



## Ethnobotanical and therapeutic uses of camomille

Mahmoud Bahmani<sup>1</sup>, Kouros Saki<sup>2</sup>, Hannaneh Golshahi<sup>3</sup>, Mahmoud Rafieian-Kopaei<sup>4\*</sup>,  
Narges Abdali<sup>1</sup>, Ahmad Adineh<sup>1</sup>, Farshad Namdari<sup>5</sup> and Fariba Bahmani<sup>6</sup>

<sup>1</sup>Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran

<sup>2</sup>Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>3</sup>Department of Pathology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

<sup>4</sup>Medical Plants Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran

<sup>5</sup>AJA University of Medical Sciences, Tehran, Iran

<sup>6</sup>Shohada Hospital of Dehloran City, Ilam University of Medical Sciences, Ilam, Iran

### ABSTRACT

The chamomile (*Matricaria achemomilla*) belongs to Astraceae family that is native of Mediterranean moderate temperate and Asia, and has high pharmaceutical, nutritional, cosmetical and hygienic values. Because of active ingredients in the chamomile's extract and essence such as terpenoids, ceraizin, coumarin, spiroter and flavonoids (including epigenin, luteolin, camazolin, bizabolol, sesquiterpene), lactones (such as matricarin), polysaccharides, capric and nonnilic ethers, amplifrons, amino acids, fatty acids, phenolic acids, choline, and coumarin, matricin, bizabolol and its oxides and the cis & trans of ton-in-di-cycloether alpha-bizabolol and azolen has major effect in the treatment of various diseases of the nervous, digestive, respiratory, reproductive, muscular and skeletal systems. It is a valuable plant that can play an important role in the treatment of human diseases. In this paper, chamomillae plant is presented in various aspects such as ecology, species, health effects, ingredients, side effects, carcinogenic or mutagenic and disuse occasions.

**Keywords:** Chamomile, Therapeutic properties, Effective ingredients, Diseases, Medicine

### INTRODUCTION

Chamomile is one of the most important remedies and one of the most widely used medicinal plants in Europe, Middle East, North America, Australia and Africa. Due to its growing usage of its essential oil in the pharmaceutical industry, cosmetics, perfumes and food flavoring preparations, study the properties and characteristics of this medicinal plant is very important. Therefore, in this paper, chamomillae plant is presented in various aspects such as ecology, species, health effects, ingredients, side effects, carcinogenic or mutagenic and disuse occasions <sup>[1]</sup>.

#### History

The latin name of camomille is taken from Greek words Khamai and Malon with the meaning of small flowers with the scent of apples. German chamomile (*Matricaria chemmomilla*) is native to temperate regions of the Mediterranean and Asia Minor and also it belongs to the family Astraceae. Nowadays this plant can be found in Europe, North America and Australia. It has Gray-green leaves flowers with yellow centers and white petals surrounded them. Flowers of this plant smell the apple. German chamomile grows in prairies and sandy soils. Its stem is green and whitish. Its leaves are small with narrow and irregular the cuts covered with shaggy <sup>[2][3]</sup>.

#### Scientific classification

The scientific classification of chamomile is given in Table 1.

Kingdom	Plantae
(unranked)	Angiosperms
(unranked)	Eudicots
(unranked)	Asterids
Order	Asterales
Family	Asteraceae
Tribe	Anthemideae
Genus	<i>Matricaria</i>
Species	<i>M. chamomilla</i>

### Botanical characteristic

The height of chamomile plant shows verity between 30 and 70 cm. Its stem contains branches ending to capitols with a diameter of 1-1.5cm. It enjoys tubular and disk flores at the end of stem. 12 to 18 White lateral disk flowers located in every inflorescence are female. Yellow tubular flowers placed in the middle of receptacle are bisexual. They will be cylindrical after disclosing. Early receptacle has a hemispherical shape that during blooming it enlarges and its form changes to hollow cone. Flower diameter is 15-30mm.

One of distinguishing feature of *Matricaria chemmomilla* is the existence of vacuity space between flowers. If flowers cut longitudinally, the gap is observable while there is not in other species. In addition after these flowers disclose and develop their shapes change to cone shape. Chamomile developmental stages divide to 3 stages: 1. initiating of flower opening (tubular flowers are still closes). 2. More than 13 and less than 34 of open tubular flowers. 3. Flower starts growing old, in this stage more than 34 tubular flowers open (figure 1) <sup>[4]</sup>.



