

[REDACTED]

Fragrance ingredients proposed for cosmetic labelling⁽¹⁾

Cranberry Herbasol® Extract PG (Art. N° X10445.01.X)

Below is the list of 26 fragrance ingredients proposed for labelling on cosmetics products in Europe and their presence in **Cranberry Herbasol® Extract PG** as sold.

INCI Name (natural origin)	CAS N°	Results (mg/kg)
Anise Alcohol	105-13-5	<10
Benzyl Alcohol	100-51-6	<10
Benzyl Benzoate	120-51-4	<10
Benzyl Cinnamate	103-41-3	<10
Benzyl Salicylate	118-58-1	<10
Cinnamal	104-55-2	<10
Cinnamyl Alcohol	104-54-1	<10
Citral	5392-40-5	<10
Citronellol	106-22-9	<10
Coumarin	91-64-5	<10
Eugenol	97-53-0	<10
Evernia Prunastri (Oakmoss) Extract	90028-68-5	<10
Evernia Furfuracea (Treemoss) Extract	90028-67-4	<10
Farnesol	4602-84-0	<10
Geraniol	106-24-1	<10
Isoeugenol	97-54-1	<10
Limonene	5989-27-5	<10
Linalool	78-70-6	<10

INCI Name (synthetic origin) ²	CAS N°	Results (mg/kg)
Amyl Cinnamal	122-40-7	<10
Amylcinnamyl Alcohol	101-85-9	<10
Butylphenyl methylpropional	80-54-6	<10
Hexyl Cinnamal	101-86-0	<10
Hydroxycitronellal	107-75-5	<10
Hydroxyisohexyl 3-Cyclohexene Carboxaldehyde	31906-04-4	<10
Alpha-isomethyl ionone	127-51-5	<10
Methyl 2-Octyloate	111-12-6	<10

(1) presence of these substances must be indicated on list of ingredients when its concentration exceeds 10 ppm in leave-on products and 100 ppm in rinse-off products (2003/15/EC Annex III vof 27. February 2003)

(2) these compounds are not found naturally in plants

Figure 1. An Example of a Fragrance Allergen Declaration

1d. Traceability, Fair Trade and Social Responsibility

Consumers are increasingly interested in the “world behind the product” and so traceability, fair trade and social responsibility are becoming more and more important. Ensuring that farmers who grow or gather the plants are not exploited and have a fair deal is often a major target and this includes particularly the use of children as slave labour.

Currently it is challenging to document this requirement for all plants because of the complex supply chain and the extensive number of raw materials but this should remain a valid objective for all raw materials. Although this is currently not a basic request from all customers, it could well become one in the future.



Plant	Sebum regulating	Anti-bacterial	Anti-inflammatory	Anti-irritant	Soothing/calming	Skin healing/regeneration
A						
B						
C						
D						
E						
F						
G						
H						
I						
J						

Figure 4. Plants with properties ideal for blemished skin

Key for figs 4 and 5

	Properties cited in literature
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Similarly for anti-ageing products the following properties could be desirable:

- Stimulate skin regeneration
- Stimulate collagen production or inhibit breakdown
- Protect against UV & harsh conditions
- Anti-oxidant / free radical scavenger
- Presence of phytohormones
- Moisturising/nourishing/smoothing
- Circulatory stimulant
- Anti-swelling
- Astringent

Plant	Skin Regeneration	Collagen	UV protection	Anti-oxidant	Phyto-sterols	Moisturising Nourishing	Circulatory stimulant	Anti-swell	Astringent
K									
L									
M									
N									
O									
P									
Q									
R									
S									

Figure 5. Plants with properties ideal for anti-ageing products

Constructing tables as shown in Figures 4 & 5, where the properties can be tabulated and compared between a number of plant candidates, gives the formulator the possibility of choosing the plant extract to meet the requirements of a particular application.

Natural Ingredients

3b. Plant Actives

Often requests are made for specific plant actives or groups of actives, rather than the properties of the plants themselves. These demands may be very general, such as the level of flavonoids, tannins etc. or they may be very specific in the case of a phytochemical that the formulator has identified as having a technical/functional advantage or one that has been receiving increased publicity in, for example, the nutraceutical or herbal supplement area. The type of information requested for plant actives falls into three

groups, each with an increased level of data requirement :

- Identification of plants high in specific actives
- Analytical data
- Claims substantiation

Let us take a specific example to illustrate this. Fig. 6 shows a list of some plants which are high in rutin. Rutin is a flavonoid or more specifically a flavonol glycoside composed of the flavonol quercetin and the disaccharide rutinose (Fig. 7).

