Standardized Plant Extracts
Personal Care
**Centellin®**
**Centella extract and cracked feet**

A new study published has evaluated the efficacy and safety of a formulation with Centellin® CG in a foot care cream (CCFC) in the management of cracked heels through cell culture and human clinical studies. It shows a beneficial effect on cell proliferation, collagen synthesis and significantly improves wound healing in the fibroblast scratch wound model. It also increased skin moisturizing. The findings demonstrate that CCFC helps in healing of cracks, reducing scaling and pain. None of the volunteers experienced any hypersensitivity reactions. Therefore, it may be concluded that the CCFC is safe and efficacious in management of foot cracks.

**Cococin®**
**Fresh and Long moisturizer, Hair**

Cococin® is a tender coconut extract, produced by a unique lyophilisation process to ensure that the solids retain optimum biological activity. It is non-irritating to the skin and rich in nutrients that provide long-term moisturization and support blood circulation. “The Nourishment Factor”. Cococin® targets cell growth (in the hair follicle), as well as inhibiting 5-α reductase. It is recommended for use in regenerative skincare products and preparations, thanks to its cytokine and mineral concentrations. It also improves skin elasticity and tone and decrease roughness, while nurturing keratinous tissue to potentially reduce the appearance of the signs of aging.

**Glabridin 98 or Pterowhite ? Skin lightening**

We offer from 4% Glabridin licorice extract, to a purified product providing 98% Glabridin. Glabridin is renowned for its ability to inhibit tyrosinase and its anti-inflammatory properties, achieved through the inhibition of cyclo-oxygenase in the arachidonic acid cascade.

Pterowhite® 90% is a proprietary natural pterostilbene ingredient for cosmetic application, extracted from the dried heartwood of *Pterocarpus marsupium*. It functions as a skin conditioning agent with skin lightening and antioxidant properties. Pterostilbene is a double-methylated version of resveratrol exhibiting a higher bioavailability as it is more easily transported across the skin. It reduces the colony counts of *Candida albicans* to less than 100 cfu/ml. It functions as a skin conditioning agent with skin lightening and preparations, thanks to its cytokine and mineral concentrations. It also enhances the properties produced by resveratrol.

**Tetrapure®**
**Skin, Hair & Nails**

TetraPure® is natural anti-fungal remedy for skin, hair (anti-dandruff) & nails. It’s white to off white crystalline powder. Compose of Tetrahydrocurcuminoids – as from Curcuma longa, but white. This product can be used as an antioxidant.

TetraPure® shows great anti-mycosis and anti-dandruff activities. It completely inhibits the growth of dermatophytes Trichophyton rubrum, Microsporum gypseum and Epidermophyton floccosum. It enhances the activity against Malassezia furfur at all tested concentration. It reduces the colony counts of *Candida albicans* to less than 100 cfu/ml. As other actives of the family of THC, Tetrapure shows tyrosinase inhibition as well as great inhibition of Melamin.

**Amla Saberry®**
**Dermal papilla cells**

Saberry is the *Emblica officinalis* fruits extract - Amla - Extract has been reported to inhibit MMP-1 production from fibroblasts. Saberry also showed mild anti-tyrosinase activity compared to Kojic acid, using the mushroom tyrosinase activity assay (Saberry IC50 32μg/ml).

New patent describes a synergistic composition comprising of β–glucogal- lin (1-O-galloyl-β-D-glucose) or β – glucogalillin and total gallates from *Amla* (Saberry®), concentrate of liquid endosperm of *Cocos nucifera* (Cococin™) and the selenopeptides (γ-L-glutamyl-Se-methyl-L-selenocysteine, and γ-L-glutamyl-L-selenomethionine) for maintaining the morphology and numbers of the dermal papilla cells when exposed to stress signals. The composition protects the dermal papilla cells from stress signals (UVB radiation), and the numbers of live dermal papilla cells are maintained at a level of 95% or more when the dermal papilla cells are exposed to UVB radiation levels ranging from 0.8 J/cm² to 1.0 J/cm².

**Boswellin®**
**Management of psoriasis**

The cream with Boswellin from Sabinsa, Boswellina serrata Roxb extract standardized for 5% of 95% 3O Acetyl-11 Keto Beta Boswellic Acid (AKBBA) was studied in an open label, multi centered phase III clinical trial, evaluating 200 psoriatic patients with application of AKBBA cream three times daily for a period of 12 weeks. The researchers observed significant changes in LB4 (p<0.001) & TNF alpha (p<0.01) values from the baseline along with significant changes (p<0.05) in VEGF & PGE2. Changes in ’modified’ Psoriasis Activity Severity Index (PASI) & above biomarkers from the baseline values along with remissions in clinical lesions observed through photographic images were considered for efficacy evaluation. The evidence shows superior anti-inflammatory responses rates, demonstrating that this non-toxic treatment is beneficial for those suffering from this condition.

*Study*: “Clinical evaluation of AKBBA in the management of psoriasis”

**Acne Actives with Sebum Control**

AcneZero is a blend of different natural ingredients consisting of Policosanol, Coleus oil, Vitex oil and Monolaurin. Studies have shown that this blend has got good potential in Anti-microbial activity and have been inhibiting the different pathogens responsible for Acne.

Extracted from *Vitex agnuscastus* berries, Vitex oil has a standardized level of arteetin. It features a high antimicrobial activity by inhibiting the owth of *P. acnes* (from 0.4%), *E. coli* (from 0.1%) and *S. aureus* (from 0.5%).

Oil obtained from the fresh roots of *Coleus forskohlii*, Coleus oil is titrated to 15% in bornyl acetate and 15% in decanal. It is also effective on the growth of skin pathogens such as *P. acnes*, *S. aureus*, *S. epidermidis* and *C. albicans*. Finally, standardized to 55-60% in octacosanol, Policosanol is a blend of fatty alcohols derived from a sugar cane wax extract. It has anti-microbial and sebum controlling properties, useful in the treatment of skin inflammations, in particular acne.
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 European 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 Corp., Nektium, Isocell, Inoreal, Herbamed … 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’.
Tetrapure®
Natural anti-fungal remedy for Skin, Hair (anti-dandruff) & Nails

Source: Vanillin and Acetylacetone
Inci: Tetrahydrodiferuloylmethane
Dose: 0.1-0.5% w/w (Skin Lightening), 0.15% w/w (Anti-fungal)
Bio-active ingredients: 99% Tetrahydrocurcumin Research reveals that Tetrahydrocurcumin (THC) is one of the major metabolites of Curcumin. THC is reported to exhibit many of the same physiological and pharmacological actions as Curcumin, in some systems, better. It can be used safely (tests available) in shampoo, cream, lotion, spray or powder form.

Anti-Fungal activity: TetraPure® shows anti-mycosis and anti-dandruff activities.
- It completely inhibits the growth of dermatophytes Trichophyton rubrum, Microsporum gyipseum and Epidermophyton floccosum
- It enhances the activity against Malassezia furfur - all tested concentration
- It reduces the colony counts of Candida albicans to less than 100cfu / ml. so... it’s also an anti-dandruff
- Tetrahydrocurcumin adapts a two pronged approach to the free radical onslaught (ORAC > 10 000 / g)
- Prevention of free radical formation.
- Intervention whereby already preformed radicals are quenched by THC.

Skin Lightening: as other actives of the family of THC, Tetrapure shows a tyrosinase inhibition of 1.8 IC50µg/ml - so much better than Kojic acid (7) or Vitamin C (9.33), as well as great inhibition of Melamin (better than Vit. C - 25 - or Kojic ro Arbutin - 100).

Glabridine 98%
Skin whitening, Anti-inflammatory

Source: Glycyrrhiza Glabra
Inci: Glycyrrhiza Glabra (Licorice) Root Extract
Dose: 0.05% - 1% depending on concentration of Glabridine
Bio-active ingredients: 4% to 90% Glabridine (98% in partnership)
Glabridine is the main compound in the hydrophobic fraction of licorice extract. It is known for its beneficial effects on the skin due to its anti-inflammatory and antioxidant properties. In addition, Glabridine greatly inhibits melanogenesis. Some researchers have established that this effect may be due to the inhibition of tyrosinase activity, and Inhibition of the production of active oxygen species.

