYN60. Other parameters obtained from this pharmacokinetic study, such as  $C_{max}$  and  $T_{max}$ , also highlighted that mangiferin coming from ZYN15 is absorbed faster than from ZYN60.

**This increased bioavailability of ZYN15 versus ZYN60 might be explained by:**

- The **enhanced aqueous solubility** of the ZYN15 over ZYN60, what could enhance the absorption of flavonoids
- Interaction of matrix components with the **transporters involved in the absorption** especially by inhibiting the ABC transporters



The pharmacokinetic data obtained in this pharmacokinetic study reveal a clear pattern in the absorption of mangiferin coming from the two Zynamite® grades:

- **Mangiferin is significantly more bioavailable from ZYN15**
- Mangiferin **absorption is faster** from ZYN15 than from ZYN60 (cf.  $T_{max}$  and  $C_{max}$  results)

Based on the obtained results, it is confirmed that within two hours of intake of ZYN15, the level of absorption is 4 times higher compared to ZYN60.

The large improvement in solubility achieved in ZYN15 allows mangiferin to pass more easily through the gastrointestinal tract, making it more bioavailable. The presumable broader phytochemical spectra of ZYN15 might also have some influence over the absorption of mangiferin.

## SeleniumSELECT®

*Selenium is a vital trace element nutrient with multiple roles in the growth and functioning of living.*

**T**he recommended levels for selenium supplementation in humans are 50-200 mcg/day. The recommended daily dietary allowance for selenium is 55 mcg. This recommendation also suggests that intake of selenium from all sources should not exceed 400 mcg. At supranutritional dietary levels, selenium can prevent the development of many types of cancer. At higher concentrations, selenium compounds can be either cytotoxic or possibly carcinogenic. **Selenomethionine is a safe form of supplemental selenium** (Schrauzer, 2003). Furthermore, organic selenium compounds such as L-Selenomethionine have been clinically proven to be more bioavailable than inorganic selenium supplements such as sodium selenite. (Burk, et al; 2006). Plants absorb selenium from the soil and convert it into organic forms that are easily assimilated. For example, L-(+)- selenomethionine, and organic compound, is the predominant form

of selenium in wheat and cereals.

L-(+)- selenomethionine is **rapidly and completely absorbed** from the gastrointestinal tract.

**L-Selenomethionine - SeleniumSeLECT®**  
Superior bioavailability

**Sabinsa has been the pioneer** in the manufacturing technology for L-Selenomethionine. They even submitted its product specifications and analytical methodology for inclusion in the USP.

A study conducted by Vanderbilt University Medical Center found that L-(+)-Selenomethionine in the form of Sabinsa's branded SeleniumSELECT®, is twice as bioavailable as selenium in the form of selenite (1.30% to 40% elemental Se).

**Prevention and management of viral diseases**

The potential protective effect of selenium in viral diseases including human immune-deficiency virus (HIV) infection has been considered because of selenium's recognized effect against a number of viral pathogens and because symptoms of impaired immune response, similar to that in AIDS, were associated in vitro and in vivo with selenium deficiency.

A study published (2021) with **Sabinsa's selenium** shows that **selenium supplementation** may be helpful in reducing the effects of the **virus COVID 19**.

## Zinc Monomethionine

Zinc potentiates antioxidant functions (comparable to vitamins E, C and  $\beta$ -carotene), stabilized membranes, immune functions, and plays a key role in the activity of a host of zinc metalloenzymes. For specific immune functions, zinc deficiency leads to both lymphopenia and declined lymphocyte function. Zinc supplementation was demonstrated to significantly improve height, weight, bone development, immune function, vision and sight, and sexual maturation.

Both animal and human studies were conducted to evaluate the bioavailability of Zn-Met in comparison to the other zinc sources, such as zinc sulfate, zinc polyascorbate and zinc oxide. Zn-Met is shown to have higher bioavailability and resist binding with dietary fiber and phytate which usually inhibit zinc absorption. Zn-Met has been shown to increase growth performance and immune system in animal and clinical studies better than other sources of Zinc.

Zinc Monomethionine contains :

- 20-22% of Zinc
- 40-45% of Methionine

**Other reported properties**

- Anti-inflammatory (rheumatoid arthritis)
- Diabetes/Blood Sugar (mimic insulin)
- Cardiovascular Health (inhibit LDL oxidation)
- Blood coagulation and anti-arrhythmic agent
- Prevention of cancer, as a single ingredient or in combination with other anti-oxidants

# Boosting mental and physical energy with Zynamite®

**Zynamite® is the multi-award winning patented botanical extract, clinically documented to provide significant sustained boosts to mental and physical performance.**

**Z**ynamite® is the healthy way to replace caffeine with a botanical ingredient without the side-effects of caffeine and actually works better than caffeine, while retaining the experiential effect. Zynamite® is the Nektium's patent-pending proprietary *Mangifera indica* extract, getting the **Nutraingredient award in 2018, 2019, and ESSNA award Best free-from product** and 'Runner-up Game changer'

Zynamite® gives sustained mental and physical energy and focus without any negative side effects.

**What do tired people need ?**  
Stressed or fatigued people lack enthusiasm and mostly feel exhausted and desperate. What they desire is a sustained boost of energy that improves physical performance, concentration, attention, alertness and mood.

**The problem with caffeine**  
Because of the mental energy and focus provided by caffeine, billions of cups of coffee are consumed daily to assist people to cope. However, caffeine is addictive and most people

## Benefits

### Cognitive health (clinical studies)

- + Rapid onset of mental activation
- + Faster reaction time
- + Increase performance
- + Focus and concentration

### Sport Performance (clinical studies)

- + Sustained energy
- + Increase power
- + Doping free

### Safety & Information

- + Own safety data : AMES, 14-day and 90-day oral toxicity, NOAEL... and new soon coming.
- + GMO, BSE/TSE free, Doping free, DNA barcode, Vegan, Kosher, Halal, traditionally used in food, registered in different countries in Europe, Australia, New Zealand, USA (self GRAS i.p.)

ple consume too much of it and suffer from its negative side effects and withdrawal symptoms.

### Caffeine in Sports Products

Many sports products contain caffeine to increase alertness and boost physical energy but these products inevitably lead people to experience jitters, anxiety, irregular pulse, insomnia and nausea - all physical and mental issues for concern, especially for sports performers. Zynamite® is the ideal alternative.

### What is Zynamite®?

Zynamite® is Nektium's patent-pending proprietary *Mangifera indica* extract standardized to ≥ 60% mangiferin.

*Mangifera indica*, the common mango tree, is cultivated extensively in the tropical and sub-tropical regions of the world. Infusions and decoctions of mango leaves are used extensively in traditional health systems and have been known for centuries for their health benefits.

### How does Zynamite® work?

**Zynamite® activates brain waves and increases Long Term Potentiation** in a remarkably similar pattern to caffeine. While caffeine antagonizes adenosine receptors, Zynamite® acts non-selectively to stimulate brain activity. The key active, mangiferin acts non-selectively to modulate multiple physiological and CNS targets.

### Bio-actives of Zynamite®

The active principle of Zynamite® is mangiferin, a natural flavone polyphenol. Ultra-high-performance liquid chromatography (UHPLC) with photodiode array detection (PDA) is used to provide high-resolution separation, identification and quantification.

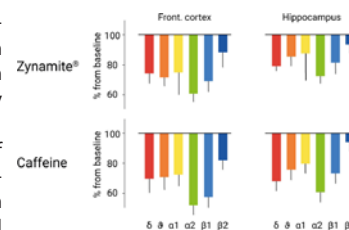
### Mental Activity

Zynamite® has remarkably similar mental

activation activity to caffeine in studies of brain electrical activity in vivo.

The pattern of electrical activation for both Zynamite® and caffeine are remarkably similar in the brain frontal cortex and in the hippocampus.

(Preclinical study, Collaboration with Professor Wilfried Dimpfel, Justus-Liebig-University, Giessen, Germany)

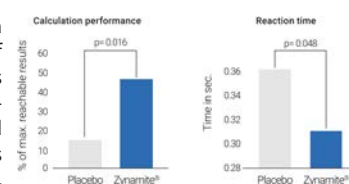


## Mental Energy

The effect of a single dose of Zynamite® as caffeine-replacement was tested in 32 participants in a double-blind, randomized, placebo-controlled, 2-armed study with parallel design.

Calculation performance Significantly improved cognitive performance. Reaction time Significantly faster reaction compared to placebo.

(two clinical studies, Collaboration with Professor Wilfried Dimpfel, Justus-Liebig-University, Giessen, Germany)

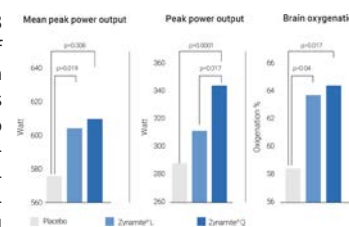


## Sport Performance

The effect of 48 hour intake of Zynamite® on performance was tested in two sports formulations in a double-blind, placebo controlled cross-over cycling trial in 30 young physically active athletes.

Mean peak power output reached in each sprint was significantly higher for both Zynamite® formulations compared to placebo. Peak power output developed in the 15-s sprint performed immediately after ischaemia was significantly higher for Zynamite®.

Brain oxygenation measured with spatially resolved near-infrared spectroscopy in the female group of thirteen women was significantly higher for both Zynamite® formulations.



## Product Features

<b>Botanical origin</b> <i>Mangifera indica</i> mango leaves	<b>Taste</b> Mild taste
<b>Bioactives</b> ≥ 60% mangiferin	<b>Recommended serving</b> Recommended 300mg
<b>Cultivated or wild</b> Cultivated	<b>Quality</b> GMO free, BSE/TSE free, DNA-barcode, Doping free
<b>Cropping pattern</b> Conventional	<b>Product certification</b> Kosher, Halal
<b>Appearance</b> Fine powder	
<b>Pack size</b> 25kg	

## Sourcing

Zynamite® is rooted in a history of traditional use. Nektium spent years understanding how different traditional cultures have used a variety of herbs to boost concentration and mental focus— from the Amazon to India, China, and Africa. Their search led them to develop the specific profile of extract that now make up the patented blend in Zynamite®.

Zynamite® is sourced by selectively pruning cultivated mango trees in the tropics meaning it is not only a natural alternative to caffeine, but as a by-product of mango production is also an ecologically sustainable one.

# enXtra® natural caffeine-free alternative

**Caffeine-free,  
All-natural energy alternative  
Up to 5 hours  
of sustained energy**



**E**nXtra® from *Alpinia galanga* is a DNA-authenticated, stim-free energy ingredient that provides fast, effective and safe energy with no crash. In a 53-person, double-blind, double-dummy human clinical trial, It was shown to improve mental alertness & acuity for up to 5 hours without increasing heart rate or blood pressure. It can be used as a replacement for caffeine or used with caffeine to prevent crash and prolong benefits. enXtra® is easy to formulate with, water soluble and has a pleasant taste profile.

- enXtra® is a galangal extract that delivers fast, effective and safe results for improving mental alertness & acuity
- It does not increase heart rate or blood pressure and is safe & effective for 5 hours without the caffeine 'crash'.
- enXtra® is water soluble and can be formulated with or without caffeine
- It brings a mild and pleasant taste

## Study Findings

- Maximum increase in alertness from baseline was observed at 3 hour interval
- The combination of caffeine with enXtra® significantly reduced mean response time as compared to placebo
- Improved ability to achieve and maintain high arousal levels to better process new information.
- The newly published study (2020) re-demonstrate the efficacy and the safety for a period of 12 weeks

## Supported by human clinical trials

### Pilot Study : Human Safety & Efficacy

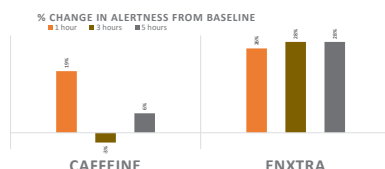
**300 mg of enXtra® *Alpinia galanga* demonstrated optimal improvement in alertness** for up to 5 hours when compared to other extract groups (70 caffeine habituated subjects)

## Second Human Study

Randomized, double blind, double dummy, placebo controlled crossover study design : 53 caffeine habituated individuals with 4 study arms

- Placebo
- Caffeine (200mg)
- enXtra® (300 mg)
- enXtra® (300 mg) + Caffeine (200mg)

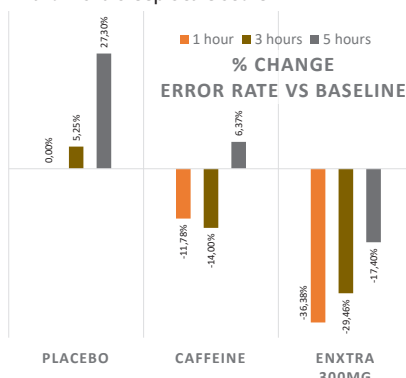
The results have even been confirmed in a 4<sup>th</sup> study, comparing again enXtra® to caffeine.



Assessments were taken at 1-hour, 3-hour and 5-hour time intervals

Standard assessment tools :

- Attention Network Test
- Psychomotor Vigilance Task
- Karolinska Sleep Scale score



## Molecular Docking / Dopamine

To better understand how enXtra® provides 5hrs of Mental Alertness & Sustain attention, without the crash, a molecular docking study of a database of molecules of enXtra® was performed against a panel of target proteins responsible for enhancing attention network components; Dopamine (DA) is the primary neurotransmitter responsible for many physiological processes including alertness, focus, feeling of well-being and improved productivity. Dopamine reuptake through the plasma membrane protein, Dopa-

**Sharpens focus, alertness, and attention for up to 5 hours**

**No increase in blood pressure or heart rate**

**Amplifies caffeine benefits without the "crash"**

**Dopamine release**

**AchE (Acetylcholine esterase) inhibition**

mine transporter (DAT), is the primary mechanism for regulating dopamine concentration suite. On 43 compounds, 25 belonging to EnXtra, were subjected to docking. As evident by glide score, active compounds of enXtra® demonstrated Glide score better than caffeine and increased dopamine levels by blocking its uptake. This increase in dopamine levels can enhance visuo-spatial performance and mental clarity, leading to improved mental alertness and better focus.

In the current study, several compounds of enXtra® namely exhibited significant Glide score for AchE (Acetylcholine esterase) target enzyme, demonstrating their potential to inhibit AchE.

**Hence it can be concluded that bioactive molecules from enXtra® decrease dopamine uptake and inhibit the AchE target protein which leads to attention-enhancing effect and better understanding**

## Manufacturing

Gentle, solvent free extraction for optimum bioactives. DNA match authentic galangal.

## Responsible Sourcing

- Skillful hands cultivating galanga for more than three generations
- Grown in hilly terrain away from pollution
- Cultivated without pesticides
- Hand picked at optimal daytime temperature
- Natural drying on high altitude, stony land near farm

enXtra® is **100% Pesticides free, GRAS, certified by Vegetarian association, non-dopant** (informed-sport.com, informed-choice.org), and freely soluble.

## Starmeric™

**The unexplored non-polar components of turmeric also have potential health benefits. Starmeric™ is a resistant starch, isolated from turmeric.**

The double-helical crystalline structure of resistant starch cannot be hydrolyzed by enzymes in the small intestine and it is passed into the large intestine for fermentation by gut microflora, there it produces short-chain fatty acids.

The resistant starch, with the virtue of its slow degradability by the enteric enzymes, lowers the postprandial glucose level and can also improve the insulin sensitivity (Sun et al., 2018). When taken orally, short-chain fatty acids released during resistant starch metabolism by gut microflora have

stronger anti-inflammatory activity (Vino lo et al., 2011 ). Starmeric™ has been shown to possess **anti-rheumatoid activity** against *Mycobacterium tuberculosis* induced adjuvant arthritis. Additionally, various studies have shown that the resistant starch can improve serum lipid profile, improve colon health, improve gut microbiome, and can act as a potent prebiotic (Janine et al., 2004).

**Starmeric™**

# Trust the Most Studied Curcuma

Sabinsa has developed a reputation for being a trusted and valued resource to academic and medical communities in providing C<sub>3</sub> Complex<sup>®</sup> for a variety of research initiatives.

Feel quiet when using the *Curcuma longa* from the leading Cie

## New Metabolic syndrome

A significant study on Curcumin C<sub>3</sub> Complex<sup>®</sup> (in combination with BioPerine<sup>®</sup>) in patients with metabolic syndrome has been published on end of 2014, showing the significantly greater effect of Curcuminoids in reducing the serum concentrations of LDL-C, non-HDL-C, total cholesterol, triglycerides and Lp(a), when serum HDL-C concentration was elevated significantly. Serum sdLDL levels were comparable (randomized, double-blind, placebo, 117 patients, 8 weeks).

## New - Osteoarthritis

Another study on 53 subjects for 8 weeks with C<sub>3</sub> Complex and BioPerine shows that this combination brought a significant improvement in arthritic indices such as VAS (Visual Analogue Scale), WOMAC (WOM Osteoarthritic Index) and LPFI (Pain Index).



All form of curcuminoids are not equal. Some forms can be bioavailable, but unfortunately inactive.

Sabinsa's Curcumin C<sub>3</sub> Complex<sup>®</sup> enjoys a special place among curcumin extracts. C<sub>3</sub> Complex is obtained from the dried rhizomes of *Curcuma longa* (turmeric) and standardized to min. 95% Curcuminoids. The name C<sub>3</sub> Complex has reference to its three main chemical compounds – Curcumin (75-85% of the composition), Demethoxycurcumin and Bisdemethoxycurcumin – collectively known as Curcuminoids.

## Traditional knowledge

The rhizome of turmeric has a rich history in India as a spice, food preservative and coloring agent, and has been used for centuries in the Ayurvedic system of medicine: well-documented for treatment of various respiratory conditions (e.g. asthma, bronchial hyperactivity and various allergies), liver disorders, poor appetite, rheumatism and influenza symptoms.

## Pharmacological activity

Turmeric and more appropriately the components curcuminoids have been preclinically and/or clinically validate for their role in maintaining health and wellness.

At the molecular level, the curcuminoids have been showed to inhibit nuclear factor kappaB (NGkB), a transcription factor that triggers inflammatory mediators.

Curcumin C<sub>3</sub> Complex counteract free radicals in 2 ways:

- Prevention of free radical formation
- Intervention whereby already preformed radicals are quenched by the curcuminoids.

Curcuminoids offer antioxidant, anti inflammatory, and a healthy immune system support, and potential prevent connective tissue break down through inhibiting destructive enzymes, with benefits in healthy aging and all-related oxidative stress (including diabetes mellitus (and the secondary complications of the disease). Studies reported It protects the liver against several toxicants both in vitro and in vivo.

Various other researches are conducted especially against metabolic syndrome (see below), as well as Alzheimer (anti-amyloid b), and cancers (breast, bladder, pancreatic, skin) where curcuminoids act by inhibiting several processes.

## Why Curcumin C<sub>3</sub> Complex stands out from the crowd ?

- **Most clinically studied Curcumin brand:** more than 65 scientific publications, including clinical trials, have been published, and more than 100 articles.
- **Free curcuminoids only,** and no inactive metabolites
- **Most active form** (independent comparison of various Curcuma 95)
- **Most safety data conducted with C<sub>3</sub> Complex and not another curcuma extract.** Only Curcumin in the market that has been reviewed and acknowledged by US FDA for GRAS status, a process which includes a comprehensive review of safety and toxicological data
- **Most Patent-IP protection:** Holds patent covering composition of curcuminoids, method of manufacture and uses
- **Most consistent quality:** C<sub>3</sub> Complex has the same composition of the three Curcuminoids consistently in the same ratio in every batch
- It is known for its **very low oxalic acid** content (what caused kidney stones), heavy metal, ...
- **Most stable supply chain:** C<sub>3</sub> Complex is promptly delivered from European buffer stock
- More **proven bioavailability**
- **Dedicated unit:** C<sub>3</sub> Complex is processed all over the year in its dedicated unit on a continuous batch extractor, without risk of cross contamination, from known fields (traceability)
- **Various awards**
- **Grades available**  
Curcumin C<sub>3</sub> Complex 95%  
Curcumin C<sub>3</sub> Complex 95% DC (Direct Compression)  
Curcumin C<sub>3</sub> Complex BWS (with Bacosides)  
Curcumin C<sub>3</sub> Complex Beadlets  
Dispersible Curcumin C<sub>3</sub> Power Liquid

## Beverage-grade with pleasant taste now available

Sabinsa introduce a new form of Curcumin which is new market-ready, product formulation concept, Curcumin C<sub>3</sub> Power Liquid, which was the Tasting Center Award Winner at Vitafoods Asia 2019.