Common Name	Latin Name
Wild pansy	<i>Viola tricolor</i>
Japanese Pagoda Tree	<i>Sophora japonica</i>
Buckwheat	<i>Fagopyrum esculentum</i>
Parsley	<i>Petroselinum crispum</i>
Tomato	<i>Lycopersicum esculentum</i>
Apricot	<i>Prunus armeniaca</i>
Elder	<i>Sambucus nigra</i>
Orange	<i>Citrus sinensis</i>

Figure 6. Plants high in rutin

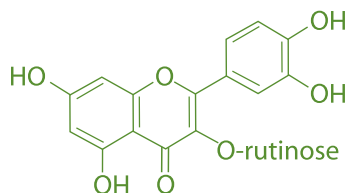


Figure 7. Chemical structure of rutin

Rutin is an anti-oxidant and free-radical scavenger but is often chosen for its vaso-protective properties in applications where anti-couperose activity is required. Rutin can be analysed

by both HPLC and HPTLC. Fig. 8 shows an example of HPTL chromatogram of lemon and orange peel where rutin is identified.

Analytical HPTLC

- Solvent system : ethyl acetate-formic acid-glacial acetic acid -water (100:11:11:26)
 - 1= Lemon peel/MeOH
 - 2 = Bitter orange peel / MeOH
 - T1 = rutin
 - Yellow = rutin
 - Orange = eriocitrin
 - Green band above orange = naringen, neohesperidin & hesperidin
- From Wagner & Blattl

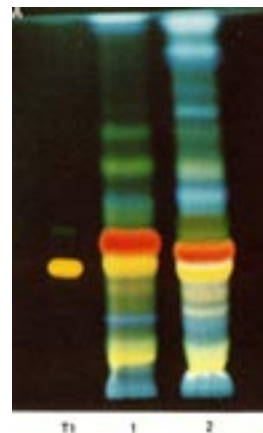


Figure 8. High performance thin layer chromatogram of lemon & orange extracts to show presence of rutin

I have discussed the different levels of information required for an active, using rutin as an example. However, choosing plants according to the presence of one specific active has resulted in what are sometimes inappropriately called “standardised” extracts, where one active is singled out for concentration or even the addition of the purified active. True standardisation should in fact encompass the whole process from plant cultivation through to manufacturing and thus the complete composition of the extract. This debate has been raging for some time in the herbal supplement market. Plants contain a multitude of phytochemicals and these often have more than one property. The activity of actives is often additive or synergistic. A good example is antioxidant activity. This

is often associated with a specific phytochemical group such as the flavonoids or even a specific member of this group. What is sometimes forgotten is that there are a wide range of phytochemicals that have antioxidant properties (Fig. 9). The efficacy of a concentrated extract with a full spectrum of plant actives can be superior to a single isolated active. This is in agreement with the tenets of traditional Chinese medicine, where whole plants are used because it is believed that the effect of the plant is due to a synergy which exists between the constituents. Perhaps the goal should be standardisation for activity rather than for a specific phytochemical. This leads us on to the last information group required for actives – claims substantiation.

Phytochemical	Phytochemical Group
α -tocopherol	Vitamin
Ascorbic acid	Vitamin
β -sitosterol	Phytosterol
Caffeic acid	Phenolic acid
Carotene	Tetraterpene
Catechin	Tannin
Ellagitannin	Tannin
Ferulic acid	Phenolic acid
Gallitannin	Tannin
Ginkgolide A & B	Terpenoid
Kaempferol	Flavone
Lycopene	Tetraterpene
Naringenin	Flavone glycoside
Quercetin	Flavone
Resveratrol	Stilbene
Rosmarinic acid	Phenolic
Rutin	Flavonol glycoside
Shikimic acid	Organic acid

Figure 9. A few examples of phytochemicals with antioxidant activity

3c. Claims substantiation

Substantiation of claims requires that an active or specialised extract is tested in the laboratory, either in vitro using cell culture or chemically measuring activity or in vivo on human volunteers to prove activity. This subject is too vast to be dealt with in detail here but the type of activity that may be tested for includes:

- Skin lightening
- Anti-wrinkle / skin smoothing
- Antioxidant activity / free radical scavenger
- Anti-inflammatory / anti-irritant
- Collagen stimulation
- Cell regeneration / stimulation
- Sebum regulation
- Anti-cellulite
- Antimicrobial