Cococin
Hair Growth, Moisturizer
Restore the skin health in aged and damaged skin

Source: Fresh tender coconuts Cocos Nucifera
Inci: Cocos Nucifera (Coconut) Fruit Juice
Dose: 0.5% - 2.0%
Cococin is « The Nourishment Factor® » that provides a valuable nutrient pool for enhancing food and beverage, as well as cosmetic product formulations. Cococin can be safely used in oral care as well as lip care compositions.

Helps restore the skin health in aged and damaged skin: Coconut water is rich in quinic acid and shikimic acid which acts as free radical scavenger and play important role in biosynthesis of polyphenols

Augments new cell growth while promoting healthy tissues / hair: Cococin™ has been evaluated for its efficacy as a hair growth promoter, in comparison with Minoxidil as standard

Helps in wound healing: Coconut water also contains cytokinins, which are also involved in healthy cell growth and differentiation for additional skin restoration

Helps in skin hydration: It provides reservoir of vitamins, minerals, RNA phosphates and organic acids that support tissue health. Nutrition and reviving skin, and healthy tissue.

Sabinsa has developed and patented Cococin + Saberry, synergistic formulation to promote healthy hair growth granted patent for «Protective Compositions for Dermal Papilla Cells».

Forslean CG
Anti-cellulite, Conditioning agent, Anti-ageing

Source: Coleus forskohlii
Inci: Coleus Forskohlii Root Extract
Dose: 0.5% to 1%
Bio-active ingredients: 95% to 98% Forskolin
Forskolin bypasses the adrenoreceptors, increasing cAMP levels directly, thereby stimulating lipolysis. It is therefore potentially useful in dislodging localized fat deposits immediately under the skin, when applied topically.

Forskolin accelerates lipolysis through the activation of hormone-sensitive lipase
Saberry

*Water soluble skin lightening agent, Hair care*

**Source:** Emblica officinalis fruits (Amla)
**Incl.:** Emblica Officinalis Fruit Extract
**Dose:** 0.2-1% w/w

**Bio-active ingredients:** 10% b-Glucogallin, 50% gallates (tanins)

**Skin Whitening:** Skin lightening by inhibition of melanin formation, stronger melanin than ascorbic acid at same concentration.

UV Protector: HORAC: 34 500 µmol CAE/100g / NORAC: 90 000 µmol TE/100g

**ORAC hydro:** 267 800 µmol TE/100g / Orac lipo: 400 µmol TE/100g

**Bio-active ingredients:** 40% Saponins Triterpenes

**Dose:** 0.5-2.0% in creams / lotions
**Incl.:** Salvia Officinalis (Sage) Leaf Extract

**Bio-active ingredients:** Xymenynic acid

**Skin Firming, Cellulite, Anti-inflammatory, Hair care**

**Source:** Santalum album seeds
**Incl.:** Xymenynic acid

**Bio-active ingredients:** Xymenynic acid

**Source:** Centella asiatica Extract
**Incl.:** Centella Asiatica Extract

**Dose:** 0.5-2.0% in soothing creams / lotions

**Bio-active ingredients:** 40% Saponins Triterpenes

**Source:** Rosmarinus officinalis seeds
**Incl.:** Rosmarin 3-15%, Salidroside 1-5%

**Bio-active ingredients:** Rhodiola rosea – roots from Altai mountains under social responsibility program, more than 5 years aged – unique licence and partnership with Russia
**Incl.:** Rhodiola Rosea Root Extract

**Dose:** 0.1%-0.3%

**Bio-active ingredients:** Rosavins 3-15%, Salidroside 1-5%

**Skin Barriers:** Study (2008, *Journal of Cosmetic Dermatology*) showed that extracts of Rhodiola rosea improved the skin’s defensive barrier functions against the stress of ultra violet rays. Subjects of this study were classified as having sensitive skin.

**Elastin:** increases components needed by the body to create elastin.

**Collagen:** elevates the number of hydroxyproline and hexosamine molecules, needed to make collagen (dermis, 2nd layer).

**Antioxidant:** pharmacological active compounds (esp. rosavins), which are able to assist the body systems with oxygen deprivation, stress and immune support - all important considerations for skin management.

**Source:** Curcuma longa
t*Efficent inhibitor of Human Leukocyte Elastase*

**Bio-active ingredients:** 95% Tetrahydrocurcumin

**Source:** Punica granatum – seeds
**Incl.:** Punica Granatum Seed Extract

**Dose:** 0.1% - 1%

**Bio-active ingredients:** Punicic acid ≥ 80% (CLnA)

**Skin lightener, Evening skin tone, UVB protectant**

**Source:** Laminaria japonica

**Bio-active ingredients:** Sulfo-Polysaccharides ≥ 40% (85% upon request)

**Source:** Laminaria japonica – whole plant

**Bio-active ingredients:** Sulfo-Polysaccharides ≥ 40% (85% upon request)

**Bio-active ingredients:** Standardized in Ursolic acid or even ursolate (70% Ursolic acid Na salt and up to 30% of Oleoanic acid Na salt), from Sage (Rosemary available).

**Tissue repair, anti-inflammatory (resistant barrier on skin/ hair)**

**Collagen and elastin synthesis**

**Beneficial to the overall health and functions of photo-aged skin**

**Efficient inhibitor of Human Leukocyte Elastase**

**Hair care for conditioning and repair**

**Source:** Emblica officinalis fruits (Amla)
**Incl.:** Emblica Officinalis Fruit Extract
**Dose:** 0.2-1% w/w

**Bio-active ingredients:** 10% b-Glucogallin, 50% gallates (tanins)

**Skin Whitening:** Skin lightening by inhibition of melanin formation, stronger melanin than ascorbic acid at same concentration.

UV Protector: HORAC: 34 500 µmol CAE/100g / NORAC: 90 000 µmol TE/100g

**ORAC hydro:** 267 800 µmol TE/100g / Orac lipo: 400 µmol TE/100g

**Bio-active ingredients:** 40% Saponins Triterpenes

**Dose:** 0.5-2.0% in soothing creams / lotions
**Incl.:** Salvia Officinalis (Sage) Leaf Extract

**Bio-active ingredients:** Xymenynic acid

**Skin Firming, Cellulite, Anti-inflammatory, Hair care**

**Source:** Santalum album seeds
**Incl.:** Xymenynic acid

**Bio-active ingredients:** Xymenynic acid

**Source:** Centella asiatica Extract
**Incl.:** Centella Asiatica Extract

**Dose:** 0.5-2.0% in soothing creams / lotions

**Bio-active ingredients:** 40% Saponins Triterpenes

**Source:** Rosmarinus officinalis seeds
**Incl.:** Rosmarin 3-15%, Salidroside 1-5%

**Bio-active ingredients:** Rhodiola rosea – roots from Altai mountains under social responsibility program, more than 5 years aged – unique licence and partnership with Russia
**Incl.:** Rhodiola Rosea Root Extract

**Dose:** 0.1%-0.3%

**Bio-active ingredients:** Rosavins 3-15%, Salidroside 1-5%

**Skin Barriers:** Study (2008, *Journal of Cosmetic Dermatology*) showed that extracts of Rhodiola rosea improved the skin’s defensive barrier functions against the stress of ultra violet rays. Subjects of this study were classified as having sensitive skin.

**Elastin:** increases components needed by the body to create elastin.

**Collagen:** elevates the number of hydroxyproline and hexosamine molecules, needed to make collagen (dermis, 2nd layer).

**Antioxidant:** pharmacological active compounds (esp. rosavins), which are able to assist the body systems with oxygen deprivation, stress and immune support - all important considerations for skin management.

**Source:** Curcuma longa
t*Efficent inhibitor of Human Leukocyte Elastase*

**Bio-active ingredients:** 95% Tetrahydrocurcumin

**Source:** Punica granatum – seeds
**Incl.:** Punica Granatum Seed Extract

**Dose:** 0.1% - 1%

**Bio-active ingredients:** Punicic acid ≥ 80% (CLnA)

**Skin lightener, Evening skin tone, UVB protectant**

**Source:** Laminaria japonica

**Bio-active ingredients:** Sulfo-Polysaccharides ≥ 40% (85% upon request)

**Source:** Laminaria japonica – whole plant

**Bio-active ingredients:** Sulfo-Polysaccharides ≥ 40% (85% upon request)

**Bio-active ingredients:** Standardized in Ursolic acid or even ursolate (70% Ursolic acid Na salt and up to 30% of Oleoanic acid Na salt), from Sage (Rosemary available).