Sabinsa's Curcumin C<sub>3</sub> Dispersible - a standardized powder extract containing 60% Curcuminoids - effectively and efficiently resolves the solubility challenge of curcumin.

Developed specifically for RTD beverages and powdered drink mixes utilizing natural excipients as a base, it can be added to water or juice, or used in chewable/ dispersible tablets.

It is not an instant powder, as it must be firstly dissolved.



# Probiotic *Lactobacillus* LactoSpore®

## Shelf-Stable Probiotic LactoSpore®

Easy to use probiotic providing 15 billion *Lactobacillus sporogenes* spores (also called *coagulans*), stable.

Activities are multiple, interacting for the whole body, including digestion, cholesterol management, bloating and health of the intestinal tract.

**L**actoSpore® is a lactic acid producing *Bacillus* preparation providing 15 billions of spores per gram.

After ingestion (medium for awakening), the spores revive and produce acid L (+) Lactic, with the positive action on other micro-organisms. LactoSpore® is used in dietary supplements, in dairy products, bakery products, in tablets or vaginal ovules and in veterinary products.

### Bacillus coagulans as a probiotic

Clinical studies have revealed that *L. sporogenes* can be successfully implanted in the intestine. LactoSpore® :

**Contain a large number of viable *lactobacilli*** that retain viability during preparation in pharmaceutical dosage forms and during storage before consumption. The spores are thermostable as against viable *L. acidophilus* cells which may not withstand spray drying.

**Survive in gastric secretions and bile** of the upper digestive tract and reach the intestine safely.

**Settle in the digestive tract and produce enough lactic acid** and other antagonistic substances to inhibit the growth of pathogenic bacteria.

Being sporulated, they germinate and produce sufficient viable cells which proliferate and perform vital healthful functions. In addition, *L. sporogenes* spores are semi-resident and are slowly excreted out of the body (7 days after discontinuation of administration).

**Gastro-intestinal and associated effects :** administration of *L. sporogenes* markedly improved the general clinical condition of the subjects and provided relief from intestinal disorders and allergic skin conditions. Studies performed on patients suffering of gastro-intestinal disorders proved the efficacy on :

- Acute and chronic intestinal catarrh
- Diarrhea
- Constipation
- Abnormal intestinal fermentation
- Dyspepsia infantum
- Allergic skin diseases
- Etc...

### Bloating, abdominal gas and distension

A new study published on March 2023, demonstrates that LactoSpore® at 2 bl. CFU (ie. 133mg of LactoSpore®) was significantly effective in alleviating the symptoms of gas and bloating in patients in the absence of other functional gastrointestinal disorders.

**Hypocholesterolemic effects :** Total serum cholesterol, LDL-cholesterol and total cholesterol to HDL-cholesterol and LDL-cholesterol to HDL-cholesterol ratios was reduced significantly over a period of three months.

**Non-specific vaginitis :** increase the vaginal acidity by the action of the lactic acid

**Veterinary probiotic** (weight gain, feces)

### New Safety, Stability and Efficacy studies published, incl. IBS

#### Treatment of diarrhea predominant IBS study : management of major depression with irritable bowel syndrome

The modification of microbial ecology in human gut by supplementing probiotics may be an alternative strategy to ameliorate or prevent depression. A double blind placebo controlled multi-centered trial was conducted to evaluate the safety and efficacy of LactoSpore® in diarrhea predominant Irritable Bowel Syndrome (IBS) patients. The study concluded that LactoSpore® along with standard care of treatment was found to be safe and effective in diarrhea predominant IBS patients for 90 days of supplementation. Hence, it showed robust efficacy for the treatment of patients experiencing IBS symptoms with major depressive disorder.

#### LactoSpore®: Anti-diarrheal & Gastrointestinal motility study

The effect of *Bacillus coagulans* MTCC 5856 (LactoSpore) on castor oil induced diarrhoea and gastrointestinal (GI) motility using well established in vivo studies found LactoSpore® exerted dose dependent anti-diarrhea activity and reduced the faecal output (33%). It also inhibited the gastrointestinal motility. The results suggested that LactoSpore® possess significant anti-diarrheal activity and therefore could be a potential agent in the management of diarrhea.

#### LactoSpore®: Genetic and Phenotypic Consistency Findings

That *B. coagulans* strain was clearly demonstrated through this study designed to evaluate probiotic potential, in-vitro safety, product stability, genetic and phenotypic consistency of the probiotic strain used for pro-

duction of LactoSpore®. Phenotypic and genotypic studies proved that the commercial preparations of LactoSpore® contained the same strain of *B. coagulans* MTCC 5856 over multiple years of commercial production. *B. coagulans* MTCC 5856 strain showed probiotic potential and found to be non-mutagenic, non-cytotoxic, negative for enterotoxin genes and stable at ambient temperature (25 ± 2°C) for 36 months.



#### LactoSpore® Safety Study

A Double-Blind, Placebo-Controlled, Parallel clinical trial was conducted to evaluate the Safety and tolerability of *B. coagulans* MTCC 5856 at a dose of 2 billion spores per day in healthy adults. Safety and tolerability of *B. coagulans* MTCC 5856 was assessed over 30 days by safety laboratory parameters (blood hematology and clinical chemistry parameters), anthropometric measures (weight, BMI, blood pressure and heart rate), adverse events, Bristol stool score, tolerability questionnaire and bowel habit diary. LactoSpore® has recently obtained the approval as Natural Health Product (NHP) that allows formulators and marketing companies to market LactoSpore® in Canada as NHP.

#### Recommended dosage Stability

The daily recommended dose is 100 to 200 Million organisms per dose - 3 times daily, in tablets, capsules, chewable tablets, vaginal tablets or ovules, etc...

**Sabinsa has studied the heat stability** at 90°C and 140°C (stability on viable count of LactoSpore® with high temperature) and the viable counts remain over 90% even after 150 sec at 90°C or 30 sec at 140°C. **Virtually 100% of spores are revived**, one reason for the choice of *Bacillus coagulans* (sporogenes), and specific drying method. Spores will not grow during their action, and disappear by natural ways after working, hence the need for regular intake.



# Tinofolin®

## Capture memories forever



Tinofolin® is the extract by Sabinsa of *Tinospora cordifolia*, one of the extremely valued medicinal plants of Ayurveda, commonly called as "Guduchi".

Guduchi means one which protects the entire body and is attributed to its ability to impart youthfulness, vitality, and longevity.

In Ayurveda, *Tinospora cordifolia* is believed to have rejuvenating, tonic, anti-aging, longevity and aphrodisiac properties. Traditionally well known for its anti-stress activity. The plant has been validated for its anti-inflammatory, anti-diabetic, anti-arthritic, anti-stress, anti-allergic, an-

ti-malarial, immunomodulatory and hepato-protective activities.

**Enhances verbal learning and memory and logical memory (of immediate and short term type) compared to placebo in healthy volunteers.**

Tinofolin® was evaluated for its ability to improve visual memory, logical memory, verbal memory, attention span and concentration in a placebo-controlled double-blind study involving 30 human volunteers of age 18-30 years for 21 days. The supplementation (500 mg/day) significantly improved verbal learning (placebo:  $-1.2 \pm 1.9$  & Tinofolin®:  $6.9 \pm 2.5$ ;  $p < 0.05$ ) and memory and logical memory (placebo:  $5.1 \pm 6.1$  & Tinofolin®:  $26.6 \pm 6.7$ ;  $p < 0.05$ ) compared to control. There were no significant untoward effects reported during the trial. Hence, Tinofolin® at 500 mg per day enhances the verbal learning and memory and logical memory (of immediate and short term type) compared to placebo in healthy volunteers.

In another double-blind placebo-controlled study in 30 healthy human volunteers for 21 days, 500 mg of Tinofolin® showed no change in the hematological and biochemical parameters. Hence, Tinofolin® can be considered as safe for human consumption.

The mechanism of action is not yet clear and Sabinsa plans to conduct further studies to better understand them.

Here are the conclusions of their pre-study: *Tinospora cordifolia*, used for its immunomodulatory properties, could have improved cognition by increasing IL-1 synthesis. The second mechanism may be due to an increased synthesis of acetylcholine (an important neurotransmitter in memory learning) by supplementation with choline, which is an important active constituent of *Tinospora cordifolia*.

*Efficacy of Tinospora cordifolia on Learning and Memory in Healthy Volunteers: A Double-Blind, Randomized, Placebo Controlled Study*

# Tinofolin®

## Le sport au naturel !



### Zynamite®

1er prix ESSNA [déc. 2019]  
7 études cliniques  
Augmentation de la puissance  
Meilleure récupération  
Réaction et concentration  
VO<sub>2</sub> max

*Mangifera indica*

### DigeZyme®

Complexe enzymatique reconnu  
Études cliniques  
Limite les douleurs musculaires  
Absorption des nutriments  
Meilleure récupération  
Végan

*Amylase, cellulase, protéase, lipase, lactase*

### Rhodiolife®

Études cliniques sur l'énergie [ATP] et la récupération  
1er prix ESSNA [déc. 2019]  
Réduit le risque d'infection virale post-exercice  
Sans dopage et sans effets secondaires, certifié BSCG

*Rhodiola rosea*

### Ecdystérones

Ecdystéroïdes naturels végétaux  
Extrait de Rhaponticum  
Aide à construire une masse musculaire maigre  
Performance et récupération  
Adaptogène

*Rhaponticum carth.*

# Satiety and Good Mood

**S**atiereal® is a patented clinically proven satiety ingredient derived from saffron stigmas. The satiated feeling induced by Satiereal® encourages weight loss while eliminating frustration. This product has a unique mechanism that not only creates satiety but helps avoid snacking and compulsive eating behaviors, which in turn leads to reduction in weight and inches.

**What is unique about Satiereal® saffron extract** is that it targets emotional behaviors :

- It **decreases** your desire to **snack**
- It **decreases** your desire for **sugary foods**
- It **increases** your **sense of satiety** or fullness (resulting in better portion control)
- It provides a **good mood**
- It can be used in **any form or food**

Satiereal® is derived from the stigma of saffron crocus, *Crocus sativus L.*, which is cultivated throughout the Mediterranean region. Historically, saffron was prized as a culinary spice, colorant and dye, and as a medicinal herb to ease digestion or to treat depression). These medicinal uses are usually curtailed by saffron's high cost. However, Satiereal® is made from a special crocus cultivation rich in active saffron constituents, so it is cost effective as a weight-loss formula.

## Specific Saffron Extract

Satiereal® is a specific combination of Crocin (carotenoid dye, crocin (golden yellow-orange), Picrocrocin (flavor, bitter glucoside, a truncated version of the carotenoid zeaxanthin) and Safranal (aroma, less bitter), definitely more than a Saffron extract of Safranal. The developer Inoreal noticed that the efficacy of the active principle needs them all together in a specific ratio : generic Saffron extract shows at same Safranal content shows a inhibition of up to 10 times less.

## Clinical Trials

### Clinical vs placebo

16 women, checked efficacy and tolerability of Satiereal® (2 x 88.25mg).

100% of supplemented women express the decrease of their food intake associated to a satiety feeling, to a decrease of the hunger feeling in the beginning of meals and a decrease of the meals duration. This is still persistent until dinner when Placebo shows an increase compulsive and reactive desire to eat

Decrease of body weight and fat mass for the supplemented subjects versus the placebo group.

Decrease of the desire and pleasure associated to the food intake mass for the supplemented subjects versus the placebo group.

**Double Blind vs placebo** (Publ. Nutrition Research)

Randomized double-blind versus placebo showed the efficacy of Satiereal® on weight

management in 60 women at the dose of 176,5mg/day; it shows that Satiereal® increases satiety, decreases hunger, reduces sugar cravings (-78%), and reduces compulsive snacking between meals. Women taking Satiereal report decreased hunger. 80.7% of women taking Satiereal® lost weight in two months. Notably, Satiereal® group lost preferentially fat mass, instead of lean mass.

**Dosage** : 2 x 88.25mg a day  
Water soluble, homogeneous without change after heat treatment (110°C, 20mins for instance) for beverages,...

**Trademark awareness** : SATIEREAL® - on internet, plenty of testimonials, YouTube videos...

consumer will search before purchasing and will rely on and look for the brand.



## Serotonin Reuptake Inhibitor

Stress, anxiety, depression... influence food behavior, generally leading to compulsive overeating in reaction to stress. This phenomenon induces weight gain, subject feel guilty, trying to stop, thus generating stress for those who need consolation in carbohydrates intake !

This is mostly due to low Serotonin levels.

Satiereal® has been demonstrated to keep the neurotransmitter serotonin signal active, in other words serotonin re-uptake inhibition in neurons (mechanism of many antidepressants). It is probable that this serotonin re-uptake inhibition accounts for saffron's use in treating depression and "melancholia" in the medicinal traditions. Saffron extract has been shown to be as effective as the tricyclic antidepressant drug imipramine and the SSRI fluoxetine (Prozac) in managing depression — with no side effects.

Pharmaceutical SSRIs have varying effects on weight, but Satiereal helps keep excess body weight from accumulating. This is one advantage of Satiereal® over other dietary satiety ingredients: it needs only be used in small quantities, it is potent, it acts directly on neurotransmitters to relieve the cause of nibbling and hyperphagia, instead of just delaying it.

**Not a common Saffron ! Satiereal®, a specific Saffron extract, works as a hunger suppressant and seems curb appetites by boosting serotonin levels. The satiated feeling induced by Satiereal® encourages weight loss while eliminating frustration.**

### Capsules and Tablets with Satiereal®

Instant stick for instance coffee or coated tea, with 9.81% of Satiereal® AWS per stick of 1.8g (formulation checked by Inoreal).

**Meal replacement** : problems with meal substitute is the snacking in between ! Satiereal® provides a long feeling of satiety... better mood so feel better

- Replacing 1 meal/day « weight management after weight loss »
- Replacing 2 meals/days « weight loss contribution »

Hyperprotein milk beverage	
Unit weight/bottle : 200g	
Semi-skimmed milk	88.762 %
Milk protein	6.95 %
Sugar	2.7 %
Cocoa powder	3.0 %
Caramel flavor	0.5 %
Satiereal®	0.088 %



**Cereals Bars, biscuits**: 1,18% of Satiereal® / bar of 14.9 g

Apricot / Coconut biscuit	
Unit weight/biscuit : 50g	
Flour	31.0 %
Brown Sugar	8.0 %
Apple Powder	14.0 %
Butter	22.0 %
Eggs	11.207 %
Apricot pieces	8.0 %
Coconut powder	5.0 %
Baking powder	0.44 %
Satiereal®	0.353 %



**Candies, Chewing gums, chews** : Better use them instead of snacking

Orange and Lemon Chews	
Unit weight/gum : 7.3g	
Agave syrup	10.0 %
Powder Sugar	30.0 %
Arabic gum	39.0 %
Orange powder	4.0 %
Citric acid	0.1 %
Lemon flavor	0.6 %
Water	13.9 %
Satiereal®	2.4 %



**Beverages and instant drinks** : 0.088% of Satiereal®

AWS per bottle of 200g gives a clear, pleasant and efficient drink. Formulations with Raspberry, Hibiscus, Apple juice, Cranberry, Iced tea, ... or even only water (yellow translucent solution).

**Other possible associations** (additional claims) with for instance 500mg of Garcinia cambodgia extract standardized to HCA (« Weight management », also in beverages), 200mg of Fucus powder.

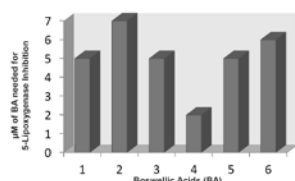
# Two Ways Anti-Inflammatory Boswellin®

One of the most famous and powerful anti-inflammatory. Boswellic acids - and especially AKBBA - have been found to inhibit 5-lipoxygenase by one of two ways (direct interaction with 5-LO and Interacting with 5-LO activating proteins FLAP) as well as human leukocyte elastase (HLE).

## What effective Boswellic Acid ?

Boswellia extracts contain Boswellic acids. Grades of Boswellin are not titled as «total boswellic acid» - which means nothing since all acids would be included. It's important to see the real content of the actives acids : the  $\beta$  boswellic acids (by HPLC) and more specifically the more potent Acetyl-11-keto- $\beta$ -boswellic

Biological activity of various derivatives of Boswellic Acids in inhibiting the enzyme 5-Lipoxygenase

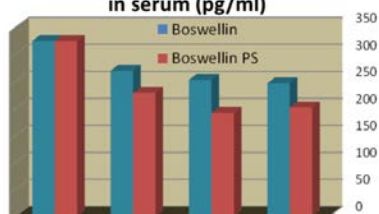


1. $\beta$ -boswellic acid	4. Acetyl-11-keto- $\beta$ -boswellic acid
2. Acetyl- $\beta$ -boswellic acid	5. $\alpha$ -boswellic acid
3. 11-Keto- $\beta$ -boswellic acid	6. Acetyl- $\alpha$ -boswellic acid

## Boswellin® PS

Boswellin PS from Sabinsa represents an improvement over the existing conventional *Boswellia serrata* extracts, providing manufacturers with a more water soluble version with enhanced joint health support potential. Boswellin® PS offers a unique release profile for the active ingredients. In addition to boswellic acids, the PS version contains Polysal™, a natural polysaccharides fraction from the gum resin of *B. serrata*. The Polysal fraction is water soluble, and enhances the healthful role in the extract.

Extracellular in vivo TNF- $\alpha$  est. in serum (pg/ml)



Inflammation is a complex process involving a series of actions and/or reactions and a broad range of biologically active substances (e.g. bradykinins, histamines, prostaglandins, thromboxanes, hydroxy-fatty acids, leukotrienes, lysosomal enzymes, and lymphokines) triggered by the body's immunological response to tissue damage. Leukotrienes, important mediators in inflammatory and allergic processes, are produced from arachidonic acid, an essential fatty acid synthesized in the body, via the key enzyme 5-lipoxygenase (5-LO). Earlier work identified the boswellic acids (BAs) as specific, non-redox inhibitors of 5-LO. Thus, they inhibit the production of inflammatory leukotrienes. Based on IC50 (effective inhibitory concentration of tested substance) values, acetyl-11-keto- $\beta$ -boswellic acid alone provided the most potent inhibitory action due to its optimal structure.

## Dual Inhibitory Action

Boswellia extract inhibit 5-LO by one of two ways:

- Directly interacting with 5-LO
- Interacting with the five-lipoxygenase-activating protein (FLAP).

as well as, human leukocyte elastase (HLE), the serine protease produced and released by polymorphonuclear leukocytes (PMNLs) which has been suggested to play a role in several diseases (pulmonary emphysema, cystic fibrosis, chronic bronchitis, acute respiratory distress syndrome, glomerulonephritis, and rheumatic arthritis) due to its aggressive and destructive properties.

This dual inhibitory action of two pathophysiologically important enzyme activities (HLE and 5-LO) is unique to the pentacyclic triterpenes from the boswellic acid series. Several leukotriene biosynthesis inhibitors furnished no HLE inhibitory activity :  $\beta$ -Boswellic acid, AKBA, ursolic acid, and amyrin significantly inhibited HLE. The HLE inhibition activity of AKBA and ursolic acid were comparable, however; ursolic acid's mode of inhibition is competitive.