Figure 1. *Matricaria chemmomilla*

Chamomile has spindle-shape root and penetrate in surface depth of soil. Leaves are narrow incision and needle shape. The leaves are smooth and crack-free and have alternate position with each other <sup>[5]</sup>. The fruit is a gray or light yellow achene with length of 1-1.5 mm. The fruit divides to two parts; onyze involves 20-25% fruit containing seeds. The rest part is dried tubular flowers. One thousand seed weight is 2-3 percent gr <sup>[6]</sup>.

### Ecological aspects of herb

Chamomile is of Mediterranean plants and heating requirements are moderate. Germination starts at 6 to 7 °C, but the optimum temperature for germination is 20 to 25 degrees Celsius. The average temperature of 19 to 20 °C is optimal while growing. In general, the temperature is of the ecological factors affecting the physiological and biochemical properties of the plant. Study results show that the temperature rising decreases the wet material, a single flower weight and number of days from germination stage to full flower opening stage. The amount of Apigenin and essence is increased with increasing temperature. Chamomile is not sensitive to chilling temperature during ZRT stage. But the coldness of spring at its stem thickening stage, would damage it, stoppe its growth and reduce flower formation.

Chamomile is resistant to salt, but it shouldn't be considered as halophile plant because in the absence of sodium

salts can grow properly. Chamomile can save salt in its root's cells with amount of 10 mg/gr so it can live in desired situation whereas other plants may get die because of drought.

It should be noted that salinity reduces yield of flower function. Chamomile grows in any soil, but light sandy soils with high amount of lime compounds, is suitable for planting this plant. The soil pH should be between 4.8 and 8, although researches have shown that there is chance of planting in alkaline soils, too <sup>[7][8]</sup>.

### The species of *Matricaria*

*Matricaria acutiloba*, *Matricaria albida*, *Matricaria arabica*, *Matricaria arlgirdensis*, *Matricaria aurea* (Loefl.) Sch. Bip., *Matricaria auriculata*, *Matricaria brachyglossa*, *Matricaria burchellii*, *Matricaria capitellata*, *Matricaria confusa*, *Matricaria coreana*, *Matricaria corymbifera*, *Matricaria courrantiana* DC. (Crown Mayweed), *Matricaria decipiens*, *Matricaria dichotoma*, *Matricaria discoidea* DC. (Disc Mayweed, Pineapple Weed, Rounded Chamomile), *Matricaria fuscata*, *Matricaria glabra* (synonym of *Otospermum glabrum* (Lag.) Willk.), *Matricaria glabrata*, *Matricaria globifera*, *Matricaria grandiflora*, *Matricaria hirsutifolia*, *Matricaria hirta*, *Matricaria hispida*, *Matricaria intermedia*, *Matricaria lamellata*, *Matricaria lasiocarpa*, *Matricaria laxa*, *Matricaria macrotis*, *Matricaria melanophylla*, *Matricaria microcephala*, *Matricaria nigellifolia*, *Matricaria occidentalis* Greene—Valley Mayweed, *Matricaria otaviensis*, *Matricaria pinnatifida*, *Matricaria recutita* L. (German Chamomile, Scented Mayweed, Wild Chamomile) Common Chamomile, *Matricaria raddeana*, *Matricaria schinzinna*, *Matricaria spathipappus*, *Matricaria subglobosa*, *Matricaria suffruticosa*, *Matricaria tridentata*, *Matricaria tzevelevii* (synonym of *Chamomilla tzevelevii* (Pobed.) Rauschert) <sup>[9]</sup>.

### The therapeutic effects

In the botany and ethno-botany studies several effects have been reported for a plant and chamomile is one of the few precious herb plants with different effects and it is considered as a miracle plant.

The chamomile plant makes nerves and sexual ability strong. It is a brain tonic, diuretic, increases the menstruation of woman and milk secretion in lactating mothers, relieves headaches and migraines and releases bladder stones. If somebody has dribbling of urine the chamomile tea is the best treatment. Chamomile is treatment of low menstrual discharge. For the treatment of sore eye, the chamomile is mixed with vinegar then steamed.