**Tissue repair, anti-inflammatory (resistant barrier on skin/ hair)**

**Collagen and elastin synthesis**

**Beneficial to the overall health and functions of photo-aged skin**

**Efficient inhibitor of Human Leukocyte Elastase**

**Hair care for conditioning and repair**
**Bacopin**  
Skin damage, premature wrinkles, age spots  

**Source:** Bacopa monniera  
**Ind:** Bacopa monniera Extract  
**Bio-active ingredients:** 20% and 50% total Bacosides (as A & B)  
**Dose:** 3 x 50 mg (children) to 3 x 100 mg (adult)  

Bacosides and the antioxidants help to dispel toxins epithelium layer, and improve skin complexion and stimulates skin cell regeneration. Brahmi - the other name - is used in treating of psoriasis, eczema, abscesses and ulceration. Ayurvedic uses: Memory Enhancing, Anti-inflammatory, Analgesic, Antipyretic, Sedative, Anti-licercogenic, Anti-epileptic.

---

**Fucoxanthin [U-HPLC]**  
Antioxidant, Protection against UV induced damage in the skin, Anti-pigmentary activity  

**Source:** Undaria Wakame  
**Ind:** Fucoxanthin / Laminaria Japonica Extract  
**Dose:** 0.05-1.5%  
**Bio-active ingredients:** Fucoxanthin UPLC, Fatty acids (PUFA)  

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. Urrú-kura et al. showed that fucoxanthin significantly suppressed ultraviolet B-induced epidermal hypertrophy, which may cause wrinkle formation, vascular endothelial growth factor, matrix metalloproteinases-13 expression, and the increase of thio-barbituric acid reactive substances (test irradiated cells and MMP expression). Topical treatment with fucoxanthin prevents skin photoage and wrinkle formation in ultraviolet B-irradiated hairless mice, possibly through the antioxidant and anti-angiogenic effects of fucoxanthin: sunscreen for photaging.

---

**Myricetin Bayberry**  
UV protection including lipid peroxydation  

**Source:** Myrica cerifera  
**Ind:** Myrica Cerifera Leaf Extract  
**Bio-active ingredients:** Myricetin ≥ 80%  

Myricetin is a potent antioxidant, similar to quercetin, and can help protect from UVB damage. A study in Taiwan has been performed in keratinocyte cells (HaCaT) exposed to UVB radiation (what decreases the cell viability), successfully reversed by treatment with myricetin. Also led to an increase of cell viability on non-exposed cells (positive effect on normal skin cell proliferation). Inhibits the lipid peroxide and hydrogen peroxide production induced by UVB. Also protect cells from UV light by inducing apoptosis (cellular death) of cells damaged by the radiation.

---

**Apple Phloridzin**  
Antioxidant, Immunoprotective (also in dermato. preparation), Anti-wrinkle, Soothing  

**Source:** Malus domestica – fruit skin  
**Bio-active ingredients:** Phloridzin ≥5% or ≥20%, Polyphenols  
**Ind:** Pyrus Malus Extract  
**Dose:** 0.05% to 0.3% depending on concentration  

Apple contains the secrecy of youth and beauty through its unique polyphenols. Among those, phloridzin is particularly recognized for its benefits through its antioxidant and its protective effects for skin.  

Three levels to control the mechanisms of skin aging:  
- Protection of the extracellular matrix (Matrix Metalloproteinases release), Positive absorption profile in UVB and UVA.  
- Provides a good looks effect (activates natural melanogenic activity)  
- Blocks inflammation (action on interleukin 8).

---

**FruitOx®**  
In-vivo cellular antioxidant, ORAC > 1 000 000 μmol TE / 100g  

**Origin:** Nektium (Spain)  
**Source and Bio-active ingredients:** polyphenols and other actives compounds from plum, blueberry, apple, pomegranate, grape Leaves  

FruitOx® is a formulation based on actives from different fruits and plants, developped by Nektium with the idea of a fruits based antioxidant, and offering a wide spectrum of anti-radical properties (hence the selection of only certain specific polyphenols from each source) and stimulation of cellular defenses. FruitOx®™ has been controlled at its ORAC value of 1 259 340 (Trolox equivalent / 100g) - by French accredited laboratory.

---

**Dihydroquercetin**  
Antioxidant, Anti-ageing, Acne, Dry skin, Hair  

**Source:** Vitis vinifera – leaves  
**Inci:** Vitis vinifera Leaf Extract  
**Bio-active ingredients:** ≥ 90% dihydroquercetins  
**Dosage:** 0.01% to 0.05%  

Dihydroquercetins referred for their strong antioxidant properties as well as actions against acne (with healing properties), UV protection, preservative. This flavanone—also known under the name of Taxifolin—tested in murine melanoma cells (two murine melanoma cells) enhances protective functions of the skin against external and internal toxicity, radiation, germs, and other environmental factors. Normalize general metabolic processes specifically, those in lymphatic and blood system, thus, slows aging.  
- Dry and aging body and facial skin  
- Sensitive skin prone to irritation and allergy  
- Skin with weakened microcirculation  
- Capillaropathy  
- Contribute to the general health of hair and hair growth.

---

**Pomegranate P40P**  
Antioxidant, Anti-ageing, Lightening  

**Source:** Punica granatum – mashed fruits  
**Inci:** Punica Granatum Extract  
**Bio-active ingredients:** Total punicosides ≥ 40%, Punicalagins A+B ≥ 30%, Total polyphenols ≥ 50%  

There are several cosmetic formulations that include an extract of pomegranate juice or oil. Pomegranate is rich in ingredients such as vitamins B and C, potassium, polyphenols etc., that enhance the beauty and life of skin. It is a good source of ellagic acid and antioxidants, which are helpful in destroying free radicals. It's so a great remedy for skin that is damaged due to sun exposure or aging, to get smooth and youthful skin.  

Pomegranate is said to extend the life of fibroblasts, for the production of collagen and elastin. Collagen and elastin pump up the skin and render it elasticity. This in turn, keeps the skin youthful for years and minimizes the visibility of wrinkles. Natural pomegranate extract contains very few ellagic although it's the usual mentioned assay, which is a metabolite by hydrolyzation of the punicalagin (1 punicalagin gives 2 ellagic acid), However, Ellagic acid has been used orally for its activity as skin lightening.

---

**Rhododendron**  
Microcirculation, Sensitive skin, Hair growth  

**Source:** Rhododendron caucasicum – leaves  
**Bio-active ingredients:** polyphenols ≥ 50%, flavonoids (DHQ) ≥5%  
**Dosage:** 0.05% to 0.2%  

Source of polyphenols and more specifically dihydroquercetins.
...A selection for Hair care

**Cococin**: Extract of tender coconut, in freeze-dried free flowing powder form (also available in liquid form for compatible solubility for skin and hair care formulations). Coconut water works at cellular level due concentrated amounts of Cytokins (involved in the cell growth and differentiation for a perfect copy of its DNA). Cococin™ has been shown to promote the proliferation of fibroblasts (wound healing potential). It’s also a long term moisturizer.