## Preclinical, in-vitro & Clinical studies

### Anti-inflammatory Effects

Wildfeuer and coworkers studied *Boswellia serrata* as a leukotriene synthesis inhibitor of intact human PMNLs and as an herbal medicine for guinea pigs suffering from experimental autoimmune encephalomyelitis (EAE). Mixed acetyl boswellic acids significantly inhibited the ionophore-stimulated release of leukotrienes LTB<sub>4</sub>.

### Study of Rheumatoid Arthritis (Clinical)

Conditions : Rheumatoid Arthritis, Ankylosing spondylitis,

Osteoarthritis - Total 175 Subjects, 1-6 years duration, 10-50 years Gupta, V.N, Yadav, D.S., Jain, M.P., Atal, C.K

Results : 67% Good & Excellent, 30% Fair, 3% Poor

## Inflammation and its Relationship to Glycosaminoglycans

- Glycosaminoglycans in the body form a ground substance found in connective tissue, mucous secretions and synovial fluids.
- In the process of chronic inflammation of connective tissue, as exemplified by autoimmune disorders, e.g. lupus erythematosus or rheumatoid arthritis, one of the first casualties of the destructive process of inflammation is the wasting away of the ground substance that is an integral element of the connective tissue. Thus the wasting away of the glycosaminoglycans in the joints leads to continuously worsening joint disfigurement and limited mobility

## Apoptosis Induction by AKBA

Apoptosis or programmed cell death (PCD) is an essential process in normal animal development and in the renewal of cell populations in the human body. The effects of AKBA were studied in two human cancer cell lines, HL-60 and CCRF-CEM. AKBA reduced the viability and proliferation of the leukemic cells from both lines in a dose-dependent manner.

## Antitumor Activity

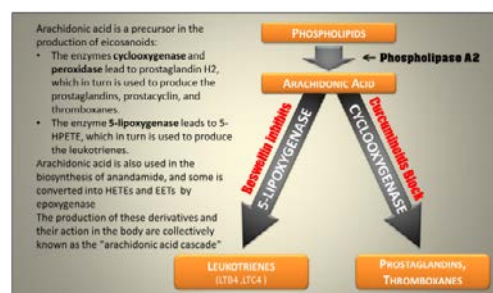
Shao and coworkers examined the antitumor activity of the four major pentacyclic triterpene acids of *Boswellia serrata*. All the compounds exhibited inhibitory activity in a dose-dependent manner. Based on cell morphology and NBT (nitroblue tetrazolium) reduction, BC-4 induced monocytic differentiation in myeloid leukemia cells in all three cell lines. Clinical studies on Malignant Glioma, Ulcerative Colitis and Bronchial Asthma were also performed.

## Recommended dosage

Oral : 75 to 200mg of extract - 2-3 times a day

Topical : 3% to 5%

As it acts as a strong anti-inflammatory agent, BS extract may be used in stand alone or in combination with COX-2 inhibitors or nutrient enhancer (BioPerine®).



**BOSWELLIN®**

# Bromelain / Papain

## Natural proteolytic enzymes

**B**romelain is a cysteine protease isolated from pineapple stem, *Ananas comosus*. Bromelain is a mixture of different thiol endopeptidases and other components like phosphatase, glucosidase, peroxidase, cellulase, escharase, and several protease inhibitors. In vitro and in vivo studies demonstrate that bromelain exhibits various fibrinolytic, antiedematous, antithrombotic, and anti-inflammatory activities.

### Properties

Its effects are mainly a product of its proteolytic activity, which stimulates fibrinolysis by increasing plasmin, but bromelain also has been shown to prevent kinin production and to inhibit platelet aggregation. It is also used for preventing muscle soreness after intense exercise, and for facilitate digestion.

### Effect of Bromelain on inflammatory

Bromelain have the ability to modulate surface adhesion molecules on Tcells, macrophages and natural killer cells and also induce the secretion of IL-1 $\beta$ , IL-6, TNF $\alpha$  by peripheral blood mononuclear cells. Bromelain can block Raf-A and ERK-2 pathways by inhibiting the T cell signal transduction. This induces the decrease of the activation of CD4 T cell and reduce the expression of CD25.

### Osteoarthritis

Bromelain is a food supplement that may provide an alternative treatment to nonsteroidal antiinflammatory drug (NSAIDs). It plays an important role in the pathogenesis of arthritis. Bromelain has analgesic properties which are thought to be the result of its direct influence on pain mediators such as bradykinin.

### Allergic airway disease

Bromelain was found to attenuate development of allergic airway disease (AAD), while altering CD4+ to CD8+T lymphocyte populations. From this reduction in AAD outcomes it was suggested that bromelain may have similar effects in the treatment of human asthma and hypersensitivity disorders

### Inflammatory bowel disease

Investigation on bromelain's anti-inflammatory action as a potential therapy for ulcerative colitis and Crohn's disease, 2 types of inflammatory bowel disease. Bromelain discourages the release of inflammatory chemicals called cytokines and chemokines from diseased tissue (Test tube study ; Duke University gastroenterology).

### Digestive Aid

Bromelain is best known for its ability to break down proteins — making this enzyme a popular digestive aid. Bromelain has been used successfully as a digestive enzyme following pancreatectomy, in cases of exocrine pancreas insufficiency and in other intestinal disorders. Because of its wide pH range, bromelain has activity in the stomach as well as the small intestine. It has also been shown to be an adequate replacement for pepsin and trypsin in cases of deficiency.

**P**apain, a papaya (*Carica papaya*) fruit latex extract, is a cysteine protease that catalyzes the cleavage of peptide bonds using a catalytic triad involving a deprotonated cysteine residue.

Papain is well known for improving digestion and treating infections, diarrhea, and allergies. It has also been used, with other protease to reduce pain, inflammation, and swelling. It's also being studied for potential use in cancer and other diseases.

### Antimicrobial action

Papain has shown antimicrobial activity against a number of microorganisms such as *Bacillus subtilis*, *Enterobacter cloacae*, *E. coli*, *Salmonella Typhi*, *Staphylococcus aureus* and *Proteus vulgaris*.

### Digestion / Slimness

Papain is used to promote digestion: discomfort, ballooning. This use is based on in vivo studies of hydrolysis of different proteins in the presence of papain. This demonstrated a specificity of action of papain towards the peptide bonds containing lysine or arginine in acid media (pH 3-5).

By diffusing in the body the papain would allow the fractionation of the abnormally secreted proteins, like the collagen fibers of the cellulite, and facilitate their elimination as well as that of the greasy cellulite.

### Uses in association of systemic enzymes

#### Accelerate recovery and healing of muscle damage

Numerous studies in Europe show that supplementation with proteolytic enzymes effectively speeds up recovery after physical exercise and injuries in athletes. It also speeds up tissue repair in patients who have undergone surgery.

In a study of footballers with ankle injuries, supplementation with proteolytic enzymes accelerated their healing and allowed players to return to the field 50% faster than placebo athletes. Several small trials in athletes have shown that enzymes can help reduce inflammation and accelerate healing of tissue lesions (including fractures) and reduce overall recovery time compared to placebo athletes.

In patients undergoing various reconstructive and facial procedures, treatment with proteolytic enzymes significantly reduced swelling and pain compared to placebo patients

#### Inflammation

The use of systemic enzymes is particularly effective during inflammation because they hydrolyze the peptide bonds that unite amino acids to proteins, thus dissolving clumps of fibrin. This reduction in fibrin allows more oxygen to reach and reactivate the tissue cells. Excess fluid is also reabsorbed, reducing inflammation.

Bromelain and Papain are part of the family of proteolytic enzymes. They are systemic enzymes, designed to survive the acidity of the stomach and to go into the small intestine where they are absorbed into the bloodstream. There, they degrade proteins, thus exerting multiple beneficial effects for health, including platelet aggregation inhibition, digestive aid and anti-inflammatory effects.

### Bromelain

**Source:** *Ananas comosus* - Stem  
**Bio-activity:** 1 200 to 5 000 GDU / g  
 $\approx$  2,4 to 10 FIP / mg  
**Units correspondence:** 1 FIP/mg  $\approx$  500 GDU/g



### Papain

**Source:** *Carica papaya*  
**Bio-activity:** 1,5 to 3,5 FIP / mg  
**Units:** 1 FIP  $\approx$  10 to 12 000 USP  $\approx$  160-180 TU / 100 TU  $\approx$  6 000 USP  $\approx$  0,6 FIP

### Reasoned culture

Krishna Enzytech cultivates in agreement with the farmers and also has their own farms in the coastal regions of Andhra Pradesh. Papaya is grown between pineapple plants, helping to manage water consumption, in soil maintained at a pH of 5.5 to 6.0. Once harvested, the fruits are sold to the fruit industry and the stem is dried and used for making bromelain.

A double-blind German study of dentist patients showed the anti-inflammatory effects of a mixture of 100 mg pancreatin, 45 mg bromelain, 60 mg papain, 10 mg lipase, 24 mg trypsin and 1 mg of chymotrypsin. Patients took this mixture before and after a dental operation for several days. Three days after the operation, levels of C-reactive protein, a marker of inflammation, were three times higher in the control group.

### Other enzymes in our range

**DigeZyme®** is a unique proprietary blend of specific digestive enzymes that offers much more than just aiding proper digestion and better absorption of nutrients.

**DigeZyme®** consists of five GMO-free broad acting enzymes obtained from the fermentation process:

- **Amylase** : breaks down carbohydrates such as starch and glycogen, into smaller units
- **Protease** : Breaks down protein and supports immune function
- **Lactase** : Breaks down lactose (milk sugar) and useful for lactose intolerance
- **Cellulase** : Breaks down cellulose and chitin. It helps free nutrients in both fruits and vegetables
- **Lipase** : Breaks down lipids and improves fat utilization and also supports the most healthy gallbladder function

# Nigellin - Elixir for Overall Health and Wellness

Sabinsa's Nigellin™ is obtained from the seeds of *Nigella sativa* (Black Cumin) and standardized to contain 5% Thymoquinone

Sabinsa's Nigellin™ represents patent pending, solvent-free, supercritical fluid extraction (SCFE) black cumin seed extracts, standardized to contain thymoquinone. **Nigellin™ is available as oil** (Nigellin™ BCS - Amber), **and defatted black and white powders** (Nigellin™ BCS - Onyx and Nigellin™ BCS - Pearl, respectively).

*Nigella sativa*, popularly known as 'black seed,' or 'black cumin,' one the most revered medicinal seeds in history of mankind, is indeed a gift from the Mother Nature—owing to its well-established, sanctified, and miraculous uses for over 3,000 years. Various medicinal and healing properties of black seed are directly mentioned in the Qur'an as 'blessed food.' Black seed has also been mentioned in the Bible as the 'curative,' used by Asian herbalists and the Romans for culinary purposes for centuries. Thus, it is not surprising that Prophet Muhammad had praised black cumin by saying that "Hold on to the use of the black seed for indeed it has a remedy for every disease except death."

## Chemical constituents

One of the reasons for considering black seeds as the main sources of nutrition and healthcare might be due to the complex chemical structure of the seeds. These little seeds contain more than 100 different chemical constituents, including carbohydrates, proteins, volatile and fixed oils, and are also an abundant source of all the essential fatty acids. **Thymoquinone** is proved to be the main active constituent of the volatile oil of the black seed and is known to have several medicinal properties.

## A time-honored remedy

Though black seed has been recognized as one of the most popular herbs in many parts of the world for centuries, extensive research during last 40 years has further validated its **potential health benefits**, viz. maintain healthy inflammatory response (Mahdavi et al., 2016), asthma control support (Koshak et al., 2017), improved glycemic control in diabetic patients (Bamosa et al., 2010), protective role in diabetic nephropathy (Ansari et al., 2017), healthy blood pressure (Dehkordi and Kamkhah, 2008) and lipid profile management (Sabzghabae et al., 2012), helps boost male fertility (Marbat et al., 2013; Kolahdooz et al., 2014).

## Asthma

Recent research published in *Frontiers of Pharmacology* identified Nigellin™ BCS - Amber, Sabinsa's Black Cumin (*Nigella sativa*) seed extract, as being the most effective of the 10 *Nigella sativa* (NS) extracts used in an in vitro study which suppressed the release of the most active cytokines and identified a prostanoid with inflammatory properties which may possess a favorable effect in the context of asthmatic conditions (Comparative Immunomodulatory Activity of *Nigella sativa* L. Preparations on Proinflammatory Mediators: A Focus on Asthma, *Front. Pharmacol.*, 02 October 2018).

Researchers **evaluated** 10 different NS extracts, and **top ranked the extract provided by Sabinsa's** parent company and manufacturing arm, Sami Labs. It surpassed the second ranking extract in terms of the active constituent, thymoquinone (TQ), by more than 300%.

Anti-inflammatory and immunomodulating properties are among the most valued in anti-asthma herbal products. Nigellin™ had the highest effects in suppressing the release

of cytokines IL-2, IL-6 and PGE2 in T-lymphocytes and also in monocytes hindering the expression on IL-2 and PGE2. These are among the most active cytokines involved in asthmatic conditions. The investigators noted a positive relationship between the TQ level in the preparations and its inhibitory potency on IL-6 and PGE2.

However, PGE2 does exhibit beneficial bronchodilatory effects in human lung epithelial cells and Sabinsa's extract showed an **enhanced PGE2 expression** in A549 human epithelial cells lines, demonstrating an interesting activity behavior of the maximum-TQ containing Sabinsa's extract. The results presented in this paper formed the biochemical basis of a subsequently conducted clinical trial.

Asthma is a debilitating disease afflicting 25 million people in the USA, alone and 334 million globally according to some estimates. It tends to flare up sharply due to external factors such as pollution and allergens.

*Nigella sativa* and its preparations have been referenced extensively in traditional healthcare systems ranging from Ayurvedic and Unani to Arabic and Prophetic for prevention and treatment of asthma, making it a candidate for study by modern researchers. Lack of standardization has, however, hampered researchers in evaluating the material's efficacy in the past.

"This emerging antioxidant ingredient has traditionally been used in the management of numerous health conditions, with recent research beginning to validate historically reported benefits."

**Elixir for Overall Health and Wellness**



Ellagic Acid is traditionally extracted from Pomegranate or Terminalia. Ellagic acid is known as skin lightening and brightening, repairing from sun damage, besides strong antioxidant properties and skin elasticity improver

Ellagic acid is used in topical formulation for its lightening effect on UV induced hyperpigmentation. It's known that Ellagic inhibits melanin forma-

tion by acting on tyrosinase. Oral Administration of Ellagic Acid for skin lightening Oral administration of ellagic acid (alcoholic extraction followed by acid hydrolysis) has been studied, and its metabolites have been detected in urines and feces. A **whitening effect on UV-induced pigmentation** was observed, with a reduction on the number of DOPA-positive melanocytes (Mineka Yoshimura, 2006). A double blind vs placebo clinical trials has evaluated the **protective and ameliorative effect** at 200mg and 100mg of ellagic acid per day, orally, followed by UV radiations. It's suggested that Ellagic acid orally administered is absorbed into the body and the ellagic

and/or its metabolites inhibits the proliferation of melanocytes in the skin.

Those studies have been performed in Japan, with products offered by Sabinsa Japan Corp. Effects of Oral Administration of Ellagic Acid-rich pomegranate Extracts on UV induced pigmentation in the human skin, Kouichi Kasai, Mineka Yoshimura, Takuro Koga, Masayuki Arai, Satoru Kawasaki, *J Nutr Sci Vitaminol* 52, March 2006. Inhibitory Effect of an Ellagic Acid-rich Pomegranate Extract on Tyrosinase Activity and UV-Induced pigmentation, Mineka Yoshimura, Yuko Tanabe, Kouichi Kasai, Yuan Yamakoshi, Taguro Koga, *Biosci. Biotechnol. Biochem* 69, 2005

## Oral Ellagic Acid for Skin Lightening

# The Effective SOD for Health & Skin

**P**roduction of reactive oxygen species (ROS) is a normal process in oxygen-breathing organisms. However, certain conditions can increase the production of ROS, disrupt the natural balance and lead ultimately to oxidative stress.

## Cells defend themselves?

SOD, dubbed the "enzyme of life" on discovery in 1968, is the **first antioxidant** mobilized by the cell as defense against oxidative stress. The enzyme turns it into hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). This is then catabolized by catalase and glutathione peroxidase.

These antioxidant enzymes have a distinct advantage over the antioxidants consumed from the diet or nutritional supplements, like the vitamins A, C, and E, carotenoids, and thiols since the enzymes are biological catalysts, rapidly and repeatedly reducing reactive oxygen species without being consumed themselves.

## Oral administration

Oral administration of SOD and the other antioxidant enzymes present in many plant extracts is, **under normal conditions, not effective**. During passage through the gastrointestinal pathway the enzyme is denatured (deactivated) rendering it ineffective as an antioxidant. However, studies have shown that combining SOD with a wheat gliadin biopolymer system **temporarily protects** the SOD during its passage through the gastrointestinal tract.

An important proof of concept in vivo study for 28 weeks showed that only the gliadin-SOD complex resulted in a significant increase in circulating antioxidant levels.



## Oxidative stress & DNA damages

GliSODin's protective benefits have been demonstrated in numbers of studies. Twenty healthy volunteers were given pure oxygen in a hyperbaric chamber, inducing intense oxidative stress.

- The GliSODin® group had significantly **lower cellular DNA damage** as evidenced by a test called "Comet Assay." Also, reduced blood isoprostane levels, another marker of oxidative stress.
- In the GliSODin group, the cell nucleus is intact, while the placebo group shows progressive nucleus damage with pronounced "comet tail".

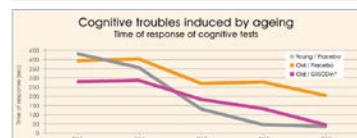
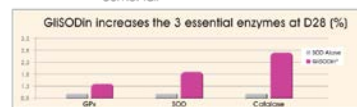
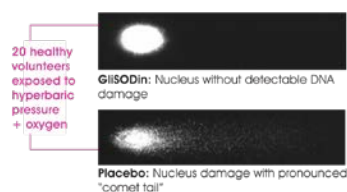
The enzymatic activity of oral free SOD is mainly to totally destroyed within few minutes. For this reason, usual studies based on free SOD cannot prove the efficacy, or at an incredibly high use (in-vivo).

Thanks to its gliadin matrix, GliSODin® is orally effective unlike most existing SOD supplements. The gliadin is not only an enteric protection but more a real vehicle for the SOD, thanks to its specific bio-adhesive properties with the epithelial cells in the small intestine.

Dose : 2 x 100mg to 2 x 250mg a day

## Anti-aging

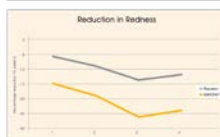
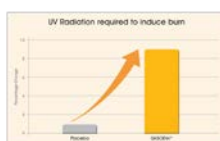
- Protects against DNA damage



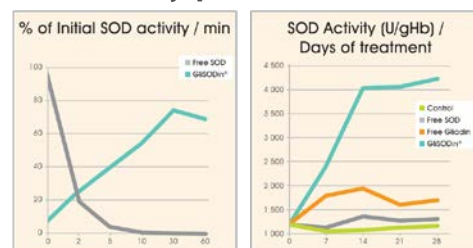
- Prevents oxidative stress
- Decreases troubles induced by ageing
- Improves cognitive functions
- Protects against photo aging
- Supports healthy immune function
- Reduces risk factors of cardiovascular disease
- Helps prevent light sun allergies

## Sun & skin health

- Increases the MED (Minimal Erythema Dose)
- Helps prevent light sun allergies
- Prepares the skin for sun exposure
- Reduces sun-burn redness, increase the minimum exposure to UV rays necessary to produce skin burn
- Faster recovery after sunburn and photo-oxidative stress



First orally effective SOD, GliSODin® is the new oral active for skin health, immune system and free radicals protection supported by more than 25 mostly published studies

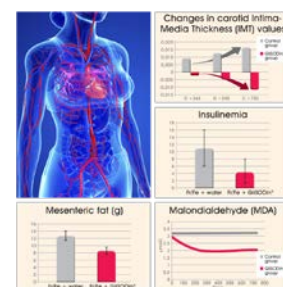


## Immunity

- Supports healthy immune function
- Immune-modulating properties shown to be effective in children
- Acts as immune-modulator
- Regulates pro- and anti inflammatory cytokines production
- Induction of Th-1 immune response

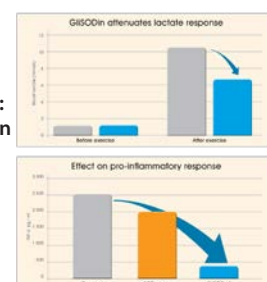
## Cardiovascular health

- Reduces risk factors of cardiovascular disease
- Decreases carotid Intima-Media thickness (IMT)
- Prevents metabolic syndromerelated diseases
- Clear benefits against atherosclerosis



## Sport & inflammation

- Anti-inflammatory effect: control C-Reactive Protein
- Decreases in-exercise lactate production
- Supports post-exercise immune function
- Improves recovery after strenuous exercise



# MoodReal®

## Positive mood, naturally (Saffron 0.2%)

Depression is a state of low mood and aversion to activity, and the most common mental disease – close to 300 millions people of all ages suffer from depressions. Depressed mood is also often associated with oxidative stress, inflammation, immune deficiency, neurotransmitters disruption, etc...

