

## PHYTICOSMETICS

# PYCNOGENOL IN COSMETICS

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Almost unknown and not largely used in cosmetics Pycnogenol is a nourishment of various possibilities especially in the light of the new tendency directed towards young people to prevent rather than to heal ageing of the skin. Supported by a huge bibliography and by recent studies in American Universities, this article deals with this product and how it is possible to introduce it as a component in the formulation of cosmetic products.

Pycnogenol is a name registered by the company Horghag Research Ltd and represents an extract from the bark of the maritime pine (*Pinus Pinaster*) studied in 1953 and widely used as a food integrator in the United States. Food integrators include different kinds of substances not sufficiently taken through a normal diet: such as vitamins, mineral salts, substances to increase physical performance or antioxidants to detoxicate the body and prevent pathologies. Pycnogenol belongs to this last category, the antioxidant class, and it is characterized by excellent hydrosolubility

that makes it very easy to be absorbed by the intestine. The main components are bioflavonoids and proanthocyanidins, in particular. The bioflavonoids are a group formed by thousands of components whose chemical structure allows them to present electrons, which is peculiar to antioxidant compounds. They can be found in fruit, vegetables, walnuts, in the seeds of grain, in cocoa and in many drinks, such as green tea and wine. The proanthocyanidins are flavonoids characterized by Pycnogenol and their name comes from the blue colour they give to plants.

Thanks also to the ethnopharmacological studies, the bioflavonoids, that were already known by the Vikings and the Indians of America, have been rediscovered and have aroused the interest of the scientific community thanks to recent studies that have attributed anti-inflammatory, anti-allergic, anti-viral, antimicrobial, antitumoural and immunostimulating activities to them. Prof. Ronald Watson and coll. of the University of Tucson in

Arizona have discovered that Pycnogenol increases the immunitary compounds called "interleukins" and that it can influence the activity of some immune system cells, such as the basophilous, the neutrophilous, the macrophages and the T and B cells. Then again Prof. Watson of the American Society for Biochemistry and Molecular Biology and Prof. Rohdewald in Germany have demonstrated even the ability of Pycnogenol to interact with some cellular process with the enzymes: cyclo-oxygenase, lipoxigenase, A2 phospholipase, C protein kinase, hyaluronidase, NADH-oxidase, glutathione reductase, RNA and DNA polymerase, and others. The mechanism that leads to this range of action should be sought in an interaction with the phosphorylation proteins and with the oxidant process blocked thanks to their antiradical, antilipoperoxidant and antioxygen radical activities. Some authors maintain that there is a reciprocal synergism between vitamin C and bioflavonoids, especially in vivo.

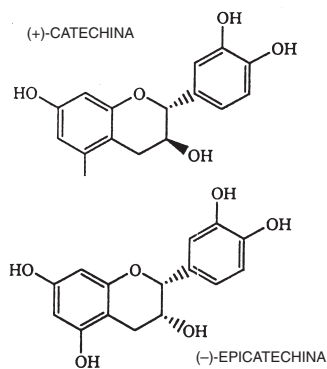


Fig. 1

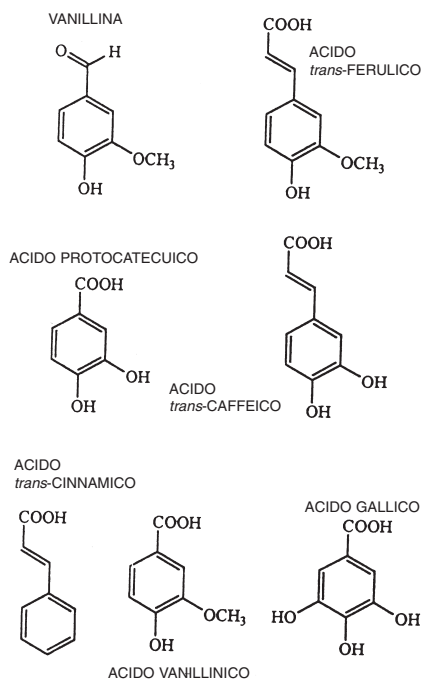


Fig. 2

Let us take into consideration now the rather complex composition of this red-brick extract: 60-65% oligomer proanthocyanidins, 10-15% oligomer flavonoids, 10-15% phenolic acid, and about 1% vanillin, glucose, phenolic acid and polymeric proanthocyanidins. The fraction of the monomeric flavonoids is characterized by catechins, epicatechins and tassipholine (fig. 1) with a strong "sweeper" action of the free radicals and, specifically, tassipholin inhibits some enzymes producers of oxygenated radicals.