- Cococin for hair care was compared in vitro on dermal papilla cells with Minoxidil vs Minoxidil alone, with evaluation of “Human Hair Follicle Dermal Papilla Cell Proliferation Assay” and “5-a Reductase Inhibition Assay”. Minoxidil 5.0% + Cococin CG 0.25% was found to be the most potent for human hair follicle dermal cell proliferation (41.21%) as compared to a 5% Minoxidil solution (32.01%). And inhibition of 5-a-reductase (14.88%) in comparison to 3.01% for 5% Minoxidil solution.
- Sabinsa developed and patented a formulation based on Cococin and Saberry (Amla extract) to promote healthy hair growth

**Tetrapure**: TetraPure™ shows great anti-mycosis and anti-dandruff activities. It completely inhibits the growth of dermatophytes Trichophyton rubrum, Microsporum gypseum and Epidermophyton floccosum. It enhances the activity against Malassezia furfur at all tested concentration. It reduces the colony counts of Candida albicans to less than 100cfu/ml. As other actives of the family of THC, Tetrapure shows tyrosinase inhibition of 

**Bacopa monniera**: Bacopin, Bacosides

**Berberis aristata**: Berberine

**Boswellia serrata**: Boswellin, Boswelic Acids, ABBBA, Polysacchach.

**Boswellia serrata**: Boswellia Oil

**Camellia sinensis**: Green Tea

**Cappuccium annuum**: Paprika

**Centella asiatica**: Centella

**CeNzyme Q10**: CoQ10

**Coffee arabica**: SlimNat

**Coffee Robusta**: Coffee Bean

**Coleus forskohlii**: Forslean, Forskolin

**Coleus forskohlii Oil**: Forslean, Oil, Pinenes

**Crataeva nurvala**: Lupeol, Lupeol

**Curcuma longa**: Curcumin

**Curcuma longa**: Sabiewhite,THC

**Eclipta alba**: Eclipta

**Embelia ribes**: Embelia

**Engelhardtia crassipes**: Engelhardtia

**Gigartina skottsbergii**: Gigartina

**Ginkgo biloba**: Ginkgo Biloba

**Glycine max**: Soy, Isolavones

**Glycyrrhiza glabra**: Glabridin, Glabridin (4-98%)

**Inula racemosa**: Inula

**Kaempferia galanga**: Galanga

**Laminaria japonica**: Fucoidan

**Malus domestica**: Apple

**Mangifera indica**: Mango

**Melia azadirachta**: Neemoids

**Miconidil solution (32.01%). And inhibition of 5α-reductase (14.88%) in comparison to 3.01% for 5% Minoxidil solution.**

**Sabinsa developed and patented a formulation based on Cococin and Saberry (Amla extract) to promote healthy hair growth**

**Tetrapure**: TetraPure™ shows great anti-mycosis and anti-dandruff activities. It completely inhibits the growth of dermatophytes Trichophyton rubrum, Microsporum gypseum and Epidermophyton floccosum. It enhances the activity against Malassezia furfur at all tested concentration. It reduces the colony counts of Candida albicans to less than 100cfu/ml. As other actives of the family of THC, Tetrapure shows tyrosinase inhibition as well as great inhibition of Melamin

**Ursolic and Ursolate**: Ursolic acid (from Salvia officinalis or Rosmarinus officinalis) enhances hair growth by stimulating the peripheral blood flow in the scalp and helps prevent alopecia and dandruff. Ursolic acid has been shown also to treat photo-aged skin (prevents the appearance of wrinkles and age spots) by restoring the collagen bundle structures and elasticity.

**Xymenynic acid** from Santalum album: Hair vitality and reduce loss. Topically it can be used for its anti-inflammatory properties in the management of arthritis, as well as helping to preserve the integrity and texture of the skin in anti-aging formulations. In hair care formulations, it improves hair vitality since it stimulates the microvasculokinetitc activity of the scalp

**Bacosides** from Bacopa m. provides proper nutrients to the hair follicle thus invigorating the hair growth. It improves micro-circulation and hair growth. Its massaging is beneficial in checking dandruff, itchiness, formation of split ends and flakes

**Eclipta alba** is reported to improve hair growth and the black color of our hair

---

**Plant** | **Name** | **Common actives**
--- | --- | ---
Aesculus hippocastanum | Venecin | Beta Escin, Terpenes
Amaranthus caudatus | Amaranth | Squalene
Andrographis paniculata | Andrographis | Andrographolides
Artocarpus lakoocha | Artonax | Resveratrol - OxyResveratrol
Asparagus racemosus | Shatavari | Saponins
Bacopa monniera | Bacopin | Bacosides
Berberis aristata | Berberine | Berberine
Boswellia serrata | Boswellin | Boswellic Acids, ABBBA, Polysacchach.
Boswellia serrata | Boswellia Oil | Oil
Camellia sinensis | Green Tea | Catechins, Polyphenols
Capsicum annuum | Paprika | Capsacin, Chilieneoids, Carotenoids
Centella asiatica | Centella | Terpen, Asiaticoside, Saponins
Citrus sinensis | Hesperidin | Hesperidin
Coccoc nucifera | Cococ | Carbohydrate, Minerals, Proteins
CoNzyme Q10 | Q10 | CoQ10
Coffee arabica | SlimNat | Chlorogenic, Caffeoylquinic acids
Coffee Robusta | Coffee Bean | Chlorogenic Acid
Coleus forskohlii | Forslean | Forskolin
Coleus forskohlii Oil | Forslean, Oil, Pinenes
Crataeva nurvala | Lupeol | Lupeol
Curcuma longa | Curcumin | Turmerones
Curcuma longa | Sabiewhite,THC | Tetahydrocurcuminoids
Eclipta alba | Eclipta | Wedelolactone
Embelia Ribes | Embelia | Embelin
Engelhardtia crassipes | Engelhardtia | Dihydroquercetin
Gigartina skottsbergii | Gigartina | Sulfopolysaccharides, Polyphenols
Ginkgo biloba | Ginkgo Biloba | Flavone, Terpen, Lactones
Glycine max | Soy | Isolavones
Glycyrrhiza glabra | Glabridin, Glabridin (4-98%) | Glabridin
Inula racemosa | Inula | Lactones
Kaempferia galanga | Galanga | Cinnamate
Laminaria japonica | Fucoidan | Sulfopolysaccharides, Fucoidan
Malus domestica | Apple | Phloridzin, Polyphenols
Mangifera indica | Mango | Mangiferin
Melia azadirachta | Neemoids | Limonoids
Momordica charantia | Momordica | Bitter Principles, Charantin
Myrica cerifera | Bayberry | Myricetin, di-Hydroxymyricetin
Ocimum sanctum | Tusi | Eugenol, Caryophyllene, Ursolic acid
Olea europaea | Olive | Oleuropene
Phyllanthus amarus | Phyllanthus | Bitter Principles, Phyllanthin, Tannins
Piper nigrum | Cosmopoeine | Tetrahydrodipipernine
Plant Formula | AcneZero | Policosanol, Coleus, Monolaurin, Vitex
Plant Formula | Policosperine | Policosanol, Oil, Piperine
Platannthus barbatus | Forslean | Forskolin
Polygonum cuspidatum | Resvenox | Resveratrol, Stilbins
Prunus domestica | Plum (Prune) | Chlorogenic Acid, Polyphenols
Pteroperas marusrapus | Pteropwhite | Tannins, Stilbins, Ptercarpoides
Punica granatum | Pomegranate | Ellagic Acid
Punica granatum | Pomegranate | Punicosides, Punicagalins, Polyph.
Quercus infectoria | Gallnut | Polyphenols
Rhodcola rosea | Rhodoliffe | Rosavins, Salidrose
Rhododendron cauc | Rhododendron | Polyphenols
Rosmarinus officinalis | Rosemary | Carnosic,Ursolic, Rosmarinic,Betulenic
Saccharum officinarum | Policosanol | Policosanol
Salvia officinalis | Sage | Ursolic Acid, Na Ursolate
Sambucus nigra | Elderberry | Anthoxygenins, Polyphenols
Santalum album | Xymenynic | Xymenynic Acid
Sapindus trifoliatus | Sapindin | Saponins
Seroes repens | Saw-Palmetto | Fatty Acids
Sesamum indicum | Sesamin | Sesamin
Synthesis | Alpha Licoic, 1,2-Hexadianol, Octaneoldiol, Decaneoldiol
Terminaria | Terminalia | Arjunalic, Saponins, Tannins, Ellagic
Undaria pinnatifida | Fucoxanthin | Fucoxanthin
Vitis agnus castus | Vixen | Artemetin
Vitéx negunpo | Vixen | Agnuside
Vitis vinifera | Grapes | Polyphenols, Quercetin
Withania somnifera | Ashwagandha | Withanolides, Alkaloids, Withaferin
Zingiber officinalis | Ginger | Gingerols
Minerals | Chromium Picolinate, Seleno-Methionine, Methyl Selenium, Molybden Methionate, Gamma-Glutamyl-L-Selenomethionine, N-Acetyl L-Cyst., etc…
Flavors | , Galbador, Geranyl, Karanaorq, Melonal, Naturanate, Safranal, Sandoral, Super Santol, Metoxy Melonal
Two forms of melanin are produced in the epidermis: phenomelanin, which is red to yellow in color, and eumelanin which is dark brown to black. The relative proportions of these also influence skin color. In addition, individuals differ in the number and size of melanin particles. Skin pigmentation is influenced by several factors like:

- Hemoglobin in the blood vessels
- Carotenoids in the dermis
- Particularly, the dark pigment, melanin in the epidermis.