Conventional antidepressants for depression, anxiety and neurodegenerative diseases are tricyclic antidepressants (TCA) such as Imipramine (Tofranil®), serotonin noradrenaline reuptake inhibitors (SNRIs) and selective serotonin reuptake inhibitors (SSRI) such as Fluoxetine (Prozac®, Sarafem®).

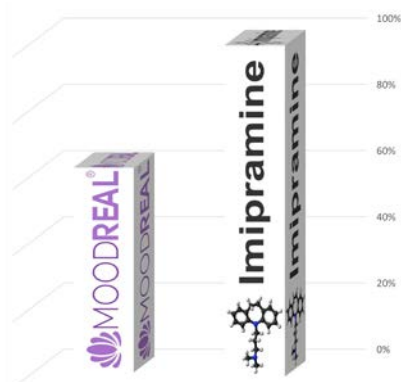
*Crocus sativus* - the saffron - is a well-known spice for its use in culinary and in traditional medicine since antiquity. **Numbers of studies and publication have demonstrated the effects of saffron and saffron extract on mental health and mood** as well as on other numerous human diseases.

### From Saffron

Moodreal® is extracted from Sargol Saffron Stigmas, using water ethanolic process of extraction as per the extracts described in the science and the studies. Saffron is a perennial herbaceous plant, planted between

### Iranian saffron, Sargol vintage

Because of its other branded and patented product *Satiereal®*, Inoreal (acquired by Natac) is a very important player in the saffron market - undoubtedly the leading European producer for food supplements - and Saffron extracts. Based on this experience and their preferred access to the Sargol vintage from Iranian saffron, has been developed Moodreal®, the extract that provides safranal (2%) as well as crocin and picrocrocin.



### Tested vs. Imipramine

MOODREAL® showed an inhibition potency of Serotonin re-uptake equivalent to 63% of Imipramine (TOFRANIL® a "golden standard")

Selective Serotonin Reuptake Inhibitor (SSRI), the standard used as an antidepressive medication and the reference compound in inhibiting 100% of Serotonin reuptake.

Over 50% of Serotonin reuptake in this test demonstrates a significant effects of SSRI.

July and September to harvest the flowers between October and December - 200,000 flowers are needed to get 1 kg of stigmas. The life of flowers is ephemeral (48h max), so they must be harvested daily - preferably in the morning when they are still closed. As the flowering stage varies, it is not possible to make an industrial harvest, and it has to be done by hand.

Before starting the extraction, the saffron goes through a set of internal controls, including botanical identification (Ph Eur), the dosage of markers (bio-actives) according to

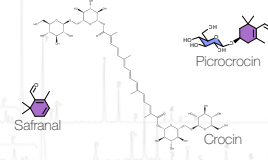
the ISO3632 standard, and the control of the total absence of addition of dyes by an analysis on each batch.

The process preserves its active ingredients and its natural composition.

### Actives

Moodreal® offers the full profile of molecules, and corresponds to the natural extract mentioned in the scientific data. Moodreal® contains a combination of Safranal (aroma, less bitter), Crocin (carotenoid dye, golden yellow-orange), Picrocrocin (flavor, bitter glucoside, a truncated version of the carotenoid zeaxanthin, can be transformed to Safranal by aglyconation) and other isomers found in the stigmas such as crocetin, a saffron carotenoid also referred to other properties<sup>(2)</sup>.

Those bioactive compounds are known to help to improve mood.



### Treatment of mild to moderate depression

Moodreal® matches exactly the extracts described in studies that most players refer to, including those describing activity against stress and depression, versus imipramine and fluoxetine (ie. Prozac®), etc....

For example, published clinical studies confirm that:

The effectiveness of hydroethanolic saffron extract (15mg x 2 / d saffron ext. >2% safranal) is similar to fluoxetine (Prozac®, 20mg / d) - 6 weeks, 40 adults, depression scoring >18<sup>(1)</sup>. In another study (6 weeks, 30 adults, depression scoring >18), hydroethanolic saffron extract (10mg x 3 / d saffron ext. >2% safranal) is as efficient as the tricyclic antidepressant Imipramine (Tofranil®, 100 mg/d), without any side effects<sup>(3)</sup>.

Iranian Saffron Sargol significantly relieves anxiety and depressive symptoms, at a dose of 30 mg / day of an extract, and within one week<sup>(4)</sup>,

and again a new study in 2019 on 57 obese adults (Depression scoring +/- 22 Beck Depression).

### Product Features / Safety

**Acute Toxicity** : safe LD50 > 5g/kg body weight

**Mutagenicity (Ames test)** : Non mutagen

**Tolerance** : Well tolerated

- No change in glucose, bilirubin, leukocytes, RBCs, nitrites, protein
- No modification of blood cholesterol, liver enzymes, renal constants

### Regulatory status

Notified to most of the EU National

authorities (EU), Self affirmed GRAS acknowledge by a Lawyer (US), NPN Number (CA), TGA registered (AU), FDA registered and FSP (US).

### Dosing and Claims

30mg of Moodreal® [EU health claims [ID 2038] : 30mg/day of extract (or the equivalent of 0,5-1g powder) : "Contributes to emotional balance", "Helps to support relaxation", "Helps to maintain a positive". Other claims [ID 2247, ID 2251]

- Hydro-alcoholic extract of *Crocus sativus* L. versus fluoxetine in the treatment of mild to moderate depression: a double-blind, randomized pilot trial, Noorbala AA and Al., 2005
- Comparative Study on The Preventive Effect of Saffron Carotenoids, Crocin and Crocetin, in NMU-Induced Breast Cancer in Rats, Maysam Sajjadi
- Comparison of *Crocus sativus* L. and imipramine in the treatment of mild to moderate depression: A pilot double-blind randomized trial, Akhondzadeh and Al., 2004
- Crocus sativus* L. in the Treatment of Mild to Moderate Depression: A Double-blind, Randomized and Placebo-controlled Trial, Akhondzadeh S. and Al., 2005, *Phytother Res* Vol 19, 2:148-51
- A placebo controlled randomized clinical trial of *Crocus sativus* L. (saffron) on depression and food craving among overweight women with mild to moderate depression, Akhondzadeh and Al., 2019, *J Clin Pharm Ther* Vol0 1:10



# All Benefits from Pomegranate

The pomegranate (*Punica granatum*) is a fruit-bearing shrub or small tree that has been cultivated over the whole Mediterranean region and the Caucasus since ancient times. In the Northern Hemisphere, the fruit is typically in season from September to January while in the Southern Hemisphere, the season runs from March to May. The name itself derives from the Latin pomum (apple) and granatus (seeded) (Lloyd, 1897).

There is a great interest in the scientific community in the properties of pomegranate, which is considered by many as a functional food because it has valuable compounds in different parts of the fruit displaying beneficial effects on health such as antioxidant, antitumoral, antihepatotoxic, antimicrobial, anti-inflammatory, antiviral, antidiabetic and improving cardiovascular, oral, and skin health. However, few well-controlled clinical trials have been completed and these effects have not been solidly established (Viuda-Martos, 2010).

## Pomegranate P40P

P40p™ is a unique product, carrier free, soluble in water and is standardized to a full spectrum of all of the essential compounds responsible for specific health promoting benefits of pomegranate juice, manufactured under strict GMP procedures.

Composition	P40P
Total Punicosides (HPLC)	≥ 40%
Punicalagins A & B (HPLC)	≥ 30%
Total Polyphenols Folin Denis	≥ 50%

The P40p™ extract is standardized to 40% punicosides with a minimum concentration of 30% punicalagins. Additionally, P40p™ guarantees a total polyphenol content of no less than 50% (Table 1). The final product is free of yeast and bacterial contamination, allergens, gluten, BSE, GMO and irradiated products. P40p™ is Kosher certified and suitable for vegans.

# P40p™

Nektium has been extracting Pomegranate in their GMP Silliker plant located at Las Palmas for years. The most studied grades:

- **Pomegranate P40P** brings bioactives compounds as punicosides and punicalagins A+B (strong antioxidant), and other polyphenols, carrier free: cardiovascular, antioxidant. Also some research on prostate health and joints.
- **Pomegranate seed oil** for body weight and antioxidant, contains Punicic acid, fatty CLNA.

Approximately, 30 mg of P40p™ provides an equivalent amount of bioactives than 50 ml of pomegranate juice.

## Chemical Profile

The key bioactive compounds in pomegranate fruit are a group of hydrolyzable ellagitannins generically called punicosides, including punicalins, punicalagins (A+B), ellagic acid glycoside and ellagic acid. Ellagic acid is commonly used to standardize commercial pomegranate extracts but this approach is unreliable, potentially misleading and vulnerable to adulteration (Zhang, 2009). Punicalagins have been identified as being responsible for most of the antioxidant activity present in the pomegranate fruit (Gil, 2000) and represent a more reliable means of standardization of commercially produced pomegranate extracts (Jimenez Del Rio, 2006).

Animal studies have shown that both ellagic acid and punicalagins are absorbed by the gastrointestinal track after oral ingestion of pomegranate juice or extract, with the concentration of the latter being higher. Punicalagins are not absorbed in vivo directly but reach the colon and release EA that is metabolised by the human microflora (Larrosa, 2006).

## Cardiovascular Health

Atherosclerosis is a collection of patchy plaques (called atheromas) in medium-sized and large arteries. These plaques contain lipids, inflammatory cells, smooth muscle cells, and connective tissue. Several investigators have studied the influence on cardiovascular health of pomegranate supplementation.

They have measured how pomegranate affects several markers involved in the development of atherosclerosis, such as plasma lipid profiles, lipid-oxidation status, platelet aggregation, interaction between macrophages lipids, and stress to the arterial wall.

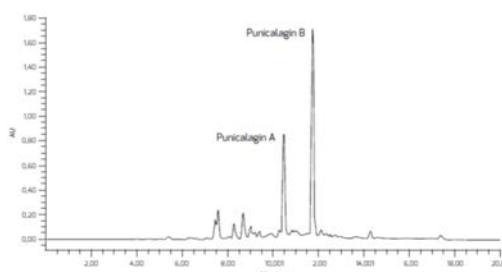
More recently Rosemblat has also confirmed that pomegranate juice daily consumption improves plasma lipid oxidant profile in patients with diabetes by reducing lipid peroxide and cellular peroxides and increasing glutathione levels, factors that all contribute to development of atherosclerosis in these patients (Rosemblat, 2006).

## Cancer

Cancer is an unregulated proliferation of cells which lose their normal controls, resulting in unregulated growth, lack of differentiation, local tissue invasion, and, often, metastasis. Dozens of information (angiogenesis, apoptosis, cells differentiation and signaling) gathered on cellular cultures and animal models have been collected.

Pantuck et al found that daily supplementation with pomegranate juice (PJ) led to a significant decrease in tumor progression in patients with prostate cancer that had undergone surgery or radiotherapy. They were able also to confirm in vitro investigations that PJ induced apoptosis and decreased cell proliferation (Pantuck, 2006)

Nektium offers a range of Pomegranate extracts looking to preserve the totum of the fruits, as in the famous P40P, and not only ellagic acids which is finally in a very small amount in the fruits. From the seeds, they extract puniceic acids, studied then for healthy body weight.



## Pomegranate Seed Oil

Pomegranate seed oil (PSO) is rich in Punic Acid (PA) and contains other actives such as ellagic acid, other fatty acids and sterols (Schubert, 1999; Amakura, 2000; Abd El Wahab, 1999). Nektium manufactures PSO with at least 80% content of PA.

## Punicic acid

Punicic Acid (PA) is structurally related to Conjugated Linolenic Acid (CLNA), and their potential beneficial biological effects (for instance significant decrease in hepatic triacylglycerol deposits, as well as levels of mono-unsaturated fatty acids). In summary, PSO has shown beneficial effects on the lipid storage and lipid serum profile in obesity animal models with a strong suggestion that it may also help uncontrolled blood glucose levels.

As extracted from the seeds of pomegranate, PSO is now considered as Novel Food.

## Weight Management

PSO has been used in a formulation intended for weight management, together with fucoxanthin. In a clinical trial, investigators found that PSO acted synergistically with a fucoxanthin, increasing the resting energy expenditure (REE). Increase in REE leads to losing weight (Abidov, 2010). PSO can down-regulate the expression of adipogenic genes (PPARγ) in fat cells.



## Cococin® - Nourishing Factor

Coconut water is often described as a «natural isotonic sports drink», providing higher amounts of electrolytes such as potassium and magnesium than conventional sports drinks. Coconut water solids also have a prebiotic role, and beneficially influence the balance of microflora in the gastrointestinal tract. When topically applied, coconut water solids nourish the skin and hair, supporting healthy cell growth.

Cococin®, **The Nourishment Factor**® captures the goodness of coconut water in a convenient, free flowing, and powder form. Affirmed GRAS for use in foods and clinically validated for its topical benefits, Cococin® finds multifunctional applications in cosmetic, personal care and food and beverage compositions.

Produced under a patented lyophilization process, the amorphous nature of the solid produced by this process protects the protein components and environment sensitive actives during subsequent pulverization and storage. During storage, the material transforms to the more stable, less hygroscopic, crystalline state.

Cococin blends seamlessly with cosmetic compositions, and easily disperses in water, making it a compact and versatile nutrient pool for use in topical formulations, as well as in functional foods & beverages that nurture from the inside out.

### Nutritionally versatile

It is important to differentiate between coconut milk and coconut water. The ratio of RNA-phosphorus to DNA-phosphorus is

significantly lower in the liquid endosperm of mature coconuts as compared to that of green coconuts. RNA plays an important role in amino acid transport and respiratory metabolism in living cells. Coconut water used to make Cococin is obtained from green coconuts at the optimal stage of maturity, to ensure a high content of **RNA and growth factors**, including shikimic acid, quinic acid and indole-3-acetic acid, along with essential vitamins, amino acids, and minerals.

Coconut water has been used in the tropics as a **nutritive and rehydrating agent** to restore electrolyte balance in cases of diarrhea (Adams, et al.; 1992), used as a short term intravenous (IV) fluid (Campbell-Falck et al.; 2000), or even in total parenteral nutrition (TPN) (Petroianu, et al.; 2004), and sports beverages (FAO, 1998)

Cococin is **The Nourishment Factor**® that provides a valuable nutrient pool and can be safely used in oral care as well as lip care compositions.

Cytokinins and **several important minerals** in Major (mm/l: Ca,K,Mg,Na...), or Minor (µm/l: B,Mn,Zn...) or trace quantities (nm /l: Al, Cu, Mo...) are found in coconut water.

Coconut water, the liquid endosperm of green coconuts (*Cocos nucifera*), is a **refreshing natural beverage, an oral rehydrating agent**, and a supplement in nutrient media for **tissue culture**. Often described as a "natural isotonic sports drink", providing higher amounts of electrolytes such as potassium and magnesium than conventional sports drinks, it also have a prebiotic role, and bene-

**Coconut water, the liquid endosperm of green coconuts (*Cocos nucifera*), is a refreshing natural beverage, an oral re-hydrating agent, and a supplement in nutrient media for tissue culture.**  
**Cococin is even more than that ...**

ficially influence the balance of microflora in the gastrointestinal tract.

It's so ideally finds important applications in:

- Rejuvenative health drinks
- Sports drinks and
- Kids nutritional support formulations

On **personal care** and cosmetic formulations, it supports cell growth of human tissues such as **hair follicles**. It is non-irritating to the skin and is rich in nutrients that provide **moisturization** and support blood circulation. With continued use, this product can also improve skin elasticity and skin tone and decrease skin roughness, while nurturing keratinous tissue to potentially reduce the appearance of the signs of aging.



**The natural patented proprietary formulation of 6 plant extracts (seeds and flowers), clinically proved for water elimination and detoxification. Water soluble, it's the new solution for uses in beverages, sticks, as well as - or course - tablets.**

ElimReal® is an exclusive and patented combination of extracts from :

- Carvi's seeds (*Carum carvi*)
- Meadowsweet Flowers (*Filipendula ulmaria*)
- Guarana's seeds (*Paullinia cupana*)
- Goldenrod's plant (*Solidago virgaurea*)
- Fennel's fruits (*Foeniculum vulgare*)
- Dandelion's leaves (*Taraxacum dens leonis*)



ElimReal is covered by a patent for slimming applications, and promotes renal elimination functions (excretory function of the kidneys) / urinary elimination /urinary volumes, so works on detoxification and slimming.

The double-blind clinical study against placebo on 95 women for 1 month demonstrates its effectiveness :

- **Increase urinary frequency** : (the subjects go to the toilet more often, a perfect marker of efficacy for subjects) *76,92% of the women who took ELIMREAL® under its tablet form observed an increase of their daily urination after 28 days.*
- **Increase of the volume of urinary excretion** of the day, thus participating in decongesting and detoxifying the body *58,34% of the women who took ELIMREAL® under its tablet form observed an increase of their 24h urinary volume after 14 days*

## Elimination & Detoxification

- **Increase sodium excretion**, analytical objective marker of efficiency *Significant Increase of Sodium excretion for both groups which receive Elimreal® ( 10,69 % and 8,78 % in the groups 1 and 2 respectively) in opposition to a decrease of -15,97% in the placebo group*

based on plants extracts with an authorization of the components in most members of the European Union.

Elimreal is supported by very strong allegations, especially linked to the contribution of fennel extract.

**Recommended dosage / proofs of efficacy:** a randomized clinical double blind versus placebo study demonstrated the efficacy of Elimreal at the dose of 805 mg/day)

## A rich source of all-natural, vegan, and versatile protein

- Free-flowing
- Water Extract, water Soluble
- Good taste



**P**romond™ is a 100% natural and vegan protein obtained from almonds and standardized to contain not less than 50% protein. This off-white to cream, free-flowing powder has good taste compared to other protein powders.

It is having a complete array of amino acids, including high levels of branched-chain amino acids (BCAAs). Although its amino acid profile is similar to whey and pea protein, is particularly high in glutamate, arginine, aspartate, and phenylalanine.

Almonds (*Prunus amygdalus*) are incredibly popular nuts worldwide, which belong to species related to cherries and plums, and are native to Middle East and South Asia.