Chamomile tea is drunk to relieve muscle aches. Chewing chamomile flowers is used to heal mouth ulcers. Eating 5 gr of chamomile root with diluted vinegar stimulates sex drive. Chamomile is anti-fever, sedative and stomach tonic. To relieve pain in teething children, they are given to drink chamomile tea. To relieve insomnia and having a quiet and comfortable sleep, it is sufficient ten minutes before going to bed, drink a cup of chamomile tea. Chamomile is effective in the treatment of anorexia, is effective for enteritis and anemia. Chamomile is used for relief of intestinal worms. It is soothing menstrual cramps and jaundice. Chamomile bath is the powerful refreshing. For this purpose, pour a few drops of chamomile essence in a bathtub for 15 minutes and then lie down. To relieve pain, a few drops of chamomile essence were mixed with a tablespoon of almond oil and rub it on the painful area. Chamomile essential oil mixed with almond oil to relieve skin problems such as eczema, hives and itching. To relieve ear pain, squeeze a drop of chamomile oil in the ear to reduce the pain. Chamomile essential oil has an emetic effect in the case of food poisoning. To eliminate backache, joint pain and gout pain, rub chamomile oil on the site. If you wash blonde hair with chamomile tea, you will make it brighter and clearer. Menopause women should drink chamomile tea every day to relieve menopausal disorders. Chamomile is anti-allergy. It cures mal-digestion, and is gastrointestinal antispasmodic, anti-enterobius vermicularis parasite, anti-malaria, anti-gangrene, stomach tonic, appetite enhancer, carminative and anti-flatulence. It relieves nervous diarrhea, prevents gastro-ulcers, uses for food poisoning treatment and curing gastroenteritis, as well as gastrointestinal ulcers. Chamomile enhances memory, strengthens the nerves and brain and has sedative, anti-migraine, hypnotic, anticonvulsant, anticancer, anti-anxiety as well as restlessness, and dizziness, anti-epileptic and anti-seizure activities. This plant is vasodilator, lowers blood pressure. Chamomile has anti-inflammatory effect. It has role in Eczema treatment, preventing and helping treatment of acne and youth rash, anti-swelling and skin redness, skin disinfectant, resolver cutaneous wounds, healing burns, strengthen the skin, tightening pores, and controlling skin infections. The other beneficial therapeutic effects of medicinal plant is enhancing the immune system, antitussive, expectorant, relieve congestion and sore throat, curing colds, lung and laryngeal inflammation, inflammation of the joints, analgesic, muscle relaxant, curing gout pain, controlling symptoms of rheumatic diseases, relieves swelling of kidney and bladder, mal urinate treatment, increase menstruate, strengthening the uterus, decreasing the swelling of the testicles and premature ejaculation, preventing premature labor, management and treatment of menopausal disorders, controlling symptoms of ulcerative colitis, eliminate fatigue, anti-allergic, wound healer, bacteriostatic, bactericidal, and antifungal. It is anti-cancer and is involved in treating the common cold <sup>[10-29]</sup>.

Chamomile has polyphenolic compounds and antioxidant activity. A major part of the chamomile effects in the treatment of diseases have been attributed to these compounds and their antioxidant activities. Antioxidants scavenge free radicals and prevent their deleterious effects on diseases complications<sup>[30-40]</sup>.

#### Cosmetic uses

The use of chamomile as cosmetic has a history as old as the use of medicinal herbs. Its properties are particularly useful for the fragile and sensitive skin to climate change. Chamomile flavonoids moist and soften the skin.

Today, the cosmetics industries are using it alone or in combination with other herbs such as rosemary. Chamomile simple tea can protect the skin when it is used externally on the skin. Shampoo with chamomile turns the hair color to light. The herbal extract is used in shampoos, various kinds of bath foam, soaps and lotions to soften the skin of the consumer. Chamomile extract is one of ingredients of the mask and pre-past washing fluids. Chamomile and its extracts make the hairs lighter, softer and fuller<sup>[41] [42]</sup>.

#### Active ingredients

Chamomile contains terpenoids, ceraizin, coumarin and flavonoids (including apigenin and spiroterers, luteolin), volatile oils, (such as kamazolyn and bizaolol), sesquiterpene lactone (such as matricarin), mucilage, polysaccharides, capric and nonilic ethers, ampliferones, amino acids, fatty acids, phenolic acids, choline, coumarin, routine, 7-glycoside, apigenine and 7-glyoside<sup>[43] [49]</sup>.

Alpha-bizabolol is the most important component of chamomile. Bizabolol has antimicrobial effects<sup>[50] [51]</sup>. Azolen is other important component of chamomile which has anti-edema and inflammation effect<sup>[52]</sup>.

