Pale rose

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Pale rose

BOTANY

Rosa centifolia belongs to the Rosaceae family and it is also known as: Common Rose, Pale Rose, Cabbage Rose, Centifolia, Hundred Leaved Rose and Provence Rose. It is a bush and its height is between 0.50-1 m.

Its branches are covered in numerous thorns; the petioles and peduncles have practically no thorns but are covered with glandular bristles. The leaves have between five and seven elliptical glandular leaflets.

The flower is a large rose, scented, with a large number of pink or purple coloured petals. The fruit consists of numerous, very hairy achenes, situated within a large, cone shaped, red, fleshy receptacle.

This rose originated from the Caucasus. It is cultivated in temperate regions of the Mediterranean coast: Syria, Lebanon, North Africa (Morocco) and in the Grasse region (France).

It is harvested before the flowers open so that the petals do not become detached. Harvesting of the rose is particularly delicate. Its worst enemy is the sun: it is for this reason the harvest is carried out at dawn, flower by flower, as quickly as possible. Also, it is at this time of day when the flower is richer in volatile products. An experienced agricultural worker can collect from five to seven kilograms of flowers a day. If this figure seems high, it must be realised that five tons of flowers are needed to obtain only one kilogram of essence, what means less than 1 gram essential oil per hour.

The extract of *Rosa centifolia* is obtained from the petals.

CHEMISTRY

Essential oil

Essential oils are complex mixtures of various components. These components belong, almost exclusively, to one of two groups of different biogenetic origin: on the one hand, the terpenoids and on the other hand, the aromatic compounds derived from phenylpropane, which are much less abundant. Additionally, products coming from the degradation of non-volatile compounds can also be found. Essential oils are liquid at room temperature, volatile and seldom coloured. In general, they are less dense than water, liposoluble and soluble in common organic solvents. They can be dragged by using water steam but are scarcely soluble in water. However, they are soluble enough to give the water a distinct aroma. The so processed water is called “distilled floral water”.

Rose oil is a highly complex mixture of more than 100 different components, phenylethanol being the most abundant one (0.03-1%). Other major compounds are:

- Monoterpenes such as α- and β-pinene, myrcene, geraniol, citronellol, nerol and its acetates, linalool, menthol, citral, rosafurane, etc.

- Sesquiterpenes, mainly farnesol.

- Phenolic acids and their esters: eugenol, eugenol acetate.

- Aldehydes: acetic, benzoic and nonyl aldehydes.

Anthocyanosides

The term anthocyan is applied to a group of red, pink, mauve, purple, blue or violet coloured water-soluble pigments, present in flowers and fruits. These pigments can be found as heterosides (anthocyanosides); their genins (anthocyanidols) derivate of the 2- phenylbenzopyrylium cation, more commonly known as flavylium cation, a name that remarks the fact that these molecules belong to the large group of flavonoids. In general, they are characteristic of flower petals and fruits.

However occasionally, they may be found in the bracts, leaves, petioles and even the roots or bulbs of certain plants.

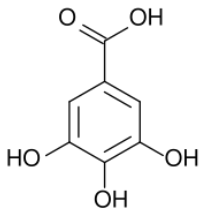
Tannins

Mainly gallic acid and its derivatives (10-24%).

Tannins are phenolic water soluble compounds with a molecular weight between 500 and 3000 that, besides taking part in the classical reactions of phenols, also precipitate alkaloids, gelatin and other proteins. At present, there is a better understanding of the chemical structure of these polyphenols composed of proanthocyanidols that, under acid and high temperature conditions, yield anthocyanosides and the polyesters of gallic and ellagic acids.

Tannins are classified according to their structure and biogenetic origin. According to this classification system, there are two types of tannins: hydrolysable tannins and condensed tannins. Hydrolysable tannins are oligo- or polyesters of a sugar (or a related polyol) and a variable number of phenol acid molecules. The sugar is generally glucose. The phenol acid is gallic acid in the case of gallic tannins and hexahydroxydiphenic acid (HHDP) and its oxidation derivatives in the case of the so called ellagic tannins. Condensed tannins or proanthocyanidols are flavan polymers.

