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Nutracosmetics: a new growth segment

A wave of novel creams and lotions is ready to reach store shelves. Is your company on board yet?

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Nutracosmetics are a new class of products in the health and beauty aids category. They incorporate nutraceutical ingredients in topical delivery systems with the elegance, skin feel and ancillary benefits of cosmetics.1 Nutracosmetics differ from cosmeceuticals in the origin of their functional ingredients. Nutraceutical ingredients formulated in cosmetic delivery systems constitute nutracosmetics, whereas cosmeceuticals are cosmetics formulated with pharmaceutical-type ingredients. For regulatory purposes, however, the product claims usually determine the status as a cosmetic or a drug.

Nutracosmetics are not designed to replace nutraceutical dosage forms. Instead, they provide complementary benefits. For example, most current nutraceutical products are based on direct ingestion. The oral delivery systems pose issues relative to unacceptable odor and taste, and possible degradation of ingredients themselves during their transport from the digestive system to the site of their desired action. Nutracosmetic delivery systems circumvent some of these issues due to their application near or at the site of affliction. Nutracosmetics and nutraceutical dosage forms are both desirable for their beneficial applications. Often, such dual mode of administration provides synergistic or extended benefits.

The formulation of nutraceutical ingredients in nutracosmetics requires special considerations. The optimization of product appearance, nutraceutical benefits, cosmetic elegance, dosage level, bioavailability, efficacy, product stability and cost parameters require a combination of nutraceutical, cosmetic and pharmaceutical product development technologies.2 This article covers the formulation aspects of a variety of popular nutraceutical ingredients (see box below) that offer consumer-desirable innovative nutracosmetic products. For marketers of traditional nutraceutical products and suppliers of nutraceutical and botanical ingredients, nutracosmetics can rekindle growth in their businesses via introduction of these new products, which can now be offered in a variety of exciting delivery systems and packaging forms.3

Popular Nutracosmetic Ingredients

Anti-inflammatory	Forskohlin (Coleus forskohlii)	**Muscle & Joint**
Boswellia serrata	Ruscogenin	MSM
Ursolic acid/Oleanolic acid	Niacinamide	Chondroitin
Rosmarinic acid	Niacinamide hydroxycitrate	Glucosamine
Ruscogenins	Ginkgo biloba	SAMe

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Darutoside	Phaseolamine	
Asiaticoside	Caffeine	
Sericoside		
Harpagoside (Devil's claw)	**Memory Enhancement**	
Magnolia Bark (Honokiol, Magnolol)	Vincamine	**Diabetes**
Horse Chestnut (Escin, Esculin)	Vinpocetin	Bilberry
Ginger (Gingerol)	Yohimbine	Gymnema sylvestre
Turmeric (Tetrahydrocurcuminoids)	Huperzine	Momordica charantia
Corydalis	Ginkgo biloba	Fenugreek
Myricetin	Rhodiola	Corosolic acid
	Bacopa (Brahmi)	Salicinol (Salacia)
Body Slimming	Citicoline	
Hydroxycitric acid (HCA)	Phosphatidyl Serin	

America is Slimming and Toning!

Everyone wants to look good and today, people are willing to go to great lengths to improve their appearance. There are far more consumer products available for the beautification of the human body than for the treatment of human ailments. The improvement of body tone and appearance is a growing multibillion-dollar industry encompassing cosmetic, nutraceutical, pharmaceutical and physical therapy disciplines. Consumers are focused on the newest miracle ingredients in body slimming, fat burning and lean body mass increasing concoctions, promotions, witchcraft and claims. A number of new nutraceutical ingredients for the treatment of obesity and promotion of lean body mass (which is reduction of low specific gravity fatty tissue and increase of higher specific gravity muscle mass) are available.

Nutracosmetics can provide a wide range of benefits to the skin, including slimming and firming.

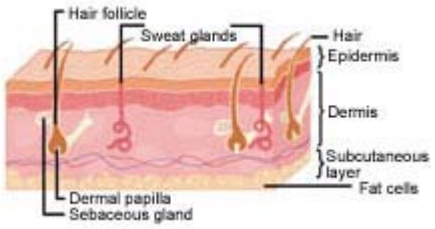
However, most nutraceuticals are administered orally. These compositions have several drawbacks including their possible unpleasant taste, their almost certain partial or full degradation during digestion, absorption and transport into bloodstream, their further degradation by the oxidizing and reducing enzymes during their transport to various organs of the body where their action is desired, and their lack of selectivity in terms of body part or organ. For example, if the weight loss is selectively desired in the chin, face or arm area, then such compositions taken orally cannot be targeted for such organs selectively. Moreover, such oral delivery systems generally cannot be formulated in synergistic combinations to provide additional beauty-enhancing benefits such as wrinkle reduction or skin color lightening. The formulations of nutracosmetics with ingredients that can provide external body part or organ slimming, firming, cellulite reduction, fat-reduction and obesity control benefits can be designed to be selective and specific for the face, chin, cheeks, arms, "love handles" in the abdomen area, eyelids and eye zone, neck, breasts, thighs and hips, and in combination with other desirable cosmetic benefits such as wrinkle reduction, age spot lightening, or spider vein control. They are now offering new convenience to consumers and market

