



The genus *Anthemis*—medicinal use of a nonmedicinal plant

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Chamomile (*Matricaria recutita* L.) is one of the most widely used and well-documented medicinal plants in the world and it is included in the pharmacopoeia of 26 countries. It is used primarily as a sedative, anxiolytic and antispasmodic as well as a treatment for mild skin irritation and inflammation.

The genus *Matricaria* comprises approximately 130 species, primarily Mediterranean flowers, although some species can be found in southwest Asia and South Africa. *Matricaria recutita* L. is a herbaceous plant indigenous to Europe and western Asia. Nowadays, it is mainly cultivated in Europe, South America, and, to a lesser extent, in Africa.

In Bulgaria it is a preference to collect your own herbs. But it is thought that there are two types of chamomile – the medicinal one (genus *Matricaria*) and the nonmedicinal (genus *Anthemis*). The two plants are from the same family (*Asteraceae*) and look very similar, but the natives may differ the two kinds and collect only the "medicinal" one and avoid the other. But in recent years the presence of phenolic compounds in species of the genus *Anthemis* has been established which determine its antioxidant effect and its therapeutic application which may be used to treat different medical conditions.

Chamomile is used both internally and externally to treat an extensive list of conditions. It is used externally for wounds, ulcers, eczema, gout, skin irritations, neuralgia, sciatica, rheumatic pain, hemorrhoids, mastitis, and leg ulcers. Chamomile is also extensively consumed as a tea or tonic. It is used internally to treat anxiety, hysteria, nightmares, insomnia and other sleep problems, convulsions and even delirium tremens. One of chamomile's main roles is as a multipurpose digestive aid to treat gastrointestinal disturbances including flatulence, indigestion, diarrhea, anorexia, motion sickness, nausea, and vomiting. Chamomile



mile is thought to heal ulcers and act as an herbal bitter to stimulate the liver.

Main active constituents are chamazulene, apigenin, and bisabolol. Chamomile's essential oil comprises 0.5% to 1.5% of the flower head. One hundred twenty chemical constituents have been identified in chamomile including terpenoids, flavonoids and coumarins. The essential oil of chamomile is a light blue color due to the terpenoid chamazulene. Chamazulene is an artifact formed during heating and comprises about 5% of the essential oil. It has anti-inflammatory, antiallergic and antispasmodic properties. Bisabolol is a spasmolytic for intestinal smooth muscle. It also has anti-inflammatory, antibacterial, antipyretic, ulcer-protective and antifungal properties. The flavonoids apigenin and luteolin possess anti-inflammatory, carminative, and antispasmodic properties. Apigenin binds to GABA receptors and has a mild sedative effect. The coumarin umbelliferone is reported to be antispasmodic, antibacterial, and antifungal.

In 2019, scientists from the Faculty of sciences at University Badji-Mokhtar, Annaba, did a study designed to determine a phenolic profile, antioxidant, and antibacterial potential of (dichloromethane, ethyl acetate, n-butanol and aqueous) fractions obtained from the aerial parts of plants from the genus *Anthemis*. Spectrophotometric and RP-HPLC analyses were carried out to determine the phenolic profile of each fraction. Antioxidant activity was determined by diphenyl 2-*pycril* hydrazil (DPPH), 2, 2'-azino-bis 3-ethylbenzthiazoline-6-sulfonic acid (ABTS), and β -carotene linoleate bleaching (BCB) assays. Antibacterial activity was determined by the agar diffusion method. The results showed that ethyl acetate fraction contained the highest number of phenolic compounds. Naringin ($68,7 \pm 16,8 \mu\text{g}/\text{mg}$), tannic acid ($47,64 \pm 4,2 \mu\text{g}/\text{mg}$), and quercetin ($44,80 \pm 2,2 \mu\text{g}/\text{mg}$) were found as the major phenolic compounds as judged by RP-HPLC. Also, ethyl acetate fraction exhibited the highest antioxidant activity in DPPH and ABTS assays with an IC₅₀ value of 0,11 and 0,56 mg/mL respectively, while the butanolic fraction demonstrated the highest antioxidant activity in BCB assay (PI = 58,65%). In addition, ethyl acetate fraction showed promising antibacterial activity, with good efficiency against Gram bacteria. *Staphylococcus aureus* (19 mm at 10 mg/disk) was found as the most sensitive bacteria.

Another study from the Sapienza University of Rome, Italy done with *Anthemis cretica* subsp. *petraea* (Ten.) extracts proofed the presence of parthenolide, 9 α -acetoxyparthenolide, tamarixetin, 7-hydroxycoumarin, 4'-hydroxyacetophenone, leucanthemitol, and proto-quercitol. Isolation of the compounds was achieved by using column chromatography while their identification was achieved through spectroscopic and spectrometric techniques. The presence of these compounds is of great relevance. Parthenolide and 9- α -acetoxyparthenolide are chemosystematic markers of the family, thus confirming the correct botanical classification of the species. Conversely, compounds tamarixen,



4'-hydroxyacetophenone and proto-quercitol were identified for the first time in the species and, instead, confirm the tendency of endemic entities to develop characteristic metabolite patterns in respect to cosmopolite species. Moreover, the presence of compounds leucanthemitol and proto-quercitol has ecologic implications and may be linked to this taxon's adaption to dry environments. From a medicinal standpoint, the isolated compounds are endowed with interesting biological activities (antioxidant, neuroprotective, antiinflammatory, antileukemic, proapoptotic, and antidiabetic).

The two studies presented, as well as many others, refute the Bulgarian traditional notions of the nonmedicinal use of the genus *Anthemis* and prove that extracts from it can be used to treat many medical diseases and conditions.

References

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