Figure 1. Gallic acid



Other active principles

Amino acids and mucilage.

TRADITIONAL USES

Of all the flowers, the rose has been the favourite of lovers of perfume for more than three thousand years.

Homer described the rose oil, which Aphrodite used to anoint the body of Hector, obtained from soaking the petals in olive oil. The Islamic perfume industry was the first to distil the petals of the Damascus rose. The Persian city of Shiraz was known in the VIII century for its rose water, which it exported to Europe, India and China until the XVII century. Apart from culinary and pharmaceutical use, from the Renaissance until the XIX rose water was much appreciated by Western perfumers.

The perfume industry uses two botanical varieties among the hundreds of known varieties, one of them is *Rosa centifolia* and the other is the Damascus rose.

The flavour of the rose is as delicate and exquisite as its perfume. The Chinese have in their gastronomy, a stew of whole Chinese roses. The Greeks and Romans used rose petals in main dishes and desserts. In eastern Mediterranean and earlier English cooking and since Tudor times, there are

exquisite desserts and main dishes flavoured with roses. Before using rose petals, it is advisable to wash them; dry them well and remove the fleshy stub in the base.

Popular medicine has used rose flowers for the treatment of pain, to stop diarrhoea, in the treatment of chronic gastritis, hepatitis, traumas and blood disorders (Ng, TB. et al., 2004).

The main industrial interest in the anthocyanosides is based on their capacity as colorants since they are natural pigments in which neither acute nor chronic toxicity has been observed in animals (Bruneton, J., 2001).

COSMETIC PROPERTIES

Antioxidant activity

Anthocyanic pigments act in vitro as free radical scavengers (Bruneton, J., 2001).

A number of tannins, especially hydrolysable tannins, inhibit the lipid peroxidation induced by ADP and ascorbic acid on rat hepatic mitochondria. The HHDP esters of glucose are the main in vitro free radical scavengers and inhibitors of the superoxide ion formation; some of them inhibit the rat peritoneal granulocyte lipoxygenase (Bruneton, J., 2001).

Ng TB. et al. (2004) found in a study that the main antioxidant agent present in rose extract was a gallic acid derivative (MW<2.5 KDa) and that a polysaccharide (MW<2.5KDa, 84.74% carbohydrate) and a polysaccharide-peptide complex (MW≥70KDa, 8.57% carbohydrate, 23.12% protein) were also components with some antioxidant activity. Rose extract inhibited the haemolysis of erythrocytes induced by peroxyl radicals (87.5% and 86.2% inhibition per 500 and 100 μmL^{-1} respectively), the lipid peroxidation in a rat brain homogenate (94.4% and 91.9% inhibition per 500 and 100 μmL^{-1} respectively), the formation of superoxide radical (90.5% and 88.4% inhibition per 500 and 100 μmL^{-1} respectively) and the formation of hydroxyl radical (79.3% and 59.8% inhibition per 500 and 100 μmL^{-1} respectively).

Guo, Q. et al. (1996) observed that the anti-free radical activity and the inhibition of lipid peroxidation of (-)–epigallocatechin-3-gallate (EGCG) and (-)–epicatechin-3-gallate (ECG) were stronger than those of (-)–epicatechin (EC) and (-)–epigallocatechin (EGC). EGCG and ECG only differ from EC and EGC because they have an extra gallic acid. This finding evidenced the relationship between structure and activity in regards to the antioxidant activity of gallic acid derivatives.

