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The discovery of new actives from plants – a promise for the next millenium

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Introduction

Man is a very inventive animal and deserves credit for most of the exciting discoveries that have taken place over the last one thousand years. However, nature is even smarter and has proven many times over, that the most significant molecules can be made by her.

A review of naturally occurring active materials

A quick review of some of the most exciting materials, shows that nature can provide some excellent ingredients for the care and protection of the skin.

Aescin or Escin

Aesculus hippocastanum

From the horse chestnut comes aescin or escin, which has anti-inflammatory properties and is particularly good for vascular problems

Allantoin

Symphitum officinale

In comfrey, one can find allantoin, one of the finest materials available for speeding up the process of wound healing, as well as having soothing, healing, and scar reducing properties.

Arbutin

Arctostaphylos uva-ursi

From a rather dull looking bush called bearberry, comes a material that has attracted a great deal of attention (particularly in Japan), namely arbutin, which has skin whitening properties and reduces unwanted skin pigmentation.

Bisabolol

Matricaria recutita

The German Chamomile (and also its close relative the Roman Chamomile, *Anthemis nobilis*) contain azulene derivatives, which are bright blue in colour and bisabolol.

Both of these materials are skin soothing, reduce erythema, are anti-inflammatory and speed the healing process.

Darutoside

Siegesbeckia orientalis

Known in some parts as the Holy Herb or Divine Grass, this plant has been used for generations as a healing plant for various skin diseases. It is a rich source of

darutoside, which gives not only the wound healing properties of the plant, but also the ability to encourage collagen production and so reduce scarring and stretch marks.

Esculoside

Aesculus hippocastanum Esculoside is present in the leaves and bark of the horse chestnut tree. It is listed in Merck as a skin protectant, and other sources cite this material to reduce skin blotchiness and increase capillary resistance. It also has anti-inflammatory properties, reduces oedema and has been shown to have antioxidant activity.

Glycyrrhetic acid

Glycyrrhiza glabra

From liquorice or licorice comes glycyrrhetic acid a powerful healing agent with strong anti-inflammatory properties. Internally, this material has been investigated for the healing of gastric ulcers and mouth ulcers, while externally the material has been shown to be effective in the treatment of chronic eczema.

Rosmarinic acid

Rosemarinus officinalis

From the humble culinary herb rosemary comes rosmarinic acid, a powerful antioxidant. The literature is abundant in the studies relating to the function of rosmarinic acid and cites its use as an anti-viral and antiseptic. It has also been shown to inhibit microvascular injury and inhibit the external oxidative effects of polymorphonuclear granulocytes. The compound is found in many other plant species as well.

Ursolic acid

Arctostaphylos uva-ursi

The bearberry provides ursolic acid, though there are many other plant species that could provide this material. It is anti-inflammatory, anti-elastase, inhibits tumour formation, and has antibacterial activity.

Ferulic acid

Oryza sativa

Rice continues to amaze, since not only is it a staple food, but it is also a prolific provider of beneficial compounds. Ferulic acid is an antioxidant, and is also a photoprotective agent, as you might expect from a molecule that was 4-hydroxy-3-methoxycinnamic acid.

Phytic acid

Oryza sativa

Also from rice comes phytic acid, which is a powerful chelating agent with six phosphate groups in a cyclic configuration.

Gamma-oryzanol

Oryza sativa

Rice produces another material called *gamma*-oryzanol, which is the power behind this versatile plant. It improves the microcirculation, and helps protect the skin against freckles and ageing. In the literature, *gamma*-oryzanol is said to have good absorption

of ultraviolet and will help to protect against sunburn, as well as having the property to protect skin lipids from oxidation.

Caffeine

Coffea arabica

Caffeine could be obtained from a number of plants including guarana (*Paullinia cupana*), but coffee is probably the best known. Recent research has shown, that the treatment of skin with caffeine, has an astringent effect, which is particularly appropriate in those areas of the body that are prone to cellulite and oedema.

Farnesol

Various spp.

Farnesol is found in numerous plant species, including rose petals, lime flowers, ylang ylang, boldo, orange (petitgrain oil), jasmine etc. The action of farnesol is to act as a deodorant by inhibiting the coryneform bacteria.

Naturally occurring active materials to be isolated and established for the next millennium

Surfactants

The availability of natural surfactants is very limited. In addition to natural triterpenoid saponins (as opposed to the steroidal saponins, which have not really been isolated with any purity to date) there is a pure betaine (from *Beta vulgaris*) which might show great promise as both a quaternary surfactant and conditioner.

Natural preservatives

There are a number of nature identical preservatives already on the market, which include the parabens, benzyl alcohol and benzoic acid. The production of hinokitiol in Japan following its discovery in *Chamaecyparis taiwanensis* has proved efficacious, though it is not in the legally permitted list of preservatives. There are dozens of potentially interesting molecules from nature that would have preservative action.

Natural colours

The scope of natural colours is already well developed, however, they are invariably not very stable and prone to fading and discolouration after only a short period of time. Looking forward, it could be an area of discovery, especially if a way was found to modify or protect these molecules.

Natural waxes

The production of natural waxes has decreased, rather than increased. In a recent survey, it was discovered that previously available waxes were no longer commercially available, e.g. Koya wax (*Cinnamomum pedunculatum*), Chinese Vegetable Tallow (*Stillingia sebifera*), Cow Tree Wax (*Galactodendron utile*), Chinese Wax (*Coccus ceriferus*), Ibota Wax (*Lingustrum ibota*) and Sela Wax (*Fraxinus chinensis*).

Natural chemicals

Flavonoids

There needs to be a source of flavonoids, such as apigenin and the related flavonoid glucosides, which are water soluble materials responsible for the improvement in wound healing times and for their anti-inflammatory activity.

Saponins

As mentioned previously, there is a need for natural saponins to act as emulsifiers and foam boosters.

Vitamins

Nature is a prolific producer of natural water-soluble and oil-soluble vitamins, which though expensive would be of interest to the “100% natural” skin care producers.

Sugars and polysaccharides

The polysaccharides are responsible for the mucilaginous substances in aloe vera, seaweed and a multitude of other plants. It would be difficult to extract these materials without degradation, however, the benefits of the final product would be worth the effort. The polysaccharides have been identified for their healing, soothing and skin protective effects.

Conclusion

In the short time available it is not possible to give a full evaluation of the potential growth of naturals in the next millennium, however, it is hoped that this paper has given a tempting insight.