These highly nutritious and extremely healthy nuts are a rich source of proteins, dietary fiber, and other micronutrients.

a.a.	/100	a.a.	/100	a.a.	/100
Glu	26,3	Phe	4,5	Asp	12,0
His	4,0	Thr	1,9	Cys	0,2
Ile	3,5	Trp	0,4	Gly	8,5
Leu	6,3	Val	4,1	Pro	5,1
Lys	2,5	Ala	4,2	Ser	3,1
Met	0,2	Arg	10,6	Tyr	2,6

In recent years, extensive research on almonds has proved that this versatile nutrient food exerts an array of health benefits, including healthy heart support [maintaining healthy cholesterol levels (Wien et al., 2010; Berryman et al., 2015), it may reduce risk of coronary artery diseases (Jenkins, 2002 & 2006; Hu et al., 1998) and oxidative stress (Li et al., 2007), healthy blood sugar levels (Jenkins et al., 2006) and healthy weight management, and related complications (Wein et al., 2003; Berryman et al., 2015; Abazarfard et al., 2014).

## Gugulipid™

*Commiphora mukul* to regulate cholesterolemia and not only.

The proven extract.

**G**ugulipid® is the extract from *Commiphora mukul* developed and launched by Sabinsa even before 1997. It's standardized in Guggulsterones E & Z at 2.5% or 7.5%. Clinical studies have shown improvement in the lipid profile in the blood, lipoprotein levels and markers of inflammation.

Preclinical studies have shown that all fractions of *C. mukul* lower serum cholesterol, but the steroid fraction (guggulsterones-E and guggulsterones-Z) is more effective. In addition, the extract is effective in reducing serum and liver lipid levels. These results are comparable to lipid-lowering agents (clofibrates) at the same dose.

Several studies by Sabinsa, Gugulipid® vs placebo in hyperlipidemic patients have shown the following results:

- Cholesterol, TG, VLDL: significant decrease
- HDL: significant increase
- Increase in α-lipoprotein
- Decrease in β-lipoprotein
- Decrease in hs-CRP protein (inflammation) and MDA (oxidative stress)

Sabinsa also highlighted the mechanism of action of guggulsterones to improve the elimination of

cholesterol and the inhibition of its biosynthesis:

- Increased excretion of cholesterol and bile acids
- Increased level of catecholamine
- Inhibition of HMG CoA reductase enzymes



Other studies have also shown that guggul extract can stimulate thyroid function, which can also act on the regulation of cholesterol levels:

- Increased peroxidase and thyroid proteolytic activity (after 6 days)
- Increase in iodine concentration after 10 days

In Ayurvedic medicine guggul means: "that which protects from the disease".

In Sanskrit, guggulu means: "that which protects from disease", in ayurvedic medicine it is said that guggul releases the "subtle channels" which awaken consciousness and refine perceptions.

### Guggulsterones

The active ingredients responsible for the maintenance of healthy cholesterol levels are the guggulsterones, specifically guggulsterone-E and guggulsterone-Z. The study of the pharmacology of oleogum resin dates back to the 1960's in India, where the gum was evaluated for its potential in the treatment of elevated blood cholesterol.

Guggulsterones are postulated to enhance the elimination of cholesterol and to inhibit its biosynthesis. Several mechanisms of action have been proposed which directly or indirectly affect cholesterol metabolism.

The cardiovascular response for cholesterol regulation, reduction of stored fat, and inflammation.

Recommended dose: 12.5 to 25 mg guggulsterones 3 times / day

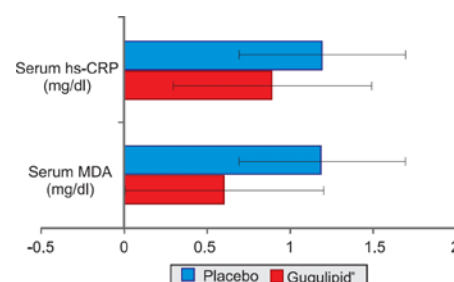
Grades at 2.5% or 7.5% guggulsterones by HPLC



### Clinical Studies

Various studies are available. Gugulipid® is supported by Phase I, Phase II and Phase III studies organized by the CDRI, India. Also a double-blind, cross-over study compared Gugulipid® to the lipid lowering drug Clofibrate.

In US : Randomized, Double-Blind, Placebo-Controlled Trial Evaluating the Safety and Efficacy of Gugulipid® in Americans with Hypercholesterolemia - University of Pennsylvania, and Serum lipid response during 12 weeks of Gugulipid® therapy in subjects with mild-to-moderate hyperlipidemia.



# Ultimate Nutrients Enhancer

**BioPerine® is the product sourced out of piperine studied for its ability to increase the bioavailability of nutritional compounds. It is also the only source from piperine to have undergone clinical studies to substantiate its safety and efficacy for nutritional use.**

## Bioavailable curcuminoids

Effect of BioPerine® on Serum Concentrations of Curcumin in Human Volunteers. The relative bioavailability is improved by more than 20 times when therapeutic effectiveness of curcumin is often limited due to its poor absorption from the GI tract.

## Bioavailable β-Caroten

BioPerine® increased the absorption of co-administered beta-carotene in human volunteers by 160%, using 5mg BioPerine®.

## Bioavailable Selenium

Effect of BioPerine® on serum selenium levels during a 6 week supplementation trial in human volunteers : increase by 145% of the selenium levels over the pre-supplementation value (50 µg of elemental selenium in the form of Selenomethionine versus 50µg+5mg BioPerine®).

## Bioavailable vitamins

Efficacy of BioPerine® (5 mg) on the bioavailability of Vitamin B6 absorption in human volunteers : increase by 250% of the vitamin B6 serum level after 2 hours compare to control (100mg B6 / 100mg B6+BioPerine®).

## Bioavailable Resveratrol

Many other studies have been conducted, the most recent one on the resveratrol : "We found that the degree of exposure (i.e. AUC) to resveratrol was enhanced to 229% and the maximum serum concentration (C max) was increased to 1544% with the addition of piperine" (Mol. Nutr. Food Res. 2011, 55, 1–8). BioPerine® has legitimate application in the field of nutrition, particularly since we are becoming increasingly aware of the impact of nutritional deficiencies on our health.

## Bioavailable CoQ10

Effect of BioPerine® on serum CoQ10 levels during a 21 day supplementation trial (+150% in serum, 90mg CoQ10+5mg BioPerine®).

### BioPerine® :

- is a **standardized extract** from the fruit of *Piper nigrum* L (black pepper)
- contains **95% of piperine**
- may be co-administered with various nutrients for both human and animal health.
- is **Nature's Bioavailability Enhancing** If you lack the one ingredient that can change the way your body looks, just go for BioPerine®
- has been **studied** by Sabinsa and many external labs
- is provided with **full safety data**

Get more for your body from this supplement.

### How does BioPerine® work?

The metabolic process that generates energy at the cellular level in the human body is called thermogenesis. Though thermogenesis has been identified as a key factor in maintaining weight loss, it has also been identified as playing an integral role in utilizing the daily food and nutrients that the human body consumes. It sets in motion the mechanisms that lead to digestion and subsequent gastrointestinal absorption. Piperine, in the patented form of BioPerine® enhances the body's natural thermogenic activity-hence the term *Thermonutrient®*. This enhancement may be explained as a means of increasing the thermal energy sufficient to «power up» the mechanism related to thermogenesis. This in turn results in increased metabolic processes that creates a «demand» for «supply» of a



### Dosage

The recommended dosage is 5mg per serving dose.

**Acute, subacute and chronic toxicity studies of piperine in laboratory animals indicate that piperine used even in a broad range of doses does not cause abnormalities in the general growth pattern, body to organ weight ratio, clinical symptomatology, or blood chemistry.**

The dose of piperine considered to be bio enhancing for absorption of nutrients is calculated as 0.04 to 0.08 mg piperine/kg body weight. That dose is 4,000 times less than the LD50 dose (dose toxic to 50% animals tested) of piperine established in mice and rats. Incidentally, the dose of piperine, which increased the bioavailability of the actives studied, was several times lower than the estimated amount of piperine consumed daily in the diet by an average individual in the USA (Majeed, M. et al.; 1999).

broad range of nutrients that contribute to metabolism, i.e. vitamins, minerals, herbals, amino acids, etc. It is as if BioPerine® activates a metabolic paddle wheel, of sorts, that selectively provides a more efficient mode of nutrient transportation into the blood. Non specific possible mechanisms promoting rapid absorption of nutrients :

- Increases blood supply to the GI tract
- Increases emulsifying content of the gut
- Increases active nutrient transport

### Advantages of BioPerine®

BioPerine® is the only product sourced out of piperine to obtain a patented status for its ability to increase the bioavailability of nutritional compounds. Secondly, it is the only source from piperine to have undergone clinical studies in the U.S. and in other countries to substantiate its safety and efficacy for nutritional use. It's an objectivated product, with a lot of sciences behind, for your kind support.

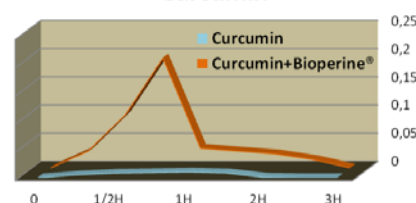
### Bioavailability Enhancer

Bioavailability is "the quantity of a substance, either nutrient, drug, or toxicant, that effectively reaches the target cells where it modifies, for good or bad, their metabolism and consequently their fate" (Basu, T.K). The nutritional materials which may be co-administered with BioPerine® are the following groups:

- **Herbal extracts** : (e.g. Curcumo, Boswellic acids, Ashwagandha, Ginkgo biloba and Capsaicin)
- **Water-soluble vitamins** : (e.g. Vitamin B1, Vitamin B2, Niacinamide, Vitamin B6, Vitamin B12, Folic acid and Vitamin C)
- **Fat-soluble vitamins** : (e.g. Vitamin A, Vitamin D, Vitamin E, and Vitamin K)
- **Antioxidants** : (e.g. Vitamin A, Vitamin C, Vitamin E, alpha-carotene, beta-carotene, beta-cryptoxanthin, lycopene, lutein/zeaxanthin, pine bark bioflavonoids complex, germanium, selenium and zinc).
- **Amino acids** : (e.g. lysine, isoleucine, leucine, threonine, valine, tryptophan, phenylalanine, and methionine)
- **Minerals** : (e.g. calcium, iron, zinc, vanadium, selenium, chromium, iodine, potassium, manganese, copper and magnesium).

If one believes that since BioPerine® is sourced out of black pepper, all one need to do is increase the consumption of black pepper. Again you have gone wrong, for the direct intake of black pepper will not help achieve enhanced nutrient absorption.

**Serum concentration (µg/ml)**  
**Curcumin**



# Ecdysterones from *Rhaponticum*

**R***haponticum carthamoides*, also known as Leuzea, or Maral root, is plant indigenous to the Lake Baikal region and distributed throughout Eastern Siberia. Traditionally the Siberians consumed the Leuzea tea mixed with *Rhodiola rosea*, in cases of tiredness and general weakness after illness and energizing remedy after the long Siberian winter.

## Traditional

Often used to improve athletic performance and build muscle mass, and improve libido, maral root is mentioned to treat a variety of health issues. The root contains compounds that can influence health, including antioxidants and plant-based steroids called ecdysteroids.

## Powerful natural anabolic steroids

Maral root has adaptogenic properties similar to ginseng root (*Panax ginseng*), replenishing energy stores, increasing libido, sharpening focus, promoting lean muscle growth, reducing body fat, improving mood and stimulating the immune system.

Key active constituents is a mixture of compounds called "levseins" representing a complex of more than 10 **ecdysterones**. 20HE (20 ecdysteroids) have been reported to have anabolic effects, and different preparations tested in human trials have shown diminished fat content with elevated muscle mass, increased working capacity in top athletes.

## Free from the side-effects of anabolic steroids

In a placebo-controlled experiment conducted on 112 athletes, 89% of those taking *Rhaponticum* found their fatigue passed more rapidly, were less lethargic following physical exertion and performed better in sports such as athletics, swimming, speed skating and alpine skiing without negatively affecting the adrenal cortex. Neither did it have the androgenic effect of anabolic steroids, nor their associated side-effects.

## Performances

During intense physical activity, *Rhaponticum* extract **inhibits energy metabolism disorders**, maintains stable levels of glycogen in skeletal muscles, increases blood supply to muscles and brain, and shortens the recovery period after prolonged muscle workload. Studies show that the work capacity of the athletes increased by 10-15%, as well as muscle cell growth.

## Anti-fatigue

A study versus placebo conducted on 50 sailors shows for the *Rhap.* group: sleep normalised, appetite increased, mood was better and, above all, their productivity increased.

## Libido

*Rhap.* extract also stimulates sexual function, increased copulative function and improved sperm quality (Mirzaev IR et al).

*Rhaponticum carthamoides*  
standardized to min. 1%  
natural ecdysteroids  
(or ecdysones)  
of plant origin

Research conducted in Russia suggests that extract of *Rhaponticum carthamoides* may significantly increase muscle mass while decreasing fat mass in athletes when taken during training.

Studies also show it may help boost capacity for work and endurance, and reduce physical and mental fatigue.

Included in the Soviet pharmacopoeia in 1961 as a remedy for increasing capacity for work, athletic performance and recovery following strenuous muscle work

## Digezyme

The process of enzymatic digestion of food in the body may be impaired by several factors: Stress due to sudden changes in food consumption patterns, exposure to environmental pollutants, vagaries of the weather, extensive travel. Somatic diseases that necessitate treatment with surgical procedures, antibiotics and immuno-suppressive drugs.

The sites of enzyme-production, such as the pancreas could also be damaged, by disease or injury, leading to enzyme insufficiency.

Some individuals may suffer from an inherent lack of specific enzyme generation systems, due to genetic factors, resulting in digestive and metabolic disorders

## Five enzymes

Digezyme consists of five GMO-free broad acting enzymes obtained from the fermentation process:

- **Amylase** : breaks down carbohydrates such as starch and glycogen, into smaller units
- **Protease**: Breaks down protein and supports immune function
- **Lactase**: Breaks down lactose (milk sugar) and useful for lactose intolerance

- **Cellulase**: Breaks down cellulose and chitin. It helps free nutrients in both fruits and vegetables
- **Lipase**: Breaks down lipids and improves fat utilization and also supports healthy gallbladder function

This group of enzymes breaks carbohydrates, proteins and fats and all three groups of enzymes are resistant to the action of gastric juices, while retaining their digestive activity. Digezyme is referenced in The Complete Book of Enzyme Therapy by Anthony J. Chichoke (Ref. 1). Digezyme was also clinically evaluated for enhanced absorption of minerals and vitamins.

## Why Digezyme ?

This multi enzyme complex **help in the digestion of components** when poorly assimilated by our bodies in cases of unbalanced diets, fatigue, or impaired pancreatic function - or in case of intolerance. Digezyme helps to improve overall health and nutritional status :

- **Reduce toxic load** generated by undigested food materials
- **Cleanse the colon**
- **Strengthen the immune system**
- **Facilitate restful sleep**
- Benefits for **Delayed Onset Muscle Soreness**

And other activities related to a good digestion :

- Enhance **mental** capacity

Digezyme is an easy-ready-to-use multi enzyme complex to help in the digestion of components, and against muscle soreness

- Help **shed excess** weight and fat
- Prevent **aging** of the skin

Digezyme is so not only used to for those who experience a chronic gastrointestinal discomfort (e.g. gas, constipation, diarrhea, cramps) or preventive in the middle age and elderly individuals.

## Dose & Quality

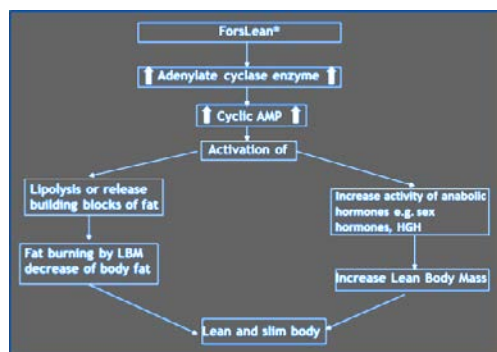
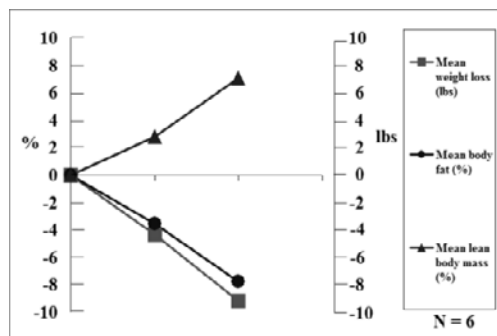
The daily dose is **50mg per dose**, three times daily, in tablets, capsules or even powdered diet mixes. Digezyme is easy to use: the activity starts when the enzymes meet the specific conditions (humidity, pH, substrate...) they need, with enough reaction time in presence.

Digezyme is a formulation of food enzymes (non-animal origin). It contains Lactase, what got an approval by Efsa (extra lactase may be needed for the claim, depending on the dosage of Digezyme).

**DigeZyme**™

# Slimming with Forslean

Forslean® is manufactured by a proprietary process and is a standardized extract from the roots of the *Coleus forskohlii* plant, the only known plant source of forskohlin. ForsLean® is a registered trademark of Sabinsa Corporation and is the only *Coleus forskohlii* preparation supported commonly by Patent.



**ForsLean®**

## Sustainability

Sabinsa is growing *Coleus* in part of its 44 000 acres, and do the extraction in its own plant selection fully dedicated to the production of *Coleus* extracts, to provide you the best quality and the best sustainability.

## Last Safety studies

Acute, Sub-Acute, Chronic Oral Toxicity and Mutagenicity of *Coleus forskohlii* Briq. Hydroethanolic Extract was published in the International Journal Of Pharmacy & Pharmaceutical Research December 2015 Vol.:5, Issue:1

Forslean® is Sabinsa's new proprietary composition extract of *Coleus forskohlii* root, standardized for Forskolin. Forslean® has shown promising results in three areas; enhancing lean body mass, promoting fat loss and promoting weight loss. In September of 1998 Sabinsa was granted a use patent for this application of Forskolin in its Forslean® composition.

## Intended Application

The importance of maintaining or regaining lean body mass has recently come to light for two important reasons. First is the increased recognition that lean body mass plays a vital role in any successful weight training regimen, and second, there is a growing awareness that lean body mass is proportionate to the overall health of an individual.

Lean body mass is composed of muscle, vital organs, bone and bone marrow, connective tissue and body water. The percentage of lean body mass to fat not only determines the body's aesthetic appearance, but more importantly, it is also an index of physical fitness, health status, susceptibility to disease and premature mortality. Because the body's metabolic rate is directly proportional to the amount of lean body mass, there is substantial interest in products that safely increase lean body mass because they are most likely to work. The use of Forslean® may help to increase lean body mass and optimize body composition with one of the side effects being fat loss and/or weight loss.

A sluggish metabolic rate is an undesired effect of many weight-loss regimens. It was observed in one study that formerly obese subjects had a 3-5% lower resting metabolic rate than control subjects. The occurrence of a low resting metabolic rate is likely to contribute to the high rate of weight regain in formerly obese persons.

Clearly, we need to change and broaden our thinking on the objectives of weight management regimens for both active and not-so-active individuals. In particular, it should be emphasized that healthy functioning of the body depends not so much on a lower fat content, but rather on obtaining a higher percentage of lean body mass.

Again, it should be kept in mind that it is not only fat, but also lean body mass that is, or can be, lost through dieting. This fact often escapes our attention when we reduce our total body weight. The loss of lean body mass offsets any benefits derived from the reduction of body weight, and can potentially increase one's chances for diabetes, cardiovascular disease and possibly some forms of cancer due to poor metabolic activity.

## Mechanism of Action

The mechanism of action on how Forslean® works is well defined : «Forskohlin, the active compound in Forslean®, is recognized as an adenylate cyclase activator. Adenylate cyclase is the enzyme involved in the pro-

duction of cyclic adenosine monophosphate (cAMP), a significant biochemical agent in metabolic processes. The role of cyclic AMP is indispensable to many body functions. It induces a chain reaction of biochemical events that trigger metabolic processes and diet induced thermogenesis, thereby providing the means to maintain healthy body composition and lean body mass levels.