Production of Melanin

Melanin biosynthesis (melanogenesis) is influenced by genetics, environmental factors, diet and medication. The production of melanin by specialized cells called melanocytes (in the basal layer of the epidermis in light skinned people and in the basal as well as horny layer in dark skinned people) occurs through the action of the enzyme tyrosinase. The rate-limiting step in melanogenesis is the conversion of L-tyrosinase to melanin, through the action of tyrosinase. Copper and oxygen act as catalysts. Other enzymes also control melanin production, particularly in the presence of sulfur. These include the following:

- Dopachrome oxidoreductase which controls melanogenesis in the absence of tyrosinase. It helps to convert dopachrome into 5, 6-dihydroxyindole.
- Alpha-glutamyl transpepsidase which helps to maintain the balance in the biosynthesis of eumelanin and pheomelanin.

Variation in skin pigmentation is attributed to the levels of melanin produced and the number of melanocytes present. Although light skinned and dark skinned people may have the same number of melanocytes present, the rate of melanin production is greater in darker skin tones. Additionally, the melanin present in the epidermal layers of darker skins is resistant to enzymatic degradation. Increased production of melanin on one side of the skin and dramatically reduced decomposition of melanin on the other side results in darker skin tones, in light skinned people. Melanin granules synthesized in the melanocytes are then transferred from the cytoplasm of the melanocytes to the basal cytoplasm of the keratinocytes. They thus form a protective covering in the inner layers of the epidermis, absorbing UV rays and inhibiting their penetration.

Controlling Melanin Synthesis

Various types of inflammatory mediators such as leukotrienes and prostaglandins, cytokines and growth factors may influence melanin synthesis by affecting the proliferation and functioning of melanocytes. This explains why inflammatory diseases often induce hyperpigmentation or hypopigmentation. The enzyme, protein kinase C that phosphorylates proteins may also influence the growth and differentiation of melanocytes.

Cytokines such as endothelins (also known as vasoconstrictive peptides) are also reported to accelerate melanogenesis.

Quick view of our Main Products

- TetraPure and Sabiwhite (tetrahydrocucuminoids): anti-tyrosinase activity along with high ORAC value and Inhibition of Melanogenesis
- Glabridine (from 4% to 98% from licorice): the well-known whitening agent from licorice
- Saberry (β-glucogallin from Amla): white water soluble Skin Whitening, MMP-1 Inhibitor, UV Protector
- OxyResveratrol Artonox: strong and dose dependent inhibition of Tyrosinase enzyme activity and melanogenesis inhibitory activity
- Ellagic Acid (pomegranate), lightening, UV protection, also in oral form
- Fucoxanthine (wakame): lessenened UVB-induced epidermal hypertrophy, VEGF, and MMP-13 expression
- Apple polyphenols & Phloridzin: skin whitening (restrain the tyrosinase) and treat the acne by sebum secretion
- Soy extract: lightening action in solar lentigenes (hyperpigmentation due to sun)

Skin lightening cosmeceuticals

The toxicity associated with hydroquinone use, induced researchers to identify less dangerous botanicals with comparable activity. The general modes of action include inhibition of the formation of melanosomes, inhibition of tyrosinase biosynthesis, and inhibition of melanin biosynthesis and interference of the transfer of melanosomes into the keratinocytes. Some agents also have a chemical effect on melanin with an increase in the degradation of melanosomes in the keratinocytes.

Antioxidants such as ascorbic acid and others help to decompose preformed melanin. Hyperpigmentation due to UV and UBV damage may also be addressed by preventive measures using antioxidant compounds with sunscreen effect and free radical scavenging action. Research efforts are generally aimed at achieving one or more of the following effects:

- Regulation/inhibition of tyrosinase, dopachrome oxidoreductase and dopachrome tautomerase involved in melanogenesis
- Regulation of the cytokine network including endothelin
- Regulation of genes related to melanogenesis
- Combinations of the above approaches

Skin Brightening

When Skin Needs Brightening

Optical properties modulate the appearance of skin. Skin needs brightening when:

- Too transparent or too highly pigmented skin appears spotted and unhealthy.
- When skin is dull. Dull skin is dehydrated skin which is to transparent or hyper pigmented.
- Early aged skin is also dull and rough due to loss of surface integrity.

What Skin Brightening Cosmeceuticals do

The effects of skin brighteners are:

- Radiant complexion.
- Beautiful skin glow.
- Even skin tone, without freckles, age spots or other types of discoloration.
- Rejuvenated, nourished and smooth skin

Other related products

Tyrosinase inhibitors such as Arbutin (from the leaves of the common bearberry), Arctophylos urva ursi and other plants, Glabridin from licorice (Glycyrrhiza glabra roots), ascorbic acid and its derivatives, Kojic acid (a bacterial carbohydrate metabolite) are better tolerated than hydroquinone. Aloesin from Aloe is reported to be a non-competitive inhibitor of tyrosinase, affecting...
Rich AKBBA Boswellin and Psoriasis

A new study on 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 on 5-LO as well as (HLE) and psoriasis.

Mean scores of arthritic symptoms as evaluated in an open field study of boswellic acids-containing topical analgesic Chilisin” (TM of Sabinsa Corp). In addition, a four week study as well as a three month toxicity study showed that administration of boswellic acids at 5 to 10 times the ED50 value did not cause side effects.

Inhibition of Leukotriene Synthesis

The presence of a specific AKBA-binding site on 5-LO that is distinct from the arachidonate substrate-binding site was determined using photo affinity labeling. Among the several compounds classified as leukotriene synthesis inhibitors, nonredox inhibitors, such as boswellic acids, are preferred. Unlike redox type inhibitors they do not interact with other biological redox systems, lessening the likelihood of side-effects like methaemoglobin formation. AKBBA has been identified as the only leukotriene synthesis inhibitor so far that inhibits 5-LO activity by noncompetitive, nonredox mechanisms (3-5% of topical formulation as cream, lotion or gel).

Management of psoriasis

A study on Sabinsa’s Boswellia cream for treatment of psoriasis, Clinical Evaluation of AKBBA in the management of psoriasis, was published in Clinical Dermatology 2014; 2 (1): 17-24. US clinical trials, intended to have AKBBA eventually approved as a drug by FDA for treatment of psoriasis, will begin in the near future. This will be a significant step for a nutraceutical company in USA.

The cream of Boswellia serrata Roxb extract standardized for 5% of 95% 3-O-Acetyl-11-Keto Beta Boswellic Acid (AKBBA) was studied in an open label, multi centered phase III clinical trial, evaluating 200 psoriatic patients with application of AKBBA cream three times daily for a period of 12 weeks. The researchers observed significant changes in LTB4 (p<0.001) & TNF alpha (p<0.01) values from the baseline along with significant changes (p<0.05) in VEGF & PG2E. Reduction in ‘modified’ PASI score from the baseline visit was in consensus with the global evaluations by physician and patients. The evidence shows superior anti-inflammatory responses rates, demonstrating that this non-toxic treatment is beneficial for those suffering from this condition. Although far from the scope of a dietary supplement, the exploratory process that has gone into such a traditional ingredient showcases Sabinsa’s passion for applying modern day technology to traditional botanicals to help create natural solutions for health.

“Our understanding of this ingredient, originating from one of the earliest compounds released by Sabinsa, called Boswellin”, is growing, and we want the world to know the positive research and the impact it has on human health,” said Sabinsa founder Dr. Muhammed Majeed. “Such indications prevalent in Ayurvedic texts are now being proven by modern research, in terms of correctly standardizing, isolating the unique compound(s) and ultimately formulating safe and effective products. The cream product is sold and marketed as a drug in India. Sabinsa holds several patents for this and other uses of Boswellia. Clinical evaluation of AKBBA in the management of psoriasis, Muhammed M., Nagabhushanam K., San- karan N., Soo D.R., Kanti S.K. 