expansion to marketers via new product launches.4

Hydroxycitric Acid (HCA): This natural product, obtained from the Garcinia cambogia plant, has received wide attention as a nutraceutical ingredient for weight control. Recent studies have affirmed that HCA is a competitive inhibitor of the enzyme ATP citrate-lyase, which inhibits lipogenesis in the body. HCA increases fat metabolism with a decrease in glycogen utilization during endurance exercises, resulting in higher performance.5 Topical applications of HCA could provide increased fat metabolism during exercise, resulting in body slimming and reduction of localized fat deposits. Niacinamide hydroxycitrate is a newly INCI-listed derivative of HCA that combines the cellular metabolism-enhancing benefits of niacinamide with fat metabolism enhancing benefits of HCA.4

Forskohlin (Coleus forskohlii): Adenylyl cyclase is a target enzyme of multiple G-protein-coupled receptors. Classic adenylyl cyclase inhibitors show an isoform-dependence. Forskolin, a diterpene extract from Coleus forskolii, markedly enhances isoform selectivity via its direct action on adenylyl cyclase to increase the intracellular levels of cyclic AMP. The biochemical mechanism of maintaining or increasing lean body mass is related to the availability of cyclic AMP. By facilitating hormonal action, cyclic AMP may regulate the body's thermogenic response to food, increase the body's metabolic rate and increase utilization of body fat (since thermogenesis is preferentially fueled by fatty acids derived from body fat and/or food).6 This has found applications for Forskohlin in body fat management via nutraceutical delivery systems. Forskohlin, in combination with HCA, could provide novel nutracosmetic formulations for body fat and body shape management.4

Where is Fat?



Source: How Stuff Works

Help for All those Aches and Pains

Popular muscle and joint nutraceuticals, such as MSM, glucosamine and chondroitin, are commonly available in various oral dosage forms, either alone or in combination. For example, the combination of MSM with glucosamine and chondroitin provides synergistically enhanced pain relief.7 Glucosamine and chondroitin are chemically related. The role of anti-inflammatory agents and antioxidants (that act via their inhibition of COX and LOX enzymes) in controlling muscle and joint problems has been well recognized. Nutracosmetic formulations can provide highly efficacious combinations of popular nutraceutical muscle and joint ingredients with synergistic anti-inflammatory and antioxidant ingredients. The topical delivery systems of unprecedented configuration can thus be developed to provide superlative, high performance muscle, arthritis and joint-beneficial products.8

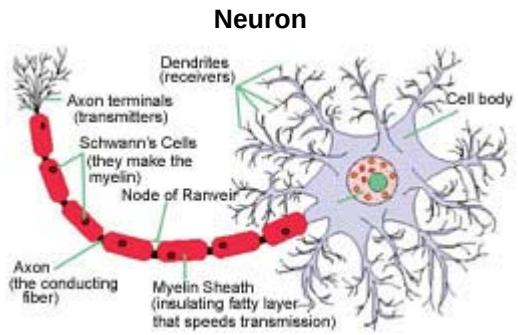
The chart above includes several anti-inflammatory agents that can be combined with popular nutraceutical ingredients offering incremental benefits. Magnolia bark extract, a more familiar antioxidant ingredient, has missed its share of market attention in anti-inflammatory applications. Refined versions of this ingredient contain very high levels of honokiol and magnolol, two chemically related substances that possess potent anti-inflammatory activity.

Horse chestnut extract is well known for its veinotropic benefits for spider veins reduction and hemorrhoid control. Purified forms of horse chestnut plant are available as escin and esculin, both of which have good anti-inflammatory effects. Escin is especially attractive due to its better water solubility. Turmeric extracts have long been used for anti-inflammatory applications in both topical and nutraceutical preparations. However, its intense yellow color (from curcuminoids) is not very suitable for nutracosmetic applications. The hydrogenated versions of curcuminoids,

tetrahydrocurcuminoids, are pale yellow to off-white ingredients that possess excellent anti-inflammatory properties and are better suited for nutracosmetic applications.

Ginger contains gingerol and gingerone, two closely related substances that have chemical backbones similar to curcuminoids. Gingerol and gingerone both possess antioxidant and anti-inflammatory properties. The commercial availability of highly purified forms of gingerol and gingerone should make them more suitable for nutracosmetic applications.