## Double blind studies

**Dozen studies are available.** In one on 12 weeks, 25-45 y, 60 obese males and female volunteers, Forslean® treated volunteers shed on an average 1.73 kg from their body weight, in comparison placebo group gained 0.25 kg.

During the 12 - week period of treatment volunteers treated with placebo gained 0.68% of body fat. On the other hand, the Forslean® treated group lost 0.46% of body fat.

In the group of volunteers that received Forslean®, there was an increase in the LBM as compared to the placebo group where, there was a decrease in LBM. HDL cholesterol showed a statistically significant increase in volunteers treated with Forslean®. Other serum lipid profiles remained statistically unaltered in the Forslean® and Placebo treated groups.

50 subjects, male and female, were randomized to receive 250 mg of ForsLean® capsules twice a day for 12 weeks. A significant decrease in body weight and fat content and a significant increase in lean body mass were observed (Kamath, M.S. et al (2004)).

The mean percentage lean body mass increased by 1.78% in the ForsLean® group, while the placebo group showed a mean decrease of 0.2% of LBM from baseline values. The mean percentage body fat content in the ForsLean® group was 34% as compared to 39% in placebo receiving group at the end of the 12-week trial

## Dosage Form

Forslean® has been clinically evaluated at one dose, 250 mgs twice daily. This provides 50 mgs of forskohlin, the primary active compound in Forslean®. Dosage has been in the form of a two piece, hard shell capsule.

## Toxicity

**Acute toxicity LD50 :** 2g / kg

**Chronic toxicity :** none at 1g / kg on 6 months

**Mutagenicity :** non-mutagenic (AMES). *Salmonella t.*, and *E. coli* also controlled.

**Safety :** A number of clinical studies investigating the efficacy of Forslean® for body composition management have been conducted, and parameters related to safety have been monitored.

No significant changes in average **systolic and diastolic pressures** (12 weeks, 60 volunteers). None even on thyroids hormones.

There is a significant positive change ( $p < 0.05$ ) in the concentration of HDL.

# Part of the Regulatory ...

**T**his is a non-exhaustive list of the number of decrees published by the European members, the European Parliament, the Council and Commission Regulations relating to food supplements.

Each link of the chain from the early grower of the plants to the end-product must carefully check that its product fulfills the regulation and totally satisfy the safety needs.

## Plant names

Different countries, associations, working groups, etc... are working on the harmonization of plant and plant extracts in Europe, as for instance Syn-adiet, Be-sup, EHPM, etc... It works towards developing an appropriate regulatory framework throughout the EU for its members' products.

## Synonyms accepted for plant

The Plant List is a working list of all known plant species. It aims to be comprehensive for species of Vascular plant (flowering plants, conifers, ferns and their allies) and of Bryophytes (mosses and liverworts): see [www.theplantlist.org/](http://www.theplantlist.org/)

## Protection (Cites)

EC No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein

## Food supplements

### Directive 2002/46/EC

This main directive of June 10, 2002 allowed the approximation of the laws of the Member States relating to food supplements and aims to ensure that they are safe and labeled in an appropriate manner. Labeling rules are governed by INCO regulation 1169/2011/EU. These products may carry nutrition and health claims in accordance with Regulation 1924/2006.

Plants and substances depend on national regulations. In France:

- plants - order of June 24, 2014
- authorized substances: order of September 26, 2016
- other French decrees: 2011/329 modifying 2006/352. The principle of mutual recognition is possible according to 2019/515/EU.

Regulation 609/2013 for foods intended for specific groups has repealed the legislation on foodstuffs intended for particular nutritional uses (DADAP: 2009/39/EC) since July 20, 2016, which has affected several categories: preparation for infants (2006/141/EC) and young chil-

dren (2006/125/EC), foods for special medical purposes (1999/21/EC) and total daily ration substitutes for weight control (96/8/EC) thus repealing these regulations.

## Organic

Since January 1, 2022, reference must be made to 2018/848/EC relating to organic production and the labeling of organic products and repealing regulation 834/2007/EC and regulation 2021/1165.

## Contaminants

### General purposes

EC 1881/2006 of 19 December 2006 setting maximum levels for **certain contaminants** in foodstuffs

### Toxins

EU 1259/2011 of 2 December 2011 amending Regulation EC 1881/2006 as regards maximum levels for dioxins, dioxin-like PCBs and non dioxin-like PCBs in foodstuff (2017/644/EU) – Mycotoxins : aflatoxin B1, total aflatoxins, Ochratoxin A, Patulin, Zearalenon, Fumonisin (401/2006/EC) – Nitrates (1882/2006) and most of other toxins are in 1881/2006. Regulation 2022/1370 is specifically focusing on maximum levels of Ochratoxin A.

### Pyrrrolizidinic Alkaloids

EU 2020/2040 of 11 December 2020 amending Regulation (EC) No 1881/2006 as regards maximum levels of pyrrolizidine alkaloids in certain foodstuffs ; Food supplements containing herbal ingredients, including extracts, except for certain categories ≤400 ppb applicable from 1.7.2022 (Without prejudice to more restrictive national rules in certain Member States).

### ETO (Ethylene oxide)

Since September 2020, numerous notifications concerning the presence of ethylene oxide (ETO) have been published in the RASFF food alert portal, firstly sesame seeds and then for our entire sector. Even if the finished product does not contain ETO, if the raw material used to manufacture the FP contains at a level that exceeds EU MRLs (EU 2015/868), then the product should be withdrawn from the market.

### PAH

EU 2015/1933 of 27 October 2015 amending Regulation EC No 1881/2006 as regards maximum levels for polycyclic aromatic hydrocarbons. Usually:

- Benzo(a)pyrene ≤10 ppb
- Sum of Benzo(a)pyrene, Benz(a) anthracene, Benzo(b) fluoranthene and Chrysene) ≤50 ppb

### Heavy Metals

EC 629/2008 of 2 July 2008 amending Regulation (EC) No 1881/2006 setting maximum levels for certain

contaminants in foodstuffs (especially heavy metals). The limits vary depending on the origin and the use.

However, we usually refer to :

- Total Heavy metals : usually 10 ppm
- Lead : usually 1 or 3 ppm
- Arsenic : usually 1.0 ppm, UE 2023/465 adds specific limits for some categories
- Cadmium : usually 1.0 ppm (3.0 seaweed der.)
- Mercury : usually 0.1 ppm

## Pesticides

EC 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC + EC No 149/2008. This list is much more strict than the EP, and even more than the USP.

[ec.europa.eu/food/plant/pesticides/eu-pesticides-database/](http://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/) for active substances and pesticides MRLs

## Hydroxyanthracenic derivatives

(EU) No. 2021/4680 sets the maximum levels of HAD, in particular aloin, aloe-emodin, emodin. Certain plants are specifically concerned (publication by ANSES of a list of 39 plants).

## Other limits

### Solvents and Residual solvents

Directive EU 2016/1855 of 19 October 2016 amending 2009/32/EC on extraction solvents used in the production of foodstuffs and food ingredients, amending EC 2009/32 of 23 April 2009 on extraction solvents used in the production of foodstuffs and food ingredients.

You may also refer in certain cases to Eur. Ph. 2.4.24 (methods) or 5.4 (limits).

## Other Quality specificities

### Allergen

EU 1169/2011 of 25 October 2011 amending EC 1924/2006 and EC 1925/2006, and repealing 87/250/EEC, 90/496/EEC, 1999/10/EC, 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004



## ... the main decrees

### Bacteriology

Usually Eur. Ph. 5.1.8 (limits) and 2.6.12/2.6.31 (methods)

### GMO

EC 1829/2003 of 22 September 2003 on genetically modified food and feed and EC 1830/2003 of 22 September 2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC.

### Food

Products comply with the Regulation (EC) No. 178/2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety and with the Regulation (EC) No. 853/2004 on the hygiene of foodstuffs

### Packaging

Materials intended to come into contact with food as described in the Regulation (EC) No. 1935/2004 and 10/2011 and 1895/2005 and 2023/2006 and its amendments.

### Nano technology / material

Commission recommendation of 18 October 2011 on the definition of nanomaterial - 2011/696/EU (+2283/2015 + 1169/2011).

### non-irradiation

EC No. 1999/3 for the list of foods and food ingredients treated with ionizing radiation.

### Novel Food

Novel Food is defined as food that had not been consumed to a significant degree by humans in the EU before 15 May 1997, when the first Regulation on novel food came into force.

'Novel Food' can be newly developed, innovative food, food produced using new technologies and production processes, as well as food which is or has been traditionally eaten outside of the EU.

The Novel Food Catalogue is a non-exhaustive list and serves as orientation.

A plant may be not novel food when its extract is, because of its process or unknown uses.

EC 2002/46 of 10 June 2002, 2019/1381 of 06/09/2019 on Novel Food amending Regulation 1169/2011, 2017/2470/EC of 20/12/2017 establishing the Union list of novel foods.



### Substances





Substances are more and more concerned in Europe, although each country may still have its own considerations, and although the definition of a substance is not fully clear yet. France publishes its Order regarding the use of other substances in supplements. It confirms that the use of substances other than those listed in Annex I, which lays down specific conditions of use for four ingredients, may be used in supplements provided they are not novel.

French decree : « Arrêté du 26 septembre 2016 établissant la liste des substances à but nutritionnel ou physiologique autorisées dans les compléments alimentaires et les conditions de leur emploi »

# The Natural Sign

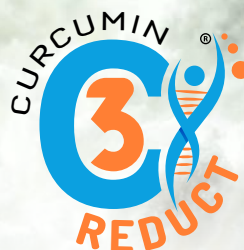
extraits de plantes standardisés objectivés

## BECARRE Natural

 <b>140 MG</b> DAILY	 CLINICAL STUDIES
 <b>27</b> PUBLICATIONS	 <b>95%</b> TETRAHYDRO CURCUMINOIDS

**FIRST EVER EFSA APPROVED NOVEL FOOD**  
**ACTIVE METABOLITE OF CURCUMINOIDS**

**POWER OF CURCUMIN REDUCTIVE METABOLITES**



**NATURAL FROM CURCUMA LONGA**  
**COLORLESS AND HIGHLY STABLE**  
**SUITABLE FOR GUMMIES, GELS,**  
**BARS, TABLETS, PREMIXES ETC.**

**THE AUTHORIZED CURCUMA**

Sabinsa has obtained **EFSA Novel Food approval** for its innovative turmeric extract **Curcumin C3 Reduct®** - 95% Tetrahydrocurcuminoids (THC), i.e. curcuminoid metabolites extracted from Curcuma longa. This may well be the first time a metabolite of a nutrient has been approved as a Novel Food.

**C3 Reduct® overcomes the limitation of the bioavailability of curcuminoids** in the most functional way since it allows the direct use of the active form of curcuminoids: its metabolites.

# Our Reading of the Plant Decree

The plant decree was published on July 17, 2014 in the official journal, laying down the list of plants, other than mushrooms, authorized in food supplements and their conditions of use. Its implementation is January 2015, 1st. The list of fungi, and probably essential oils, will be the subject of further publication.

This decree includes 14 articles, describing the terms used and the applications, and 3 annexes.

This text is intended for all players acting in the production, processing and distribution of food supplements. It refers to the other decrees of this sector, such as the European Directive 2002/46 / EC and its amendments, including national decrees (2006/352, 1170/2009). It gives the list of plants authorized on the market and / or mutual recognition by Article 16.

## Annex I

Annex I lists the 540 authorized plants (at the date of June 2014), with :

Their scientific name and family : synonyms exist in several cases . If necessary, you can also visit the website [www.theplantlist.org](http://www.theplantlist.org)

Their vernacular name

The part(s) used

The substances to be monitored : it is not necessarily substances to be absent or undetectable, but substances that the decree specifically request to be checked.

The restrictions of use: mainly specific labeling warnings (child, pregnant women), sometimes about the process.

## Annex II

Annex II contains information that may be provided by operators in the sector in order to understand the preparation. As such, a model was proposed by Synadinet and Food Supplements Europe. This model is split into several parts. There is no obligation to complete each field, as indeed it's just a model-form :

### Plant (ie. Raw Material)

**Plant Description** : Scientific name, vernacular name, family, existing monograph, risk of falsification (by another similar plant for example)

**Culture method** (geographical origin, method of cultivation, specific agreements, licensing, 338/97) and collection (collected plant parts , mechanical or manual cleaning, drying)

**Parts of the plant** used and its identification (controls, markers, purity)

Production process (starting from the plant)

**Geographical location** of the process (unit), manufacturer, preparation before process (grinding, separation, ...)

**Description of the extraction process** from the raw material (ex. if it is extracted from an oleoresin, it is necessary to mention the process from the plant): solvent (concentration and quality) for extraction, purification, and

any other step (elimination of compounds or hazardous compounds).

**Other information** related to the process, definition of a batch, size

**Plant preparation** (ex. Plant extract for BE-CARRE Natural)

**Name , PER** (Plant Extract Ratio: final ratio after extraction and before any other addition and the initial amount of extracted plant - dry /dry if it is a dry extract), **DER** (Drug Extract Ratio: ratio between the final ratio of the preparation and the initial amount, so after addition any additives or carrier ...). A product without carrier shows a PER = DER. Sometimes indicated, the NER is the native ratio

**Full composition** (in %, with the nature and purpose of each component, purity criteria additives - 231/2012)

**Standardization** (markers, actives) with a detailed method of analysis (validated / internal validation) and the standard used as a reference

**Substances to be monitored** : with reference to Annex I or any other molecule needing to be monitored

**Impurities** (eg 2009/32), contaminants, bacteriological controls, other controls, see ... 1881/2006, 629/2008, 1259/2011, etc

**Statements, other data** : nutritional data, GMO (1829 and 1830/2003) Irradiation (1999/2, 1883/2003), allergens (2007/68, 2000/13), ...)

**Stability data** with the reference (ICH ?), does it need homogenization, ...

In addition, BECARRE Natural completed the form of a preparation to additional food safety information when available, although Annex III is not needed..

- **Exposure Level** : consumption of the plant, of the extract
- **Risk analysis** : toxicity studies, genotoxicity, mutagenicity, safety, NOAEL
- **Traditional use**
- **Possible evolution** of the process

## Annex III

This third part relates to the safety of the plant preparation, and it must be completed when there is a doubt, or when the plant preparation does not have enough history to justify its safety. Regarding the safety for the consumer, it is provided by the manufacturer of the food supplements, with the support - in our view - of each manufacturer involved. Annex III may correspond to a 'simple' analysis of the literature of available toxicological data and / or made by the producer, as an extensive risk analysis in the case of conflicting studies, or molecules interaction, or whenever the specific analysis needs.

### Which products are concerned by Annex III ?

All products are concerned since the risk analysis must be done on all extracts but not all require a Annex III.

It is important to understand that Annex III is applicable when the plant preparation

The plants decree has been published July 17th, 2014 «laying down the list of plants, other than mushrooms, authorized in food supplements and their conditions of use». You'll find here below a reading of the publication - especially annexes II et III

cannot refer to an existing and traditional use enough to guarantee the safety of a plant preparation (or food supplements), as it exists and has existed on the market. Thus, a plant extract may be traditionally produced in a PER of 15:1 and by using a high solvent (eg, pure ethanol). It is this extract which is known, and can prove its safety - and so would not need an Annex III. Speaking of food safety, we can refer only to what is clearly known.

### Collect of information

The traditional use can be justified by various ways, including probably monographs, references in pharmacopoeia (with specific description of the extract and not only of the plant), references to EMA, relation to the WEU (Well Established Use ), or from pharmaceutical agency, etc ... describing the extract (plant part, solvents and concentration processes, ratio), and with the Annex II to confirm that the plant extract that is offered is conform to traditional extract.

### From Risk analysis to Annex III

#### 3 possible cases

The **preparation is described in the literature** to demonstrate the history of use and safety. It is sufficient to indicate.

The **preparation is not described in the literature but the argument shows that the extract is equivalent to one described preparation**. It should provide the rationale for comparing the described preparation and its extract.

The **preparation is not described in the literature and no equivalent that can be demonstrated**: it is necessary to bring the safety analyzes - including toxicology - in relation to the identified hazards to be indicated in Annex III.

Italy : « Regulations on the use substances and plant preparations in food supplements »





# Reading the specification sheet allows you to be vigilant

Reading a specification sheet of a plant extract logically provides a lot of information, but sometimes you have to know how to interpret it. In order to be able to effectively compare different origins of the same plant extract, it is necessary to pay close attention to certain points of vigilance. The implementation in France of Annex II together with the plant decree of June 2014 has enabled a first step in the description of plant extracts, allowing actors to better compare different sources, and to be able to select the best source according to their needs and targeted activities, and in a constant search for quality, better efficiency and safer products.

## 1 Clear description of the plant

### Latin name

The only internationally recognized name. It is composed at least of a genus and species name and an author's name or initials. It can be completed by a variety name. Ex. *Rhodiola rosea* L.

The same plant can have several Latin names:  
*Coleus forskohlii* = *Plectranthus forskohlii*

### Common name / vernacular name

This is the name commonly used for a plant in a given country or region. The same common name may correspond to several different plants, hence the need to cross-check with the Latin name if only the vernacular name is given.

Ginseng can be used for *Panax ginseng*, *Siberian ginseng* (*Eleutherococcus*), *Indian ginseng* (*Ashwagandha*), *Peruvian ginseng* (*Maca*), *American ginseng*, *Brazilian ginseng*, *Himalayan ginseng*, ... with very different properties.

The name *Curcuma* is used for *Curcuma longa* L., but also for *Curcuma xanthorrhiza*.

It might also be a case of the supplier wanting to play on the name for commercial purposes:

use of *Rhodiola crenulata* for '*Rhodiola*' *Rhodiola rosea*. The ratio between total rosavins (rosavin+rosarin+rosin only) and salidroside is in the order of 2.5:1 to 3:1 for *Rhodiola rosea*, not for *R. crenulata* (more salidroside found by analysis).

The same plant (same Latin name) can have several common names

*Centella* = *Gotu kola* = *Hydrocotyle* = *Centella asiatica*

### Plant part

The active ingredient profile varies according to the part of the plant used, and some parts may be forbidden (e.g. borage leaf) or even toxic, or may not allow a claim at all. Another plant part may also be used discreetly to reduce the cost of the extract (e.g. ginseng leaf, *ashwagandha* root). Precise analysis of the active ingredient profile and ratio, or TLC, provides more information on the actual parts used.

### Origin of the plant

Knowing the origin of the plant helps to avoid certain risks:

- risk of shortage due to tense political situations,
- risk of contaminants due to the local use of prohibited phytosanitary products, for example,
- The active ingredient profile (the same plant may have different active ingredient profiles depending on the origin, even if close -

The monomer/dimer ratio is practically reversed between Chardonnay seeds from Champagne and Burgundy

- local restrictions on resources (e.g. a plant indicated as being of a geographical origin when it is in fact hardly available in that region), etc...

### Other parameters

The visual appearance, taste and smell of a plant are also criteria for a quick and pragmatic first check.

a fucoxanthin extract is coloured  
 harpagophytum is very bitter  
 valerian has a characteristic smell

Other identification methods exist of course, such as TLC, HPLC, UPLC fingerprint, DNA analysis, GCMS - to be adapted according to the plants.

You may also refer to monograph (EMA, WHO, ...), pharmacopoeia (EP...), wfoplantlist.org, theplantlist.org, Health Canada, etc...

## 2 The plant extract ratio

For the same plant (or part of a plant), the same solvent leads to the same extraction ratio. This means that a client cannot ask for the ratio he wants to match a claim, unless it is a dilution.

The ratio given must be understandable, and the final ratio (DER, Drug Extract Ratio) must be mentioned.

### DER (Drug Extract Ratio)

ratio between the quantity of the initial dry plant and the final extract, including the carrier. This ratio can vary depending on the standardization, and will be lower than the PER.

### PER (Plant Extract Ratio)

ratio between the initial quantity of dry plant and the extract (whether it is a simple extraction, a purification, etc.), therefore before standardisation with a carrier or any element external to the plant (additives, drying aid, etc.).