<table>
<thead>
<tr>
<th>Comparative table sheet</th>
<th>Orac</th>
<th>DPPH</th>
<th>Tyrosinase</th>
<th>Melanin</th>
<th>Elastase</th>
<th>Collagenase</th>
<th>UV Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artonox</td>
<td>19 735</td>
<td>2 700</td>
<td>0 049</td>
<td>1 200</td>
<td>1 120</td>
<td>1 020</td>
<td>n.c.</td>
</tr>
<tr>
<td>Glabridine 40%</td>
<td>3 256</td>
<td>49 000</td>
<td>0 250</td>
<td>3 000</td>
<td>n.c.</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>Pteroswhite</td>
<td>12 508</td>
<td>4 900</td>
<td>6 000</td>
<td>0 550</td>
<td>n.c.</td>
<td>n.c.</td>
<td>30</td>
</tr>
<tr>
<td>Resveratrol</td>
<td>25 223</td>
<td>3 010</td>
<td>5 500</td>
<td>2 500</td>
<td>n.c.</td>
<td>31</td>
<td>n.c.</td>
</tr>
<tr>
<td>Saberry</td>
<td>2 682</td>
<td>n.c.</td>
<td>321 000</td>
<td>14 000</td>
<td>n.c.</td>
<td>n.c.</td>
<td>15 (UVA) 42 (UVB)</td>
</tr>
<tr>
<td>Sabwhite</td>
<td>10 786</td>
<td>n.c.</td>
<td>1 770</td>
<td>3 000</td>
<td>n.c.</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>Tetrupure</td>
<td>10 212</td>
<td>1 300</td>
<td>1 800</td>
<td>3 200</td>
<td>n.c.</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>Kojic Acid</td>
<td>-</td>
<td>500 000</td>
<td>7 000</td>
<td>10 000</td>
<td>n.c.</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>3 400</td>
<td>1 930</td>
<td>9 330</td>
<td>25 000</td>
<td>n.c.</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
<tr>
<td>Arbutin</td>
<td>-</td>
<td>500 000</td>
<td>193 600</td>
<td>100 000</td>
<td>n.c.</td>
<td>n.c.</td>
<td>n.c.</td>
</tr>
</tbody>
</table>

- ORAC Value: μmol Trolox equivalents/g (Higher is greater)
- DPPH Inhibition: IC50μg/ml (lower is greater)
- Tyrosinase Inhibition: IC50μg/ml (lower is greater)
- Melanin Inhibition: IC50μg/ml (lower is greater)
- Elastase Inhibition: IC50μg/ml (lower is greater)
- Collagenase Inhibition: IC50μg/ml (lower is greater)
- UV Protection: IC50μg/ml (lower is greater)

(…) the action of tyrosinase complex in the sub-stratum and reducing the conversion of DOPA into melanin.

Arbutin and Kojic acid inhibit tyrosinase directly, while L-ascorbic acid and its derivatives are believed to act as reducing agents on intermediates in melanin biosynthesis at various points in the oxidation chain reaction from tyrosine/DOPA to melanin. Our products are usually compared to Arbutin and to Kojic acid.

Green tea is also reported to be a competitive tyrosinase inhibitor through the gallocatechin moiety in the major catechin constituents epicatechin gallate, epigallocatechin gallate and gallate.

Paper mulberry extract (from the root bark of Broussonetia kazinoki x B. papyrifera ) also contains active depigmenting agents, which were shown to be more efficacious than hydroquinone (IC 50 of 2.5 mg/ml against 5.5 mg/ml for hydroquinone).
Acne is a common skin disorder which is a visible end result of hormonal, bacterial and inflammatory disturbances that take place at the level of the oil pore (pilosebaceous follicle). It is characterized by presence of open comedones (black heads) and closed comedones (microcysts).

Some of the common causes of acne:

- Growth and multiplication of acne causing bacterium Propionibacterium acne
- Higher levels of the hormone Dihydrotestosterone by the activity of the enzyme 5-alpha reductase.
- Increase in androgens during puberty and adolescence which in turn, triggers an enlargement of the sebaceous glands.

Prevention of acne

Acne may be prevented by:

- Reducing sebum production (secreted by sebaceous glands)
- Reducing bacteria (P. acne) on the skin
- Reducing the inflammation
- Exfoliation-peeling of the skin which unclogs pores

Anti-microbial Vitex

Vitex oil is extracted from the berries of Vitex agnuscastus and is standardized for 0.40% of Artemetin. It is made up of long chain fatty acids and long chain fatty acids like lauric, myristic, palmitic, stearic, oleic, linoleic and linolenic acids. The oil has potential anti-microbial activity. Vitex oil inhibits the growth of Propionibacterium acnei (anaerobic bacteria), E. coli (from 0.1%) and S. aureus (aerobic bacteria, from 0.5%).

At concentrations above 0.4%, it effectively inhibits the P. acne bacteria and the activity is well comparable to 1% Clindamycin gel.

Anti-microbial Coleus oil

Coleus oil is an oil obtained from the fresh roots of Coleus forskohlii. It is standardized to 15% Bornyl acetate and 15% Decanal. The oil having good anti-microbial activity is a potent anti-acne ingredient. Coleus oil was found to effectively inhibit the growth of skin pathogens such as:

- Propionibacterium acne (associated with acne) : Inhibition of more than 25% at 1.25µg/ml (versus 15% for tea tree oil), and still 15% at 0,5 mg/ml
- Staphylococcus aureus (a bacterial strain found in infected wounds and skin eruptions including acne) : Inhibition by 40% at 30µg/ml, so about 3x more than tea tree oil, and still 30% at 7,5 mg/ml when tea tree oil is then not active anymore
- Staphylococcus epidermidis (a bacterial strain occurring in a variety of opportunistic bacterial skin infections): inhibition by ca. 30% at 30µg/ml, so double than tea tree oil, and still 15% at 7,5 mg/ml when there’s no more activity from tea tree oil.
- Candida albicans : Inhibition by 40% at 30µg/ml and ca. 20% at 15µg/ml, so always more than Tea Tree Oil, without the unpleasant odor.

Sebum control Policosanol

Policosanol is a mixture of fatty alcohols derived from waxy extract of sugarcane, containing a minimum of 55 – 60% Octacosanol. Policosanol is useful in managing inflammatory skin conditions, particularly acne.

In a 2 week study on 16 human subjects between 8 and 25 yrs of age, 2% and 5% Policosanol colloidal solutions were found to be safe for local application. Topical applications of the Policosanol colloidal solutions were found to decrease the sebum secretion in a concentration dependent manner. (Reduction from 11.6% to 27.6%). Policosanol effectively compared with Clindamycin.

Cosmoperine Tetrahydrodropiperine (THP) as enhancers of nutrient and drug bioavailability

Cosmoperine has been subject to various studies: for instance, it has been found to enhance the Tetrahydrocurcuminoids (THC) due to increase penetration by min. 30% of the active across the barrier. Even at the highest dilution of 0.0001%. Other actives such as green tea polyphenols, synthetic pyrethroid, Albendazole, Betamethasone Dipropionate, etc., have been also performed with same proofs of efficacy (absorbed faster rate and more completely)

Recommended use: 0.01% to 0.1%
Cococin™, The Nourishment Factor® captures the goodness of green coconut water in a convenient powder form. Coconut water is the nutrient-rich liquid endosperm of coconut abounding in proteins, amino acids, sugars, vitamins, minerals and growth hormones that support healthy cell growth & hydration. Coconut water solids are freeze-dried using a special process that preserves the activity of nutrients.

Cosmetics and nutricosmetics
Cococin is the Nourishment Factor® that provides a valuable nutrient pool for enhancing food and beverage, as well as cosmetic product formulations. Cococin can be safely used in oral care as well as lip care compositions.
- Helps restore the skin health in aged and damaged skin
- Augments new cell growth while promoting healthy tissues
- Helps in wound healing
- Helps in skin hydration

Cell Proliferation enhancement
Cococin was used in the growth medium for fibroblast cell lines in an in vitro study (in Swiss 3T3 fibroblast cell line). Cell proliferation was significantly enhanced in cells treated with Cococin containing nutrient medium as compared to controls receiving standard nutrient medium.