Ursolic acid (from rosemary plant) and oleanolic acid are two chemically related triterpenes that, like other triterpenes and diterpenes such as asiaticoside (from Centella asiatica), sericoside (from Terminalia sericea), ruscogenins (from Ruscus aculeatus, or butcher's broom), boswellic acid (from Boswellia serrata) and darutoside (from Siegesbeckia orientalis), possess good anti-inflammatory activity. Ingredient suppliers need to market purified harpagoside (from Harpagophytum procumbens, or devil's claw) and promote its anti-inflammatory benefits for nutracosmetic applications. However, some of these terpenoids are poorly soluble in water and other common cosmetic ingredients. Special techniques are required to enhance their bioavailability in topical formulations.4



Source: Enchanted Learning.com

Where Are My Glasses?

Memory-enhancing ingredients are a rapidly growing category in nutraceutical markets. The development of topically effective nutracosmetic products combining the knowledge of nutraceutical industry with modern cosmetic ingredients and delivery systems is a promissory new area. Popular memory-enhancing nutraceutical ingredients such as vincamine, vinpocetine, vinburnine, yohimbine and huperzine (all of which have alkaloid bases) can now be formulated in cosmetic delivery forms. Vinpocetin and its analogs facilitate cerebral metabolism by improving blood flow to the brain, boosting brain cell ATP production and increasing utilization of glucose and oxygen by neurons. These vinca alkaloids also increase the production of noradrenaline and dopamine, contributing, in this way, to the release of serotonin and the concentration of acetylcholine. Imagine, now consumers can have a great facial moisturizer that can also provide memory enhancement benefits! The enhancement of topical bioavailability of such alkaloidal nutraceuticals has been achieved via recently disclosed Ion-Pair delivery systems. 4

Vincamine is obtained from vinca (periwinkle) plants and Crioceras longiflorus, an African plant. Vinpocetine and vinburnine are slight chemical modifications of vincamine, which provide improved efficacy due to their enhanced bioavailability. Yohimbine is extracted from the bark of yohimbe. It has excellent vasodilatory properties. Huperzine is obtained from club moss (Huperzia serrata), which has been used for Alzheimer-type symptoms in Chinese folk medicine for centuries. The availability of a highly-purified form of the active ingredients from these traditional phytomedicinal plants has now made possible their formulation in nutracosmetic products that can offer product stability, cosmetic elegance and enhanced topical efficacy.

Brain cells, especially neurons, contain a higher level of fatty materials than cells of other body parts. For example, Axon, an integral moiety of neurons, is coated with myelin, which is 70-80% lipids and 20-30% protein. Since fatty materials (especially those with unsaturated chemical bonds) are prone to oxidative damage, the inclusion of appropriate antioxidants in topical memory enhancement formulations, especially those that can penetrate the blood-brain barrier, is prudent.

Nutracosmetic Moisturizers for Diabetic Skin

Diabetic skin is prone to problems associated with poor circulation and poor blood clotting. It usually requires prolonged healing periods from even minor surface cuts and abrasions. The skin surface appears discolored due to poor microcirculation and easily ruptured capillaries. Skin dehydration frequently accompanies diabetes. Botanical extracts suitable for a cosmetic cream formula to help alleviate symptoms of skin disorders related to diabetes are now available. These are better formulated in combination forms to increase their benefits and bioavailability.

Vaccinium myrtillus (bilberry) increases the strength of capillaries to help microcirculation. In Germany, it is approved as a drug for the treatment of diabetes mellitus. It also has antiseptic properties to help heal surface wounds of diabetic skin.

Gymnema sylvestre has been used in India since ancient times. It has been shown to help diabetes I (no insulin production by pancreas) by stimulating the pancreas.

Momordica charantia contains a natural hypoglycemic peptide (polypeptide-p, or p-insulin) that helps body control and manage sugar tolerance in diabetics. It also helps skin dehydration.

Trigonella foenum-graecum (fenugreek) contains trigonellin, an alkaloid known to possess antidiabetic activity. It also helps control skin disorders. Banaba is a popular medicine plant in the Philippines and is used in the treatment of diabetes mellitus. Corosolic acid has been identified as the active component in banaba. This ingredient has found limited applications in nutracosmetics due to unavailability of corosolic acid in high activity (90%+) form.

New Opportunities Exist

Relative to the use of nutraceutical ingredients in nutracosmetic formulations, their physical form and purity level play an important role. The extracts that may have received popular acceptance as (ingestible) nutraceuticals may not be preferred in (topical) nutracosmetic formulations due to their dark color, unpleasant odor, poor solubility or undesirable perception of skin feel. The availability of purified forms of such ingredients that may contain their “active” principles in 80%+ levels with acceptable color and odor features is thus highly desirable. A number of nutraceutical ingredients must be produced in such purified forms before they can be introduced into nutracosmetics. Nutraceutical ingredients suppliers should form cooperative ventures with nutracosmetic formulators for undertaking such business forays to assure their success. Opportunities thus do exist for suppliers, formulators and marketers!

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