

## Chamomile extract



### BOTANY

*Anthemis nobilis* L. (= *Chamaemelum nobile* L.). Roman chamomile is a member of the Asteraceae (Compositae) family, native to Europe. The stem is procumbent, up to 25 cm tall, glabrous or downy. It grows in dense tufts. Leaves are sessile, alternate, bi- or tri-pinnatifid, finely dissected, with lineal leaflets. In summer, terminal, solitary flowerheads appear, consisting of some 20 ray flowers with white ligule and numerous hermaphrodite disk flowers with yellow corolla, the ends of the anthers ovate and the tip of the style truncate. A flowerhead reaches a maximum of 1 cm in diameter. The fruits are cylindrical achenes, about 1 mm in diameter, the ray ones slightly larger. Pollination is through hymenoptera, although the plant can also self-pollinate. This plant is native to Europe, naturalized in America. It requires well-drained soils and sunlight. It endures frost, drought, nutrients shortage and high alkalinity. Some cultivars tolerate the transit well and can be used as lawn covering grass. *Anthemis nobilis* is taxonomically related to *Matricaria recutita* (German chamomile). Opposite to German chamomile, Roman chamomile is perennial, rather creeping, with more intense aroma and larger flowerheads. Both species have similar chemical composition. The extract chamomile is produced from the flowers of *Anthemis nobilis*.

### CHEMISTRY

#### Essential oil

0.6-2.4%. The essential oil of Roman chamomile flowers mainly consists of esters of the angelic, methacrylic, tiglic and isobutyric acids with aliphatic C4 to C6 alcohols, especially isobutyl angelate. Distillation generates chamazulene, though in very small proportions.

#### Sesquiterpene lactones

Approximately 0.6%. From the germacranolides group, e.g. nobilin.

#### Flavonoids

These include heterosides of apigenin and luteolin.

#### Phenol acids and derivatives

For example caffeic and ferulic acids and their esters with glucose.

#### Coumarins

#### Other active principles

Phytosterols ( $\beta$ -sitosterol, stigmasterol, taraxasterol), catechols (L-epicatechol), choline, inositol, fatty acids (oleic, linolic, palmitic, stearic), triacontane.

## TRADITIONAL USES

Topical applications of Roman chamomile have traditionally been used as a soothing and anti-pruritus complementary treatment for dermatological complaints, as a protective trophic agent to treat cracked skin, excoriations, cuts and insect bites, for ocular complaints due to several causes (fumes, tired eyes, swimming in the sea or in a swimming pool, etc.), as an ache reliever for mouth and throat (gargles, tablets) and for mouthwash and mouth hygiene products (Bruneton, J., 2001). Roman chamomile is traditionally used to prepare cosmetic products and liquors.



## COSMETIC PROPERTIES

### Anti-inflammatory activity

The flavonoid apigenin has been found to exert *in vitro* anti-inflammatory effects on animals, which are stronger than those of indomethacin and last for more than 18 hs post-administration. This activity was ten times stronger than that of matricin and twenty times stronger than that of chamazulene (Alonso, J., 2004).

Flavonoids are believed to exert their anti-inflammatory action on different sites. Several tests showed that flavones block the arachidonic acid pathway by inhibiting the enzymes phospholipase A, cyclooxygenase and lipoxygenase. Furthermore, flavonoids were found to inhibit histamine release. Other possible mechanisms are: blockade of Ca<sup>2+</sup> intake by mast cells and basophils, or stabilizing the mast cells membranes. Flavonoids were also effective in fighting inflammation through their free radical scavenging activity (Carle R. & Gomaa K, 1992).

Besides flavonoids, the azulene in Roman chamomile essential oil has shown *in vitro* anti-allergic and anti-inflammatory activities, through inhibition of histamine release. Intraperitoneal administration of the essential oil into rats (350 mg/kg) resulted in anti-inflammatory (carrageenan test), sedative and antidiuretic activities (Alonso, J., 2004).

Sesquiterpene lactones are also involved in the anti-inflammatory activity of Roman chamomile.

Thus, chamomile extract is recommendable to formulate cosmetic products with anti-irritant activity.

### Antimicrobial activity

This activity is due to the essential oil content of Roman chamomile. All of the essential oils have antimicrobial activity to a greater or lesser degree. This activity can be measured by using the phenol coefficient, which rates the antimicrobial strength or weakness of a certain oil comparing it with that of pure phenol (coefficient = 1.0). Phenol – a component of essential oils – shares some characteristics of alcohol, which result in antimicrobial activity. The highest the phenol coefficient of a certain essential oil, the strongest its antimicrobial activity. Different research studies have confirmed the antimicrobial properties of essential oils, especially on antibiotic-resistant bacteria, such as *Staphylococcus aureus*, which resists methicillin, or *Enterococcus faecium*, which resists vancomycin (Hartman D. & Coetzee JC., 2002).

Essential oils show antiseptic effects against different pathogenic bacteria, even antibiotic-resistant strains. Some essential oils are also effective against the fungi and yeasts (*Candida*) that cause mycosis. The active doses are generally low. In general, the doses calculated for *in vitro* experiments may be used for external applications (Bruneton J., 2001).

Therefore, the extract of chamomile is recommendable to formulate cosmetic products with purifying and antiseptic activity.

Finally, we would like to mention that the reference publication *Plants preparations used as ingredients of cosmetic products. Vol. I* (Council of Europe, 1994), includes a monograph on the glycolic and the oily extract of *Anthemis nobilis* L. flowers, which attributes them the following cosmetic effects and recommends the following maximum concentrations:

- anti-pruritus, soothing, refreshing, natural hair dye
- up to 5% as an anti-irritant agent in preparations for sensitive skin, mucosa and eyelids. Sunprotection products.
- other possible effects: anti-inflammatory, anti-irritant, mild antiseptic

**Recommended concentration: 3 to 5 %**

### BIBLIOGRAPHY

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- Web sites:  
[www.fitoterapia.net](http://www.fitoterapia.net)