Besides the antiradical activity, phenolic acid prevents the formation of nitro-compounds of the aminoacids that are responsible for cancers, allergies and edemas. As well as being a hepatoprotector, the caffeic acid stops the synthesis of the leukotrienes, inhibiting the arachinodate-5-lipoxigenase enzyme (fig. 2).

But the most important action of Pycnogenol is generated by oligomeric proanthocyanidins (OPC): natural polyphenylene oxide contained especially in red grape seeds, green tea and, in high concentration, in the maritime pine bark (fig. 3-4). Let us now leave out the various pharmacological activity of Pycnogenol on the different organs and let us weigh up its use in cosmetics, considering the concept of the "antioxidant substance" again. As the free radicals are of different types, every antioxidant will

act in a different way, according to its solubility. Since the OPC have the characteristic of being very hydrosoluble, they are more active than other substances, like vitamin C and E and other standard antioxidants. In particular, they are very active in the induction phase as well as in the phase of the propagation of the lipid peroxidation. It is obvious that a synergism exists between the OPC and vitamin C and this is demonstrated in nature by the fact that natural vitamin C is protected against oxidation really by bioflavonoids contained in the fruit. With regard to this we can support a theory by which vitamin E is regenerated by antioxidants, that is to say by the ascorbate that is in its turn reactivated by enzymatic systems such as glutathion and lipoic acid taken from food. In turn, the oxidant system may be reactivated by cell reduction enzymes NADH or NADPH subordinates. By using the ESR spectroscopy it was possible to highlight that the time of half-life of the ascorbate radical is increased by flavonoids and also that Pycnogenol is the most active. The proanthocyanidins protect the macrophages from oxidant damage of free radicals and this represents an effective help to the immune system. In particular, the oligomeric OPC inhibit the degranulation of the mast cells, preventing them from releasing histamine

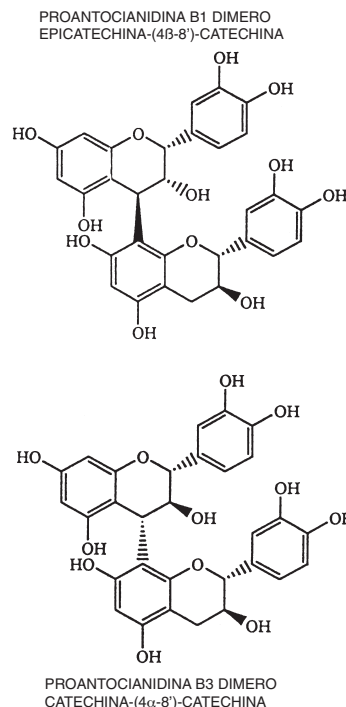


Fig. 3

and other mediators. Prof. White of Nottingham University has discovered that the antihistamine effect of the OPC comes from the block of the decarboxylase histidine enzyme that forms histamine from the histidine aminoacid. The anti-enzyme activity towards some enzymes can be considered very interesting: enzymes such as elastase, collagenase, beta glucuronidase, that is to say the main enzymes involved in the change of the main components of dermis and of extravascular matrix. Considering that vitamin C is necessary to produce collagen, the fact that Pycnogenol pro-

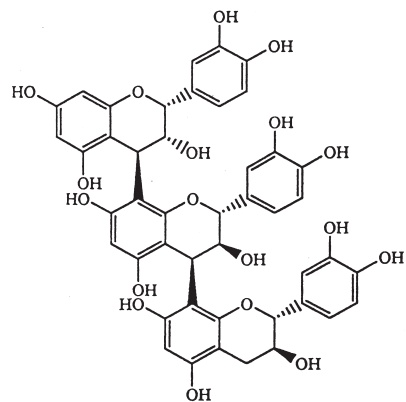
tects Vitamin C really contributes to an effective pharmacological action in all the situations of skin aging and of insufficient peripheral circulation like varicose veins, limphoedema, retinopathies, couperose and telangiectasies. In these last few years, the interest of modern cosmetics to functional groups able to stop free radicals is justified by the fact that they are considered really responsible for skin aging.