#### Side effects, carcinogenesis or mutagenesis effects

Kamillosan products don't have allergenic potential. There aren't any reports based on carcinogenesis ability. In high dose it is nauseous and usually used alone. It shouldn't be used with astringent herbs such as walnut leaves and quinine. It is not recommended using in heart disease or during pregnancy, even wouldn't be used essential oils topically<sup>[53] [54]</sup>.

### CONCLUSION

The history of treatment of diseases with medicinal plants is as old as the history of living human on the earth, and humans were and are treating themselves by medicinal plants. Humans are not treated only with chemical compounds, they are treated by all natural compounds, too. One of the great blessings of god in nature is the medicinal plants. Unlike chemical drugs, herbals have less side effects and their impact on the human body is more than chemical drugs<sup>[55] [56]</sup>. Herbal medications are used around the world increasingly and there are extensive researches on these are being done<sup>[57] [60]</sup>. One of the widely consumed herbs is chamomile. There are some goods are produced from chamomile such as matricaria mouthwash, anti-septic and wound healing gel and drops of chamomile.

Since the traditional use of medicinal plants is not affordable from economic standpoint and the controlling the pharmaceutical effects is necessary so it has been tried to formulate the herbs in standard pharmaceutical dosage and presented to consumers.

### REFERENCES

- [1] JK Srivastava, E Shankar, S Gupta. *Molecular medicine reports* ,November **2010**,3 (6), 895–901
- [2] LS Baumann. *Dermatologic therapy* ,**2007**,20 (5), 330–342.
- [3] National Center for Complementary and Alternative Medicine. "Chamomile". National Institutes of Health, Retrieved 3 November **2012**.
- [4] Rahimi-Kalavmardi. Cultivated tetraploid and diploid species composition of the essential oils of chamomile and reviewed and compared with samples in Iran. PhD thesis, University of Pharmacy.
- [5] N Dezhnabadi. Chamomile plant that attracts water, saline soils, *Agricultural news magazine*, **1380**
- [6] A Zargari , Tehran University press, Volume 3.
- [7] R Amirbeygi. RhyaftHay Herbs Production and Technology, Publications think Day, **1374**, Vol 1.
- [8] M Hajseydhadi. Effects of sowing date and plant density on growth, yield and amount of active ingredient of chamomile plant. Payan–Namh BS-MS Agronomy, College of Agriculture, Tehran University, **1382**.
- [9] M Bahmani, K Saki, M Gholami-Ahangaran, P Parsaei, A Mohsenzadegan, N Zia-Jahromi . *Middle-East J Scien Res*, **2012**; 12 (2), 260-263.