### NER (Native Extract Ratio)

ratio between the quantity of the initial dry plant and the extract obtained by a simple extraction (i.e. without purification for example), and before any external contribution. It does not change, or changes only slightly, for the same part of the plant and the same solvent (see the "What is an extract" pages).

*Eleutherococcus* 8-10:1 (NER) with ethanol 30% provides 1-1.2% eleutherosides. It is not restandardized, so NER = PER

= DER = 8-10:1. In addition to 1% eleutherosides, the extract provides 99% of the plant's totum.

A stronger solvent + purification (more 'efficient' extraction) provides up to 10% eleutherosides for 60-70:1 (=PER). Standardized to 1% by dilution of 10% extract and 90% carrier: its DER is therefore logically 6-7:1. The extract still provides 1% eleutherosides but only 9% other plant compounds and 90% carrier

By comparing different specification sheets, it is easy to find the inconsistencies and the correct information.

A 10:1 extract of harpagophytum cannot provide only 2% harpagoside, and the NER is rather 2-3:1.

Similarly, the literature can provide information on the active ingredients of a plant.

*Bacopa* contains about 1.5 to 2.5% bacosides (by HPLC). Due to losses during extraction, a 20% extract corresponds to 15:1, or even 10-12:1 for the best plants

It is so recommended to check the percentage of native extract and of carrier/additives, as well as the typical markers of the plant.

### Ratios and prices

The ratio must correspond with the cost price of the raw material according to its active content (several markers allowing a greater precision).

*Guarana* provides 3-5% caffeine, for a cost of \$6. 12% endogenous caffeine extract (i.e. from *guarana*) corresponds to a ratio of 3-4:1, so a raw material cost of at least 20€, without any production or commercial charge yet.

## 3 The solvents

The specification sheet mentions all the solvents used, in extraction and potentially in purification. If not indicated in the sheet, the ratio of solvents is given in Annex II. The solvent must comply with local regulations - including residuals - and be sufficiently selective where necessary. Not all solvents are miscible with each other.

Ethanol 25 corresponds to 25% ethanol in 75% water  
 Ethyl acetate is not water-soluble, and often used for purification  
 Main solvents for solid:liquid extraction are water, ethanol (extraction, column chromatography), Ethyl acetate, CO<sub>2</sub>

The solvent is adapted to the plant and to the types of molecules to be extracted (in particular their polarity). You can check whether the declared solvent allows the

desired compounds to be extracted.

*Boswellia serrata* (resin) cannot be extracted with water, even hot water

Certain solvents such as supercritical CO<sub>2</sub> (apolar, therefore rather for apolar molecules such as oils) do not leave residues in the extract. But it can happen that a solvent is used although not mentioned in the specification sheet, for reasons for example of cleaning the plant but also cleaning of certain contaminants, or of another solvent.

You can ask for the process flow chart - when available - for more information on the different extraction steps, the solvents, but also the control points.

## 4 The markers

Actives and markers are parameters that confirm the extract and its properties. An extract does not provide just one active ingredient, but a whole profile of compounds.

Many analytical methods exist: UV, HPLC, Gravimetry, TLC, etc.... It is important to understand that a method only allows us to know how the extract reacted to that method. For example, the UV method must be associated with a suitable wavelength. The HPLC method must use a known standard, etc.

A blueberry extract yields 36% anthocyanin by HPLC as Cyanidin, but in fact only 28% anthocyanin by HPLC as Cyanidin-3-O-G (which is one of the anthocyanins present in the extract)

A method can also analyze a family of products, even if the specification sheet indicates one molecule

A centella extract indicated as 20% asiaticosides by UV may actually correspond to the total saponins. The same extract can give 5-6% asiaticosides by HPLC, as asiaticoside.

The full and detailed HPLC profile is also a good indicator where possible as it allows for the reading of multiple actives or markers. And it also allows to check if one peak stands out exceptionally more than the others. This is the case for instance to describe *Ginkgo biloba*.

A 36% anthocyanin bilberry extract shows 18 specific peaks, while a 36% anthocyanin blackcurrant extract shows 4 main peaks.

The words in the method also give information about what has been analyzed, and on what basis.

Harpagophytum 10% harpagosides UV (in fact glucosides), meets 5-6% Harpagosides by HPLC (in fact glucosides as harpagoside), and 3% Harpagoside by HPLC (without 's', so only the active)

You can also check the coherence of the conversion factors sometimes mentioned in the sheet.

A broccoli extract with 5% glucoraphanin by HPLC cannot provide 4% sulforaphane by conversion, if only by Lavoisier's law (see Sulfodyne page).

The analysis can also be carried out in search of markers typical of another plant.

Zederone (a sesquiterpene) is used to differentiate the species *Curcuma longa* from *Curcuma elata*

Do not hesitate to ask us how we integrate the specific information of each plant extract. That's one of our strenghts.

## Our main partners

**BECARRE Natural forges close links with its partners, in order to ensure quality, innovations in accordance with our markets and sustainability. In addition to the names below, BECARRE Natural also works on some specific products because they correspond exactly to our core business.**

**Ingood is the new name of Triballat Ingredients, now itself named Olga, a family company located in Brittany, and at the origin of many innovations for future nutrition, as the unique Sulfodyne®.**



Ingood ingredients is supplying us with their Sulfodyne®, the only natural form of active sulforaphane on the market developed by Nutrinov.

Sulforaphane is an organosulfur compound which it's obtained from cruciferous vegetables such as broccoli, Brussels sprouts, and cabbage, for antioxidant activity, anti-inflammatory activity, Cell-protecting activity... and much more. It's the unique extract of stabilized broccoli providing the active sulforaphane and not a precursor.

SULFODYNE® is your guarantee of getting real broccoli sulforaphane, and nothing less, because you prefer the active form rather than its precursor !

**Laboratoires ISOCELL is at the cutting edge of scientific research in the field of aging, and oxidative stress in particular. That's how they developed GliSODin®, their oral grade of improved SOD.**



Based in Paris, Founded in 2001, ISOCELL has an international dimension, being present in over 30 countries. ISOCELL also

hold several international patents (Europe, US, Japan) in these areas of research and development.

Innovative products have been developed to strengthen the antioxidant and immune systems and protect the body at the cellular level against external stresses and aging. The products of the GliSODin® line are manufactured in accordance with Good Manufacturing Practices (GMP).

[www.glisodin.org](http://www.glisodin.org)  
[www.glisodine.fr](http://www.glisodine.fr)

[www.glisodinskin.com](http://www.glisodinskin.com)

**Synadiet is the Food Supplement Association, member of several national, European and international organizations.**



With close to 300 members (consultants, manufacturers, contract-manufacturers, suppliers of ingredients, distributors, analysis laboratories, etc.), SYNADIET has a force of representativeness that is unique in France. It is the largest national union in the European

Union in terms of number of members.

Synadiet aims to unite and support its members in the exercise of their profession, which is to help preserve and improve the health of consumers, through the use of food supplements & other natural health products, and to engage them in a process responsible and transparent.

Becarre Natural actively participates in the work of Synadiet via the working groups - as well as in some of the EHPM working groups - and Gontran Gaillot has been a member of the board of Synadiet since March 2022.  
[www.synadiet.org](http://www.synadiet.org)

**Leader for Rhodiola with its Rhodiolife® product, the Spanish based company Nektium has succeeded to develop its activity with innovative extracts supported by internal studies, such as Zynamite®, Xanthigen®, its pomegranate extracts, and many others.**



Nektium Pharma is the Spanish company dedicated to the identification, development and production of high quality active ingredients derived from plants, for use in the health-food and cosmetics industries.

Nektium is located at Las Palmas, Canary Island, and focuses its efforts on the development and industrial production of high quality standardized products derived from plants, which are key ingredients in health food products. The company produces standardized extracts and novel ingredients and products, contributing to the prevention of diseases and improvement of quality of life through nutrition.

Manufacturing high quality extract starts with the selection of qualified raw material suppliers. Rhodiola roots - for instance - are strictly harvested from the Altai region of Siberia as a result of several years of a collaborative efforts.

Purity and sustainability are the two main selection criteria. Nektium stands for environmental preservation, sustainability and corporate responsibility.

Production activities and facilities are ISO, HACCP & GMP certified. Organic raw material may be available.

In 2018, Nektium has inaugurated the new Nektium facility, 10 000 m2 devoted to the new product development and production.

[www.nektium.com](http://www.nektium.com)

**Founded in 1988 by Dr. Muhammed Majeed, Sabinsa remains the company dedicated to the principles of tradition, innovation and research in plant extracts. Today, Sabinsa regularly offers new studies and innovative new extracts.**



Sabinsa manufactures and markets phytonutrients and standardized herbal extracts, specialty & fine chemicals, and organic intermediates used in the nutritional, cosmetics, pharmaceutical, intermediary chemicals and food industries.

Sabinsa's efforts have begun to earn the company vast recognition, in addition to growing sales. Sabinsa confirms everyday its position of leader on botanical extract, and at the origin of so many objectivized products (Circusins®, C3 Reduct®, BioPerine® from Black Pepper, Garcinia Cambodgia Citrin®, Coleus Forslean®, etc...).

Sabinsa is a group which includes all the needed activities to provide high quality botanical extracts - and not only ayurvedic plants. Sabinsa has a research and development facility in India and near Princeton, NJ and six manufacturing facilities in and around Bangalore, India, and in Utah. Today, Sabinsa manufactures over 100 such plant-derived products, besides some synthetic and hemisynthetic products for perfumery.

Sabinsa also provides custom manufacturing from lab scale to pilot / semi-commercial scale, and process development.

[www.sabinsa.com](http://www.sabinsa.com)

and dedicated website such as:

[www.c3reduct.com](http://www.c3reduct.com), [www.seleniumselect.com](http://www.seleniumselect.com)

[www.LactoSpore.com](http://www.LactoSpore.com), [www.selenoforce.com](http://www.selenoforce.com),

[www.curcuminoids.com](http://www.curcuminoids.com)



## Our main partners

Satiereal®, ElimReal® et MoodReal® are extracts developed by Inoreal® - a french firm created in 2006 now acquired by Natac Group - which help nutrition and health manufacturer to be at the cutting edge of innovation.

Supported by a meticulous sourcing, exclusive extraction process, clinical studies of safety and efficacy, those products are formulated to allow innovation by having the agreement of international administrations, and are allowed for selling all across the world.

Specialized in saffron extracts for many years, the acquisition of Inoreal has even reinforced the position of the Natac Group on saffron extracts.

[www.satiereal.com](http://www.satiereal.com)  
[www.elimreal.com](http://www.elimreal.com)

[www.moodreal.com](http://www.moodreal.com)

### UIVEC

Professional union for the valorisation of hemp extracts



UIVEC (Union des Industriels pour la valorisation des extraits de chanvre) gathers industrial and economic actors interested in the exploitation of hemp extracts (CBD, CBG, CBN, etc., except THC and THC-A). It represents the entire value chain of the hemp extracts industry, from the production of hemp to the distribution of finished products (producers, processors, distributors, laboratories, brands...) through consulting and analysis.

The purpose of this Union is to accompany the development of the hemp extracts sector in its multiple uses (food, cosmetics, animal feed...), as well as the structuring of this sector. UIVEC represents the voice of the sector's professionals and works to guarantee the safety and quality of the products to the final consumers.

[www.uivec.org](http://www.uivec.org)

GVB Biopharma, one of the world's leading innovators in hemp technology

Fully vertically integrated, "From seed to shelf"

GVB Biopharma is a story of friendship, dedication to exacting principles, and swift success. Founded in the fertile farm country of central Oregon in 2016 by three best friends who have known one another since high school, GVB has grown rapidly into a leading technology-driven hemp solutions provider.



**BIOPHARMA™**  
A 22ND CENTURY GROUP COMPANY

From seed to shelf, they responsibly produce superior, innovative hemp-based products for customers, partners, and employees seeking a better quality of life through hemp technology.

GVB is at the vanguard of the organic cultivation, research, development, and marketing of hemp-based wellness solutions for suppliers, customers, and consumers around the globe. They believe passionately in the powerful, life-enhancing qualities of CBD and other hemp-based products, and take pride in their research in every facet of hemp cultivation and production. Their work changes lives for the better.



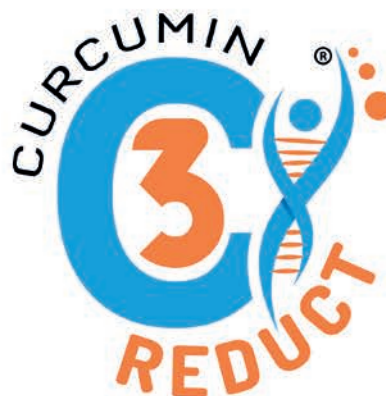
## The Natural Sign

extraits de plantes standardisés objectifs

### BECARRE Natural



## Le Curcuma approuvé Novel Food



- 🔗 **Extrait du *Curcuma longa***
- 🔗 **Source de Tétrahydrocurcuminoïdes, métabolites du curcuma**
- 🔗 **Apport de 140 mg**  
(Publication Novel Food, Juin 2022)
- 🔗 **Etudes (AMP Kinase activation, Organ protection, Gingivitis), outre les études sur le C3 Complex®**
- 🔗 **Seul ou associé, poudre blanche**

BECARRE Natural

[www.becarre-natural.com](http://www.becarre-natural.com)

[info@becarre-natural.com](mailto:info@becarre-natural.com)

**becarre**  
the natural sign

# A selection of our previous news and innovations

## Pioneer in cultivation of Rhodiola

Nektium is taking steps to secure the long-term sustainability of its RhodioliLife® Rhodiola rosea extract by **switching a significant proportion** of its raw material sourcing to **cultivated plants**. The move – an industry first on such a large commercial scale – will reduce reliance on under-pressure wild-grown supplies.

## Organic elderberry extract, 6 to 10%

Organic elderberry extracts are now available, also in a version with a higher concentration of anthocyanins (by HPLC).

## BeTheanine® : 40% Natural L-Theanine, 100% Natural Green Tea, low solvent

BeTheanine® is an extract without any carrier or compounds other than from the extraction (low EtOH) of green tea. It brings 40% L-Theanine by HPLC, and low EGCG.

## First ever EFSA approved novel food active metabolite of curcuminoids

Sabinsa has obtained **Novel Food approval** from EFSA for C3 Reduct®, the **curcuma** extract with the curcuminoid metabolites Tetrahydrocurcuminoids (THCs).

## New Ways for Weight Management with Cirpusins®

Cirpusins™ is the **new objectivized extract** of *Cyperus rotundus*, with so good actions on weight, but also adipogenesis, BMI, Leptin and Lipid profile. And the clinical study is now published.

## New study on brain functions at a single dose Zynamite®

A battery of **cognitive tests** were performed pre-dose, at 30 minutes, 3 hours, and 5 hours post dose. Significant improvement performance accuracy of Computerised Mental Performance Assessment System (COMPASS) assessment battery, including enhanced performance in the Attention and Memory assessments.

Effects were sustained throughout the study – from 30 minutes after dose to 5 hours post dose.

## High bio- available Selenium and Zinc

Sabinsa was a pioneer in the grafting of Se on Methionine.

### Zinc Monomethionine:

Absorption and retention properties increased compared to zinc salts (4 to 6 times more efficient).

**Selenium SeLECT®**: L-Selenomethionine stable with increased bioavailability.

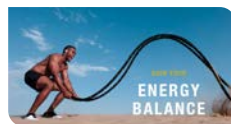


## Iron deficiency and physical activity

A new study explains the mechanism of action, and the Iron Supplementation with a natural product, BioPerine®.

Supplementation with a natural product, BioPerine®, in the form of black pepper, as a bioavailability enhancer, shows a potential application as an athlete Fe supplement for improving hematological parameters.

## Energy balance using Forslean® Brown & White fat



The patents define a method of achieving **optimal mammalian energy balance** using ForsLean® Coleus forskolii extract, on a particular physiological and developmental stage of the mammalian cellular system, and outline a molecular mechanism: how Forskolin actually aids in fat conversion into heat, a novel concept called energy balance.

ticular physiological and developmental stage of the mammalian cellular system, and outline a molecular mechanism: how Forskolin actually aids in fat conversion into heat, a novel concept called energy balance.

## Boswellin® in management of Psoriasis

Sabinsa's Boswellia extract cream can be used to manage mild to moderate psoriasis through its anti-inflammatory effects.

## Zynamite® Again 3 studies and best proven booster for "mental and physical energy"

- Two ESSNA awards : 'Best free-from product' and 'Runner-up Game changer' + Frost & Sullivan
- Two winner NI awards plus one as finalist
- Rapid onset of mental activation, Faster reaction time, Increase performance
- Sustained energy, Increase power, Doping free

## Immune booster Echinacea angustifolia 4% échinacosides, and more...

Guaranteed 4% echinacosides, but also for its decatetraenoic isobutylamide acid content - alkamide for **immunomodulation**.

## Sport Natural Ecdysteroids

Nektium launched a new extract of Rhaponticum carthamoides standardized to min. 1% natural ecdysteroids of plant origin. 20HE (20 Hydroxy ecdysteroids) have been reported to have anabolic effects, and have shown diminished fat content with elevated muscle mass & working capacity.

## Back to Gugulipid®

### Alternative to Red Yeast Extract

Gugulipid® from Commiphora mukul standardized to Guggulsterones Z&E (2.5% or 7.5%). Well-known but always so efficient.

Gugulipid is the **cardiovascular response for cholesterol regulation**, reduction of stored fat, and inflammation.

## GLiSODin®

### Endometriosis / Colon cancer

A new study published demonstrates that GLiSODin® modulates the function of vasculogenesis and angiogenesis in endometriosis tissue :

- Significant decrease in the implantation surface of the endometriotic zone
- Decreased expression of MDA serum and TNF-α in endometriotic tissue
- Reduction in the expression of VEGF (Vascular endothelial growth factor)

A second study on reduction the AOM-induced colon cancer.



## LactoSporin®: Novel Probiotic Metabolite For Skin and Hair, and acne

Sabinsa announces LactoSporin®, an ingredient for cosmeceutical products that has anti-microbial, anti-oxidant, anti-inflammatory, and anti-collagenase properties, shows protective efficacy against UV radiation, environmental pollutants, and prevents microbial biofilm formation, induces hair growth, and prevents accelerated skin aging... and **acne** (vs. benzoyl peroxide).

## Dispersible Curcumin C3

Curcumin C3 Power Liquid was the Tasting Center Award Winner at Vitafoods Asia 2019 in Singapore for Best Functional Beverage.

Sabinsa's Curcumin C3 Dispersible is a standardized powder extract containing 60% Curcuminoids, developed specifically for RTD beverages and powdered drink mixes utilizing natural excipients as a base.

## Plant extracts and SARS-COV-2

Facing the pending pandemic, different actors have launched new studies against Sars-COV, or are compiling the results from past studies especially dedicated to this form of virus, such as :

- **Curcuma**: through the ACE2 receptor and suppression of CYT release
- Study Sabinsa: Lower the **Selenium** level, higher the possibility of COVID 19
- **Nigellin®**: Nigellidine and alpha-hederine
- **GLiSODin®** in the field of immune health
- **Withania somnifera** : Withanone can block the COVID 19 viral replication protease
- **Andrographis paniculata** : andrographolides as shown to inhibit the SARS-COV-2 viral protease
- **Licorice**: molecular docking showed the potential to bind to ACE2 and prevent the entry of SARS
- **Probiotics** could decrease the incidence of respiratory infection (23 trials / 6269 patients)

## Sabinsa gets attestations for COSMOS

This presently concerns :

- Saberry : Emblica Officinalis Fruit Extract.
- Coccin : Cocos Nucifera Liquid Endosperm.
- Nigellin Amber (Black seed extract).

## High Lactase DigeZyme®

DigeZyme® is the unique proprietary blend of specific digestive enzymes that offers much more than just aiding proper digestion and better absorption of nutrients.