Vitamin E and coenzyme Q 10 are well-known and used in cosmetics and vitamin C is living a very interesting period thanks to its ability to regenerate collagen. Pycnogenol, already used by American and Swiss companies in anti-age formulations for some years, is still quite unknown although rapid success is predicted thanks to its marked tropism for collagen and for the substances of the dermis matrix. At this point, the proanthocyanidins in particular can protect and work in synergy with Vitamin C. The remarkable vasoprotector and anti-edemas activities are a fundamental indication in those preparations for couperose

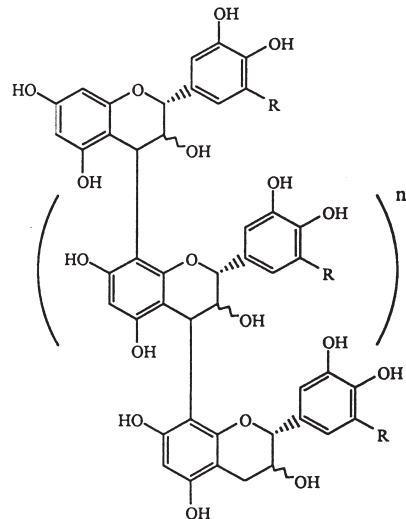
and for eye contours (periorcular edemas). As for cellulitis, the anti-inflammatory activity could extend the usage of these products, but no studies have been carried out on this subject up till now.

Instead the introduction of Pycnogenol in sunprotection products is very interesting. The Canadian researchers Kerr and C.T. McElroy have registered a regular increase of the ozone hole in the stratosphere due to pollution, so as to assert that the radiations UVB that reach the earth are increasing by 35% in winter and 7% in summer. On the base of these results the cell biologist, toxicologist specialist in the antioxidant study Dr. Antti Arstila of Jyvaeskylae University in Finland has demonstrated the protective effect of Pycnogenol.

Considering the dermis alterations produced by sun radiations such as: erythemas, immunologic damages, premature aging and tumours, he could say that Pycnogenol decreases the cytotoxicity due to radiations and inhibits the lipid peroxidation in human fibroplasts cultures. Then he has remarked the "sweeper" effect of the superoxide free radicals generated by the system xanthine-xanthine oxidase in vitro. It must be considered that vitamin E did not produce a similar effect under the same experimental conditions. Another interesting work was carried out by Prof.



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EPICATECHINA-(4β-8)-CATECHINA  
-(4β-8)-CATECHINA



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Miklos Gabor of Szent-Gyorgi Medical University in Hungary, published in the journal *Scripta Phlebologica* in 1994. In this article it was asserted that the anti-inflammatory activity of Pycnogenol prevents the formation of irritation edemas from UVB radiations, improving the permeability of the capillary walls. The fact that the inflamed area presented the highest number of free radicals confirmed the validity of Dr. Arstila's theory on Pycnogenol's ability to eliminate the superoxide free radicals with a consequently decreased cytotoxicity from UVB radiations on fibroblasts and its ability to inhibit the lipid peroxidation.

Obviously, the first advice to keep a healthy, young skin is to live a healthy life with a healthy diet, little stress, exercising, avoiding excessive sunbathing, not smoking, not eating many fats, drinking little alcohol and using skin products over the years. But if someone wants more, Pycnogenol should be taken into consideration, orally as well as cosmetically, considering the properties of these products and especially their non toxicity. Many studies carried out in some Institutes such as Institut Pasteur in Lyon, the Cytotest Research in Darmstadt in Germany and the works of Prof. Pantaleoni and Prof. Quaglino of the Pharmacological toxicity of

the University of L'Aquila, confirm Pycnogenol is not mutagenetic, carcinogenic nor teratogen: it is not toxic.

In conclusion, as for cosmetics, Pycnogenol is a very remarkable product that, if taken in the right concentration (50-120 mg per day orally and at a concentration of 0.5-0.1 for local use) it may be beneficial in preventing skin ageing. As for its most important actions, we can assert that Pycnogenol protects capillaries and skin hydration, prevents and heals UVB radiation damage and helps vitamin C in rebuilding and maintaining collagen. It reduces inflammation and speeds the elimination of the dermis flaking. Its molecular structure is much smaller than that of vitamin E and C and this allows more rapid penetration.

It is hydrosolubile and, the most important thing, it is not toxic and does not provoke dependence. In every way the Pycnogenol is taken, in cream as well as orally, it is a healthy ingredient and a very effective cosmetic.

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