Hair Growth
Each individual hair is formed inside a hair bulb deep in a hair follicle. The follicle is a tiny but powerful factory, which throughout many people’s lifetime hardly ever stops working. From a baby’s birth for many decades, as much as a century in some people, the follicle continues to produce hairs. Finally the hair spontaneously falls out. The follicle rests for a little while, and then starts to produce yet another new hair.

Between starting to grow and falling out years later, each hair passes through three distinct stages: Anagen (the growing phase), Catagen (the intermediate phase), Telogen (the shedding phase).

Cococin™ has been evaluated for its efficacy as a hair growth promoter, in comparison with Minoxidil as standard (2% minoxidil) in the experimental cream, which equaled that of the reference standard (2% minoxidil) in the experimental conditions of this study (see picture).

Reducing the appearance of skin aging
Twenty-two females in good health of ages 20-35 years old were subjects in a double blind placebo controlled clinical study (Research Report Sami Labs Ltd., 2005). A cream containing 1% coconut water solids (Cococin INCI: Cocos nucifera (coconut) fruit juice) was applied onto the marked areas on the left arm and right arm respectively (see figure).

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.

At the completion of growth, the solid endosperm and the last of the coconut water provide nourishment for the forming embryo and seedling.

Thus, coconut water serves the role as a reservoir of nutrients to support tissue growth (Tulecke, et al; 1961).

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). A published research report mentions that coconut water can be used as a short term intravenous (IV) fluid (Campbell-Falk et al.; 2000). Other reported applications include use in total parenteral nutrition (TPN) (Petroianu, et al.; 2004), and sports beverages (FAQ, 1998).
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 mountainous regions 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. *Rhodiola rosea* used for the production of RhodiolaLife® is wildcraft collected from this part, under the Russian Government License. Altai Mountains represent a pristine area free from contamination in of the most well preserved and remote natural environments. Nektium is involved from the early beginning in the collection practices, with SOPs describing the stage of the plant growth, best time of collection and ecologically non-destructive systems.

**Active Ingredients**

Activities related to *Rhodiola rosea* have been traditionally attributed to the presence of four principal active ingredients: salidroside, rosavin, rosarin and rosarin (Sokolov, 1985; Furmanova, 1998). The root of *R. rosea* shows six distinct groups of chemical compounds. The Phenylalkanoids are the main contributors, incl.:  

- **Phenylpropanoids**: Rosavins are products of the phenylpropanoid metabolism. Rosavins (ie. rosavin, rosorin and rosarin) are specific to the root from Rhodiola rosea. 
- **Principal phenylethanoids**: consist of glycosides and salidroside has been reported 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 concerning the bioactivity (Jiménez 1994).

Supplementing with *Rhodiola rosea* is a whole-body approach to maintaining health and wellness. While most supplements address specific conditions, *Rhodiola rosea* acts on many biological systems and can counteract one of the primary causes of illness – chronic stress, asthenia and premature aging. In today’s frenetic society, a one-size-fits-all supplement regimen with herbs and vitamins is ineffective. Each person is physiologically unique and requires a specific protocol for health. Supplementing with *Rhodiola rosea* is the foundation for an individualized supplement protocol because of its ability to heighten the body’s innate ability fight stress-related illness. *Rhodiola rosea* has been demonstrated to be effective in different important applications:

**Stress**

The effects of the stress on skin have been extensively proved. Stress is a well-known triggering factor in the appearance or exacerbation of psoriasis, alopecia areata, atopic dermatitis, acne, and other skin disorders. 

Panconesi et al. described the psychopharmacology of stress in dermatology and found that the skin and central nervous system are related embryologically. The parasympathetic nervous system is critical to regulating our stress response. *Rhodiola rosea* enhances parasympathetic function and fortifies the stress response system, improving our ability to overcome stress and reducing our risk of stress-related health problems.

**Anti-aging properties**

Application of *Rhodiola rosea* extract as a useful method of retarding the signs of photoaging and protecting the skin from UV damage. Photoaging can include signs of aging such as skin atrophy and means the thinning and/or general degradation of the dermis caused by free radicals damage which is often characterized by an alteration and degradation of collagen and/or elastin due to extrinsic factors such as photodamage caused by exposure to UV radiation. *Rhodiola rosea* extract can help in the prevention or retarding skin aging, including wrinkles lines appearance, skin atrophy and thinning appearance reduction.

Those properties of *Rhodiola rosea* extract are associated with:

- DNA repair
- Collagen synthesis
- Oxidative scavenger
- UV radiation absorption

Figure on the right shows dose-dependent sunburn cell formation in living skin equivalents. Pretreatment with *Rhodiola rosea* significantly reduces the formation of sunburn cells via UVB irradiation. *Rhodiola rosea* pre-treatment significantly reduces UBV induced sunburn cell formation in L5E. Looking at the UV-Vis spectrum of Rosavins (Rosarin, Rosavin, Rosin), the absorption spectrum has a maximum in same wavelength than UV radiations.

**Wrinkles**

Enhances Skin Barriers: first, preventing your skin from wrinkling is protecting it from sun damage, which is the chief culprit in pre-mature aging of the skin. One study published in the June 2008 issue of the *Journal of Cosmetic Dermatology* showed that extracts of *Rhodiola rosea* improved the skin’s defensive barrier functions against the stress of UV rays. Subjects of this study were classified as having sensitive skin.

Supports Elastin Production: Elastin is the rubber band effect in the skin that enables it to bounce back instead of sagging or wrinkling. Genetics play the largest role in determining how fast skin will wrinkle with the fairer skin having the highest risk of damage, according to the experts at SkinCarePhysicians.com. Applying *Rhodiola rosea* extract to delicate areas of the skin may help prevent premature wrinkling as the herb increases two types of molecular components needed by the body to create elastin. According to the cosmetic company, Origins, one of their skin care products containing *Rhodiola* showed significant reductions in line-wrinkles after an 8 week clinical test.

**Supports Collagen Production**

The dermis is the second of three layers of skin, sitting just below the epidermis. The dermis consists of collective tissues, including elastin and collagen, which support the skin and provide its flexibility. When in good supply, elastin and collagen prevent sagging and wrinkling. Imagine the skin as a tramponle, which has to rebound after every stretch and strain. *Rhodiola rosea* elevates the number of hydrosxylproline and hexosamine molecules, which are necessary for the body to make collagen.

**Antioxidant and Stress Support**

*Rhodiola rosea* can be used to treat the body holistically as it contains neuro-supportive ingredients and antioxidants, which assist the body in coping with stress. Consider the effects of stress and the role it plays in the skin’s vibrancy. According to a February 17, 2010 article on the Fox News health blog, *Rhodiola rosea* contains pharmacological active compounds called rosavins, which are able to assist the body systems with oxygen deprivation, stress and immune support – all important considerations for skin management.
**Forslean Coleus**

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.

**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.

**Mechanism of Action**

The mechanism of action on how Forslean® works is well defined: «Forskolin, the active compound in Forslean®, is recognized as an adenylyl cyclase activator. Adenylyl cyclase is the enzyme involved in the production 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.**

**Cosmeceutical applications**

**Topical fat reduction** in specific areas of the body is a common concern for women. Ronsard popularized the term “cellulite” to describe the dimpling and “orange peel” external appearance of the thighs, the cause of which was attributed to the aging process by later researchers. The structure of subcutaneous adipose tissue accounts for the development of the “orange peel” appearance. Groups of fat cells are attached to the underside of the dermis by fibrous connective tissue. As fat cells enlarge, the fibers are stretched and pull down on the underlying skin. This causes the indentation or dimpling of the skin called cellulite.

It has been demonstrated that adipose tissue metabolism varies from one region of the body to another, for example, in severely obese women losing weight after the jejunileal bypass surgery, fat was seen to be absorbed more slowly in the thigh region than the abdominal region. These differences lead to the hypothesis that localized application of agents that trigger lipolysis or fat breakdown could help in cases of fat accumulation at specific subcutaneous sites.

Forskolin accelerates lipolysis through the activation of hormone-sensitive lipase — adrenoreceptors playing important roles in the regulation of lipolysis (adrenoreceptors are neurons that are activated by adrenaline (epinephrine) or similar substance). Based on clinical studies reported in literature, Coleus forskohlii extract 95% is potentially useful in dislodging localized fat deposits immediately under the skin, when applied topically.