Trombetta, D. et al. (1998) investigated the efficacy of the antioxidant activity of the essential oils from different Mediterranean plants and spices. They tested the antioxidant activity of 12 essential oils using the bleaching method of the stable radical 1,1-diphenyl-2-picrylhydrazyl (DPPH) and by detecting the relative antioxidant capacity to sequester the radical cation chromogenic 2,2',-azinobis (3-ethylbenzothiazoline-6-sulphonate) ($ABTS^{\bullet+}$)) in comparison with the anti-radical activity of Trolox. Using these studies they determined that the antioxidant activity of the essential oils is due to the presence of phenolic metabolites. In both experimental models, all the essential oils showed strong antioxidant activity, which depended on the concentration of the sample in the reaction mixture. The results also highlight the influence of the phenolic compounds in the antioxidant behaviour of these essential oils.

Thus, pale rose is very useful in formulating cosmetics aimed at protecting the integrity of skin and hair.

Activity as vascular protector and venotonic

The therapeutic relevance of anthocyanosides is focused on their action on the vascular system. Compounds containing anthocyanosides are employed to treat symptoms related to vein and capillary fragility (Bruneton, J., 2001)

Anthocyans have been successfully employed to treat several vascular conditions: capillary fragility (couperosis) and chronic peripheral vein insufficiency. Up to the moment, their capillary protective action has been attributed to their tendency to improve the tonicity and resistance of the capillary walls and to their specific affinity to bind compounds in the elastic fibbers (collagen and elastin) thus making them more resistant to the degrading actions of elastase and collagenase (Muñoz, O. et al., 2003).

Biologic tests with animals based on stain diffusion indicated that anthocyanosides reduce capillary permeability and increase capillary resistance. The activity of these heterosides is possibly related to the role of collagen present in the blood vessel-walls in the permeability of these walls. It seems to be partially due to the inhibition of proteolytic collagen-degrading enzymes (collagenase). Other properties have been evidenced, for example, an anti-oedema action (Bruneton, J., 2001).

The historical concept of capillary protective action is linked to the following observation: some forms of scurvy that were cured by administration of lemon juice could not be cured by administration of ascorbic acid only (vitamin C). Therefore, it was postulated that ascorbic acid could only act in association with a «C_2» or «P» factor, which was first identified *strictu sensu* as flavonoids and later more generally as anthocyanosides and flavan oligomers (Bruneton, J., 2001).

It has been demonstrated that rose essential oils are capable of relieving and often they can even eliminate skin ailments caused by circulation problems. Studies have been carried out which demonstrate that these oils act by repairing ruptured capillaries, reducing redness and improving the general condition of the skin (Brud, et al., 1999).

Thus, pale rose is relevant for cosmetic applications aimed at reducing varicose veins and oedema, draining and stimulating blood circulation in general.

Astringent activity

Local applications of tannins turn the outermost layers of skin and mucosa impermeable, thus protecting the deeper layers. Tannins also have a vasoconstrictor effect on small superficial blood vessels. By reducing the loss of liquids and preventing external injuries, tannins facilitate tissue regeneration (wound healing) in cases of superficial wounds or burning.

This activity makes pale rose useful as cosmetics for the regulation of sebum secretion.

Finally, in the publication *Plants in cosmetics. Volume II. Council of Europe* (2001) there is a monograph on *Rosa centifolia* that mentions its balm, astringent and aromatising properties as well as the possible cosmetic uses of the glycolic rose extract.

Glycolic rose extract concentrations up to 7% are recommended to formulate skin care cosmetics, soaps and detergents for sensitive skin and mucosa, and eye-contour cosmetics.

COSMETIC APPLICATIONS

Action	Active	Cosmetic Applications
Antioxidant	Tannins Anthocyanosides Essential oils	Anti-ageing Photo-protection Hair colour protection
Venotonic/ Vascular protection	Anthocyanosides Essential oils	Anti-varicose veins Stimulant of blood circulation
Astringent	Tannins	Regulates sebum secretion

RECOMMENDED DOSE

The recommended dosage is between 0.5% and 5%.

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