Sabinsa now offers DigeZyme® EC, enriched in Lactase.

## RhodioliLife®, Best Targeted Sports Nutrition Product + Doping free (BSCG certified)

RhodioliLife® convinced the judges in the category 'Best Targeted Sports Nutrition Product +50'.

It is side-effect free and **doping free** as certified by BSCG. RhodioliLife® got the ESSNA award for sport nutrition.

## Nigellin® / The next anti-inflammatory

Obtained from the seeds of Nigella sativa (Black Cumin) and standardized for Thymoquinone and Thymohydroquinone. In a study, Nigellin® had the highest effects in suppressing the release of cytokines, and also in monocytes hindering the expression on IL-2 and PGE2.



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## enXtra® - a 4th new study

A fourth study demonstrating Safety & Efficacy of enXtra® in Healthy Adults'. None of the study group showed any significant change in the ECG or haemodynamic parameters as compared to baseline. Post consumption, alertness and calmness scores were significantly increased.

## Sabinsa's pTeroWhite®

### Anti-Aging, Skin Brightening, and SPF

Two new studies have recently been published on the topical benefits of Sabinsa's pTeroWhite® for anti-aging, skin brightening, and as a natural SPF agent.

## TinoFolin®

### "Capture memories forever"



TinoFolin - new name of the extract of *Tinospora cordifolia* - was evaluated for its ability to improve visual memory, logical memory, verbal memory, attention span and concentration in a placebo-controlled double-blind study involving 30 human volunteers

## Starmeric™

### Insoluble Turmeric Fibers / Diabetes

Starmeric™ is a resistant starch, isolated from turmeric and having a high content of amylose. Studies have implicated the anti-diabetic potential of resistant starch.

## LactoSpore® / Depression

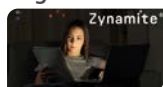
Sabinsa's Shelf Stable Probiotic LactoSpore® Found to Reverse Depression Symptoms in Patients Suffering From IBS According to Published Study.

## Lemon fibers

Min. 70% Total Dietary Fibers from organic lemons. Prebiotics, typically non-digestible fiber like the fibrous peel of the lemon, induce the growth or activity of beneficial microorganisms in the gastrointestinal tract and normalizes bowel movements.

## New scientific article on

### Cognitive Function for Zynamite®



The article is based on a recent CNS clinical study in collaboration with Prof. Kennedy :

- Zynamite® improves concentration, attention & memory
- Onset already 30min after intake, lasts longer than 5 hours

## pTerosol™ and blood sugar management

pTerosol™ by Sabinsa is the Pterocarpus marsupium extract, standardized to 5% of C-glycosides, offers you a new alternative for Blood Sugar and Cholesterol Management (pre-clinical study).

## ESSNA awards

The European Specialist Sports Nutrition Association [ESSNA] honored Nektium in a total of three categories:

- Zynamite®: Best "free from" product
- Zynamite®: "Game changer"
- Rhodioliife®: Best Targeted Sports Nutrition 50+

## Alertness and focus

Extracted from rhizomes of *Alpinia galanga*, grown in pollution free hilly terrain, is a DNA-authenticated. enXtra® is ideal functional ingredient for energy drinks (with or without caffeine), and many other various forms.

## DigeZyme® / Dyspepsia

Sabinsa's Multi-Enzyme Complex DigeZyme® Demonstrated Efficacy in Management of Dyspeptic Symptoms with **Functional Dyspepsia**: Published Clinical Study.

## Papain and Bromelain enter our catalogue

Processed in India by a dedicated company specialized on enzymes, taking care of sourcing and quality. Those two enzymes complete the range with the well known Digezyme.

## LactoSpore® / Cholesterol

Sabinsa's Shelf Stable Probiotic LactoSpore® "May Improve Cholesterol Levels", study suggests.

## Promond™ - Almond protein powder for sport

Promond™ almond protein is a water-soluble **50% protein** sourced from Indian variety of almonds.

It is water extract with a complete array of amino acids, including high levels of BCAAs. Promond™ is made from almonds sourced in northern India, out of over-irrigation.

## DigeZyme® and Muscle Soreness



Sabinsa's DigeZyme®, the proprietary well-known blend of non-animal enzymes, shows benefit for **delayed onset muscle soreness in a study** published in Sports Nutrition and Therapy.

## Boswellin® osteoarthritis of the knee

Boswellin Super, our Boswellia serrata extract at 30% AKBBA, was found to **alleviate knee pain** in healthy adults in a new study, increased the space between the knee joints, and pain also decreased.

## Rhodioliife® and the immune system

The Rhodiola extract Rhodioliife® has clearly demonstrated its ability to **protect cells from viral infection**, through activation of the human immune system.

## Centellin®

### Centella extract and cracked feet

Centellin® CG in a foot care cream shows a beneficial effect on cell proliferation, collagen synthesis and significantly **improves wound healing** to help in healing of cracks. It also increased skin moisturizing.

## Curcumin C<sup>3</sup> Complex and metabolic syndrome

Significantly greater effect of Curcuminoids in reducing the serum concentrations of LDL-C, non-HDL-C, total cholesterol, triglycerides and Lp(a), when serum HDL-C concentration was elevated significantly.

## Rhodioliife® improves memory and increases brain activity

Rhodiola rosea is known to improve . ECG showed an increased neurotransmitter production in the studied areas, at least for 5 hours . Also an improve of memory and an increased activity in brain.

## Preserved actives from Pomegranate

P40p™ is the unique carrier-free Pomegranate extract standardized to the whole spectrum of the real actives offered in pomegranate : **punicosides** and more specifically the highly potent **punicalagins**.

## Bio-efficace SOD GliSODin® and oncology

Different studies have shown the great interest of the clinically proven enhanced SOD and oncology / radiations (prevention of inflammation of benign fibrosarcoma cells, and effective role in azoxymethane-induced colon cancer).

## GliSODin® in accelerating symptom relief in children with allergy

Clinical efficacy of GliSODin® was demonstrated / 6-17 years old with asthma, tested positive for house dust mite allergy on skin prick test, and received immunotherapy.

## Curcumin C<sup>3</sup> Complex and omega-3

While curcumin is a well-recognized anti-inflammatory agent, Omega-3 acids are known precursors of several biosynthetic inflammatory resolvers.



Recent mechanistic studies revealed that the synergistic effect of C3 Complex® and Eicosapentaenoic acid, an Omega3 component, against the depredations caused by both TNF-α and PIF (Proteolysisinducing Factor).

## Curcumin C3 Complex® - Body fat and interleukin-1β

Curcumin-piperine, works well to reduce total body fat, reduces cellular aging as indicated by preserving telomere length, and enhance the CR effects for the prevention of metabolic syndrome by reducing the low grade chronic inflammation that always persists in obese conditions.

A plant extract is a substance or an active with desirable properties that is removed from the tissue of a plant, usually by treating it with a solvent, to be used for a particular purpose. Extracts may be used in various sectors of activities : Food and functional properties for foodstuffs (antioxidant, texturizer, etc...), Processing aids, additives – chemical replacers, pharmaceutical for therapeutic properties - preventive and/or curative – cosmetic for functional properties for beauty and well-being, etc...

Some sectors of activities clearly define an extract. For cosmetic uses, for instance, a "cosmetic product" shall mean any substance or preparation intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odors and/or protecting them or keeping them in good conditions.

An extract may be common to different sectors based on its chemical description, although different sectors mean different technologies (different forms, solubility, stability), different regulation, different claim, different problematic. As representing manufacturers, we feel very concerned by the request of the end-users and may adapt its proposal.

- An extract must also respect :
- The quality constraints in terms of irradiation, allergens, toxicity, adulteration, activity, stability, sustainable resources, traceability, etc...
  - The chemical and physical request in terms of description (TLC, physical recognition, genotype) as well as heavy metals, nitrates, solvents, residues such as pesticides or residual solvents, additives, foreign bodies, etc...
  - The regulation in terms of assay, sol-

vent, environmental components, legal uses, registration or notification (reach, organic grades,...), labeling, claims, certification (GMP, ISO), etc...

## Raw Material

It's important to understand that an extract starts from the raw material: the plants. The identification of a good source includes the description of areas and type of collect, the capacity of collect, the use and not-used area and the impact of our needs for extraction to guarantee a sustainable source. It's so important to analyze the supply chain starting from the collect, including the exporters and the different middle men, which may cause variability on the quality besides the natural variability linked to the weather and the soils. Finally, an overview of the needs of the local citizens and the risk (government, wars, weather, etc...) allows to find the right partners for the long term, and minimize the impact on the nature while checking the return to the people.

## Preparation

All equipment may not use the same materials, and the quality of the extraction may vary depending on the preparation of the raw materials. This goes from the cleaning to avoid foreign bodies to the cut or grinding. Dried herbals are more common, with the risk to put out some gaseous components and the benefit that the plant does not start to hydrolyze or produce non needed metabolites. Preparation may also consist in thawing (fruits may be frozen for instance), cooking (to produce aromas for instance), decoating, destemming, or even enzymatic reaction before the extraction.

## Solvents

A solvent must comply with the local regulation, be effective and be selective

enough (when needed). Most common are Water, Ethanol, Ethyl acetate, CO<sub>2</sub>, Methanol, Aceton, Acetic acid, Hexane... the choice of the solvent will impact on the yield of extraction (acquaintance with the targeted actives) in the full respect of the request from customers and environmental components (depletion of the ozone layer, life of the solvent in atmosphere, groundwater pollution, air pollution).

On a chemical point of view, the best solvent may be chosen after looking at the dipolar moment : an electric dipole is a separation of positive and negative charges, characterized by their dipolar moment, a vector quantity (Coulomb. meter or Debye), subject to continuous electrostatic attraction and repulsion. Each solvent may be classified based on its dipolar moment (cf : Ven der Waals Forces).

- Apolar and low polar solvent, mainly lipophilic characteristic, with a moment from 0 to 1.5 (Hexane, cyclohexane, dimethoxymethane, Chloroform, Ethyl ether, phenol)
  - Polar aprotic solvent, mainly hydrophilic characteristic
- Protic solvent (a protic solvent is a solvent that has a hydrogen atom bound to an oxygen as in a hydroxyl group or a nitrogen as in an amine group). Polar protic solvents are solvents that share ion dissolving power with aprotic solvents but have an acidic hydrogen. These solvents generally have high dielectric constants and high polarity).
- Moment of most common solvents : Hexane (0), Ethanol (1.69), Methanol (1.70), Ethyl acetate (1.78), water (1.85), acetone (2.88). Depending on their miscibility, solvents may be used together (combined solvents, or separation from one solvent to another solvent).

## Extraction process

The process must generally be simple, fast, economic, in compliance with the local

# WHAT IS AN EXTRACT ?

regulation, effective and selective when needed. However, certain steps may require a long time of process.

**Pressing** : One of the more usual extraction (the morning orange juice), pressing may be used complementary or prior to other process, for instance to prepare the materials, defat it, etc... It causes mechanical perturbation and gives a liquid product.

**Distillation and hydro-distillation** : By direct heating or steam, this process is mainly used for oils and volatile components. It may cause degradation (oxidation, hydrolysis, enzymatic reaction, ...)

**Solid / Liquid extraction** : It consist in the extraction or separation of one active or more from solid materials working on the solubility in a liquid to obtain the soluble part and the insoluble part, or fractionation of an homogenous solution. The typical Solid / Liquid extractions are :

- Maceration** : solid in solvent, room temperature
- Digestion** : solid in solvent, over room temperature, below ebullition
- Decoction** (=reflux): solid in solvent, temperature of ebullition
- Infusion** (teas) : solid in liquid at temperature of ebullition, then cooling of the suspension
- Elution**, leaching (Lixiviation) : solvent goes through the solid
- Lixiviation** : always with cold, fresh and new solvent
- Percolation** : solvent goes on and through the solid

## Concentration

This step consists in the increase of the dry matter content to facilitate the further steps, using for instance evaporation.

## Separation / Purification

Different type of separation, based on size, weight, charge, hydrophilic / lipophilic capacity (separation liquid / liquid), solubili-

ty, volatility (liquid / steam), etc....  
**Filter press** : the filter press uses increased pressure to maximize the rate of filtration and produce a final filter cake with a low water content.

**Membranes, Ultra filtration, Nano filtration** : membrane filtration or cross-flow filtration technology which ranges between ultrafiltration (UF) and reverse osmosis (RO). The fundamental principle of Nanofiltration membrane technology is the use of pressure to separate soluble ions through a semi permeable material.

**Liquid / Liquid** : Liquid-Liquid Extraction (LLE) is a method used in the recovery of a key component from a multi-component stream using an immiscible solvent. The two streams are contacted and separated. The solvent absorbs the key component stripping it from the original stream.

## Crystallization

Crystallization is the (natural or artificial) process of formation of solid crystals precipitating from a solution. Crystallization is also a chemical solid-liquid separation technique, in which mass transfer of a solute from the liquid solution to a pure solid crystalline phase occurs. The crystallization process consists of two major events, nucleation (the solute molecules dispersed in the solvent start to gather into clusters, on the nanometer scale) and crystal growth (subsequent growth of the nuclei that succeed in achieving the critical cluster size). Nucleation and growth continue to occur simultaneously while the supersaturation exists.

- **Single-solvent recrystallization** : «compound A» and «impurity B» are dissolved in the smallest amount of hot solvent to fully dissolve the mixture, thus making a saturated solution. The solution is then allowed to cool => different solubility of compounds in solution drops => compound dropping (recrystallizing) from solution. The

- slower the rate of cooling, the bigger the crystals formed. The solid crystals are collected by filtration.
- **Multi-solvent recrystallization** : similar to the single-solvent but where two (or more) solvents are used, the proportion of first and second solvents is critical. Possible removal by distillation or by an applied vacuum.
- **Hot filtration-recrystallization** : separate «compound A» from both «impurity B» and some «insoluble matter C».
- **Seeding** : this can be spontaneous or can be done by adding a small amount



of the pure compound (a seed crystal)

## Chromatography

Chromatography is used for separation of mixtures. A mixture dissolved in a “mobile phase” passes through a stationary phase, which separates the analyte. The ultimate goal of chromatography is to separate different components. The stationary phase or adsorbent in column chromatography is a solid. The most common stationary phase for column chromatography is silica gel, followed by alumina. Also possible are ion exchange chromatography, reversed-phase chromatography (RP), affinity chromatography or expanded bed adsorption (EBA). The mobile phase or eluent is either a pure solvent or a mixture of different solvents. It is chosen so that the retention factor. The Van Deemter equation in chromatography relates the variance per unit length of a separation column to

- the linear mobile phase velocity by considering physical, kinetic, and thermodynamic properties of a separation
- **Column chromatography** : the stationary bed is within a tube. The particles of the solid stationary phase or the support coated with a liquid stationary phase may fill the whole inside volume of the tube (packed column) or be concentrated on or along the inside tube wall leaving an open, unrestricted path for the mobile phase in the middle part of the tube (open tubular column). Differences in rates of movement through the medium are calculated to different retention times of the sample.
  - **Flash column chromatography** : the solvent is driven through the column by applying positive pressure. This allowed most separations to be performed in less than 20 minutes, with improved separations
  - **Thin layer chromatography** (TLC) is similar to paper chromatography. However, instead of using a stationary phase of paper, it involves a stationary phase of a thin layer of adsorbent like silica gel, alumina, or cellulose on a flat, inert substrate. Compared to paper, it has the advantage of faster runs, better separations, and the choice between different adsorbents
  - **Ion exchange chromatography** uses ion exchange mechanism to separate analytes. It uses a charged stationary phase to separate charged compounds including amino acids, peptides, and proteins. In conventional methods the stationary phase is an ion exchange resin that carries charged functional groups which interact with oppositely charged groups of the compound to be retained. Ion exchange chromatography is commonly used to purify proteins using FPLC (fast protein liquid chromatography)
  - **Chiral chromatography** involves the separation of stereoisomers

## HPLC

(High Pressure Liquid Chromatography) and LPLC (low pressure). Preparative high performance liquid chromatography is

similar to analytical HPLC but features increased injected mass with possibility to “stack” injections automatically. There’s technically no product limitation, but usually expensive.

## Semisynthesis

Hemisynthesis or Semisynthesis or partial chemical synthesis is a type of chemical synthesis that uses compounds isolated from natural sources (e.g. plant material) as starting materials. These natural biomolecules are usually large and complex molecules. This is opposed to a total synthesis where large molecules are synthesized from a stepwise combination of small and cheap (petrochemical) building blocks. It is also possible that the semisynthetic derivative outperforms the original biomolecule itself with respect to potency, stability or safety. Drugs derived from natural sources are usually produced by harvesting the natural source or through semisynthetic methods.

## Drying

Drying means putting out the liquid. Dryers may be atmospheric (spray dryer, fluid bed dryer, etc...), or vacuum (belt dryer, tray dryer, etc...).

### Spray Dryer

By definition, spray drying is the transformation of feed from a fluid state into a dried form by spraying the feed into a hot drying medium. The process is a one step continuous operation. The feed can be either a solution, suspension or a paste. The spray dried product conforms to powder consisting of single particles or agglomerates, depending upon the physical and chemical properties of the feed and the dryer design and operation

### Vacuum dryer

At constant volume, when the pressure decreases, the boiling temperature decreases. Evaporation at a lower temperature makes possible to get a preserved product. In addition the high rate of heat efficiency is said to result in the best drying performance in the world. The drying

## Adulteration & Falsification : get the extract you asked for

- Adulteration means falsification of an extract in terms of origin, assay, extraction, actives, or analysis, mostly in order to improve the price.
- **Method of analysis** :
    - **UV versus HPLC** : except for very few actives / markers, UV methods always give much higher response than HPLC (when the standard exists of course) without being able to find a correlation. This may be versus HPLC, or can be many others, especially when using internal method.
    - **Wave lengths** : a different wavelength or the use of a different Specific Absorption Coefficient
    - **Standard** : the use of a different standard for a better response by HPLC.
    - **Family of the actives** : refer to the global family of the actives instead of the active alone.
    - **Reduction of the number of markers**, what allows to use addition of chemical origin. The more there are markers in the description, the most difficult it is to falsify them.
  - **Plant Extract Ratio** : difficult to be sure to get a 4:1 extract when there’s no marker to control.
- **NER / PER** : voluntary misunderstanding between Native extract and Plant extract, sometime even considering the original plant, with the water.
  - **Specie** : use of a another bionomial origin, of even a plant close to the original plant (same genus)
  - **Part of plant** : use of a different part than the one mentioned or recommended (for instance, leaves instead of roots, even partly)
  - **Addition of chemicals** : addition of exogenous origin material, from other plants or from chemical process. They can be added to a colored carrier or sometimes to the plant powder in order to get at least a positive TLC.
  - **Solvents** : use of another solvent than the one mentioned for a more selective and efficient extraction.
  - **Geographical Origin** : plants may offer a different profile depending on the geographical origin, that you may need specifically. It can be also collected from a non-authorized zone.

Those are the most common noted origins of adulterations.

Dryer : drying or cooling paste-like, granular, powdery and pulpous material - etc....

## Before Packing

Further steps before packing consist in Milling, compacting (to increase the bulk density for instance), grinding (to tune the size reduction in a safe way, especially with fragile particle or components) and then homogenization and standardization : those steps guarantee a optimized reparation and the correct and needed content of actives as mentioned in our CoA (certificate of analysis).

### Lyophilization or cryodesiccation

A lyophilizator needs to cool (for freezing and trapping water), create a vacuum (to sublimate water), generate heat and transfer heat energy to the product.

Others : Rotary Drum Dryer : Wet material is introduced from one end of the dryer, and then stirred evenly by the oar of the inner barrel - Plate Dryer : kind of high-efficiency conductive and continuous drying - Blade

process is greatly accelerated due to the fact that the loaded material makes contact with the heating panel in the form of a thin layer. Vacuum drying does not cause the emission of any exhaust gases or hazardous smells.