As an alternative to tanning by exposure to the sun that can cause skin cancer, topical application of forskolin induces tanning and is safer to use.

**Dosage Form**

The recommended levels of use as a skin conditioning agent: 0.1 to 0.5% of a topical formulation, such as an ointment, cream or lotion.

**Anti-fungal remedy for Skin, Hair & Nails**

**TetraPure** is standardized for a minimum of 99% of Tetrahydrocurcumin (INCI Name: Tetrahydrodiferuloylmethane): research reveals that Tetrahydrocurcumin (THC) is one of the major metabolites of Curcumin, reported to exhibit many of the same physiological and pharmacological actions as Curcumin, in some systems, better.

Fungal infection of the skin is the 4th most common skin disease in 2014 Effecting more than 1.2 billion people around the world. A mycosis is a fungal infection of animals, including humans. Mycosis are common, and a variety of environmental and physiological conditions can contribute to the development of fungal diseases.

Human mycoses may be broadly classified as:

- Superficial, cutaneous and subcutaneous
- Systemic

**Dermatophytes**

It is observed that TetraPure® inhibits the growth of dermatophytes *Trichophyton rubrum, Microsporum gypseum and Epidermophyton floccosum* at all tested concentration (from 0.15%, Antifungal Efficacy – Agar Dilution Method).

**Malassezia furfur**

Checking the activity against MF (agar Dilution Method - Sabourauds Dextrose Agar with an overlay of coconut oil), it is observed that TetraPure® enhanced the activity at all tested concentration.

**Candida Species**

It is observed that TetraPure® at 0.15%, reduces the colony counts of *Candida albicans* NCIM3471 (Yeast) from 14.6 10^3 to less than 100 cfu/ml with an overall percentage reduction of 99.99% over a test interval time of 28 days.

**Anti-fungal formulation:** 0.15%w/w Skin lightening form: 0.1% - 0.5%w/w

**Tetrapure® inhibits superficial and cutaneous mycosis**

**FOCUS**

**Disease** | **Causative Organism** | **Incidence**
--- | --- | ---
Malassezia furfur | Malassezia furfur | Common
Tinea pedis | Epidermophyton floccosum | Rare
White piedra | Trichosporon beigeli | Common
Black piedra | Pseudoallescheria boydii | Rare
Dermatomycosis | Non-dermatophyte moulds | Rare
Hendersonula toruloidea | Scytalidium hyalinum, Scopulariopsis brevicaulis | Rare

**Dosage Form**

The recommended levels of use as a skin conditioning agent: 0.1 to 0.5% of a topical formulation, such as an ointment, cream or lotion.

**Anti-fungal remedy for Skin, Hair & Nails**

**TetraPure** is standardized for a minimum of 99% of Tetrahydrocurcumin (INCI Name: Tetrahydrodiferuloylmethane): research reveals that Tetrahydrocurcumin (THC) is one of the major metabolites of Curcumin, reported to exhibit many of the same physiological and pharmacological actions as Curcumin, in some systems, better.

Fungal infection of the skin is the 4th most common skin disease in 2014 Effecting more than 1.2 billion people around the world. A mycosis is a fungal infection of animals, including humans. Mycosis are common, and a variety of environmental and physiological conditions can contribute to the development of fungal diseases.

Human mycoses may be broadly classified as:

- Superficial, cutaneous and subcutaneous
- Systemic

**Dermatophytes**

It is observed that TetraPure® inhibits the growth of dermatophytes *Trichophyton rubrum, Microsporum gypseum and Epidermophyton floccosum* at all tested concentration (from 0.15%, Antifungal Efficacy – Agar Dilution Method).

**Malassezia furfur**

Checking the activity against MF (agar Dilution Method - Sabourauds Dextrose Agar with an overlay of coconut oil), it is observed that TetraPure® enhanced the activity at all tested concentration.

**Candida Species**

It is observed that TetraPure® at 0.15%, reduces the colony counts of *Candida albicans* NCIM3471 (Yeast) from 14.6 10^3 to less than 100 cfu/ml with an overall percentage reduction of 99.99% over a test interval time of 28 days.

**Anti-fungal formulation:** 0.15%w/w Skin lightening form: 0.1% - 0.5%w/w

**Tetrapure® inhibits superficial and cutaneous mycosis"**
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, tenu- rizer, 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 external parts of the human body (epidermis, hair system, nails 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 odours 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 irra- diation, allergens, toxicity, adalteration, activity, stability, sustainable resources, traceability, etc.
- The chemical and physical request in terms of description (TLC, physical rec-ognition, genotype) as well as heavy metals, nitrites, solvents, residues such as pesticides or residual solvents, addi- tives, foreign bodies, etc.
- The regulation in terms of assay, sol-vent, environmental components, legal uses, registration or notification (reach, organic grades,...), labeling, claims, cer- tification (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 ana-lyze the supply chain starting from the collect, including the exporters and the different middle men, which may cause variability on the quality besides the natu- ral variability linked to the weather and the soils. Finally, an overview of the needs of the local citizens and the risk (govern-ment, wars, weather, etc..) allows to find the right partners for the long run, and minimize the impact on the nature while checking the return to the people.

Preparation

All equipment may not use the same ma-terials, 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 herbs are more com- mon, 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, CO2, Metha-nol, 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 environmen- tal components (depletion of the ozone layers, solvent in atmosphere, groundwater pollution, air pollution). On a chemical point of view, the best sol-vent may be chosen after looking at the dipolar moment: an electric dipole is a separation of positive and negative charg-es, characterized by their dipolar moment, a vector quantity (Coulomb. meter or De-bye), subject to continuous electrostatic attraction and repulsion. Each solvent may be classified based on its dipolar moment (cf.: Vren der Waals Forces).

- Apolar and low polar solvent, mainly li-philic characteristic, with a moment from 0 to 1.5 (Hexane, cyclohexane, di-methoxymethane, Chloroform, Ethylic ether, phenol)
- Polar aprotic solvent, mainly hydrophil-ic 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 nitro- gen as in an amine group). Polar protic sol-vents 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: Hex-a ne (0), Ethanol (1.69), Methanol (1.70), Ethyl acetate (1.78), water (1.85), aceton (2.88). Depending on their miscibility, sol-vents 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 regulation, effective and selective when needed. However, certain steps may re-quire 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 materi- als, defit it, etc... It causes mechanical per-turbation and gives a liquid product.

Distillation and hydro-distillation: By di- rect heating or steam, this process is main-ly used for oils and volatile components. It may cause degradation (oxidation, hydro-lysis, 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 fraction-ation of an homogenous solution. The typical Solid / Liquid extractions are:

- Maceration: solid in solvent, room tem-perature
- Digestion: solid in solvent, over room tem-perature, below ebullition
- Decocation («reflux»): solid in solvent, tem-perature of ebullition
- Infusion (teas): solid in liquid at tempera-ture of ebullition, then cooling of the sus-pension
- Elution (leaching (Lixiviation)): solvent goes through the solid
- Liquidation: 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 ca-pacity (separation liquid / liquid), solubil-ity, 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 filtra-tion: membrane filtration or cross-flow fil-tra-tion technology which ranges between ultrafiltration (UF) and nanofiltration (NF) and reverse osmosis (RO). The fundamental principle of Nanofiltra-tion membrane technology is the use of pressure to separate soluble ionic through a semi permeable membrane.

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 steams 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 precipi-tating from a solution. Crystallization is also a chemical solid-liquid separation technique, in which mass transfer of a sol-ute from the liquid solution to a pure solid crystalline phase occurs. The crystallization process consists of two major events, nu-cleation (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 suc-cede 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 mix-ture, thus making a saturated solution. The solution is then allowed to cool => different solubility of compounds in solution drops => compound drop-ping (recrystallizing) from solution.
slow 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 unrestrained 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 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.

**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.

**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 repartition and the correct and needed content of actives as mentioned in our CoA (certificate of analysis).

**Adulteration & Falsification**

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 wave length 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.

**Drier**

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 repartition and the correct and needed content of actives as mentioned in our CoA (certificate of analysis).