- [10] J Sarris, A Panossian, I Schweitzer, C Stough, A Scholey, *European neuropsychopharmacology*, **2011**, (12), 841–860.
- [11] O Singh, Z Khanam, N Misra, MK Srivastava. *Pharmacognosy reviews*, January 2011, 5 (9), 82–95.
- [12] D Patel, S Shukla, S Gupta. *International Journal of Oncology*, **2007**, 30 (1), 233–45.
- [13] McKay, L Diane.; JB Blumberg. *Phytother Res*, **2006**, 20 (7), 519–30.
- [14] M Jarrahi. *Nat Prod Res*, **2008**, 22 (5), 423–8.
- [15] BS Nayak, SS Raju, AV Rao. *J Wound Care*. **2007**, 16 (7), 298–302.
- [16] M Cemek, S Kağa, N Simşek, ME Büyükkokuroğlu, M Konuk. *Nat Med (Tokyo)*, **2008**, 62 (3), 284–93.
- [17] JK Srivastava, S Gupta. *J Agric Food Chem*, **2007**, 55 (23), 9470–8.
- [18] C Koch, J Reichling, J Schneelee. *Phytomedicine*, **2008**, 15 (1–2), 71–78.
- [19] R Segal, L Pilote. *Canadian Medical Association Journal*. **2006**, 174 (9), 1281–2.
- [20] M Bianco, C Lúquez, LI De Jong, RA Fernández, *Int J Food Microbiol*, **2008**, 121 (3), 357–60.
- [21] V.M Chandrashekhara, K.S. Halagali, R.B. Nidavani, M.H. Shalavadi, B.S. Biradar, D. Biswas, I.S. Muchchandi. *Journal of Ethnopharmacology*, **2011**, 137 (1), 336–340.
- [22] M.T.L Ielpo, A Basile, R Miranda, V Moscattello, C Nappo, S Sorbo, E Laghi, M.M Ricciardi, L Ricciardi, M.L Vuotto. *Fitoterapia*, **2000**, (71), 101- 109.
- [23] E Middleton. *Heart disease, and cancer*, **2000**, (52), 673- 751.
- [24] R Avallone, P Zanolli, L Corsil. *Phytother Res*, **1996**, 10, 177-9
- [25] R Avallone, P Zanolli, G Puia. *Biochem pharmacol*, **2000**, 59(11), 1387-94.
- [26] Y Clement, G Chapouthier. *Neurosci Biobehav Rev*, **1998**, 22(5), 623-33.
- [27] P Zanolli, R Avallone, M Baraldi. *Fitoterapia*, **2000**, 71 (1), 117-23.
- [28] Y Wang, H Tang, J Nicholson, P Hylands, J Sampson, E Holmes. *Journal of Agricultural and Food Chemistry*, **2005**, 53, 191-196.
- [29] W Carl, L Emrich. *J Prosthet Dent*, **1991**, 66, 361-369.
- [30] S Rahnama, Z Rabiei, Z Alibabaei, S Mokhtari, M Rafieian-kopaei, F Deris. *Neurological Sciences*, **2014**, 1-8.
- [31] M Rafieian-Kopaei, N Shahinfard, H Rouhi-Boroujeni, M Gharipour, P Darvishzadeh-Boroujeni. *Evid Based Complement Alternat Med*, **2014**, 680856.
- [32] S Asgary, A Sahebkar, M Afshani, M Keshvari, Sh Haghjooyjavanmard, M Mahmoud Rafieian-Kopaei. *Phytother. Res*, **2013**.
- [33] SY Asadi, P Parsaei, M Karimi, S Ezzati, A Zamiri, F Mohammadzadeh, M Rafieian-Kopaei. *Int J Surg*, **2013**, 11(4), 332-7.
- [34] H Shirzad, M Shahrani, M Rafieian-Kopaei. *Int Immunopharmacol*, **2009**, 9(7-8), 968-70.
- [35] Z Rabiei, M Rafieian-kopaei, E Heidarian, E Saghaei, S Mokhtari. *Neurochemical research*, **2014**, 39(2), 353-60
- [36] M Gharipour, MA Ramezani, M Sadeghi, A Khosravi, M Masjedi, H Khosravi-Boroujeni. *J Res Med Sci*, **2013**, 18, 467-72.
- [37] P Parsaei, M Karimi, SY Asadi, M Rafieian-Kopaei. *Int J Surg*, **2013**.
- [37] H Shirzad, F Taji, M Rafieian-Kopaei. *J Med Food*, **2011**, 14(9), 969-74.
- [38] M Bahmani, A Zargarani, M Rafieian-Kopaei, M Saki. *Asian Pac J Trop Med*, **2014**, 7(1), 348-354.
- [39] B Delfan, M Bahmani, H Hassanzadazar, K Saki, M Rafieian-Kopaei. *Asian Pac J Trop*, **2014**, 7(1), 376-379.
- [40] N Jafarpour, SA Maleki, M Asadi-Samani, MH Khayatnouri, Gh Najafi. *J HerbMed Pharmacol*, **2014**, 3(1), 41- 45
- [41] A Goldsmith, *Medicinal Plants*, Tehran: Tehran Institute of Publishing and Printing, **1371**, Vol III.
- [42] Ayvrvshh, 100 plants and 1000 uses, published by Nahid, Spring **1369**.
- [43] Amin GH.R, *Iranian Traditional medicinal plants of Iran*, Volume One, Tehran, Department of Health Research, **1370**, 70-1.
- [44] F Moatar and M Shams-Ardakani, *Guide to medicine*, Tehran. Publications of the Academy of Medical Sciences, Iran, **1378**, 17-16.
- [46] DE Frigo, BN Duong, LI Melink, LS Schief, BM Collins-Burow, DK Pace, JA Malachlan, ME Burow, Flavonoid phytochemical regulate activator protein- 1 signal transduction pathway in endometrial and kidney stable cell lines. *J Nutr*, **2002**, 132, 1848-1853.
- [47] P Gardiner. *J Herbs, Spices & Med Plant*, **1999**, 37-55.
- [48] A Gomaa, H Tahia, M Mahmoud, A Esraa. *J Pharmacol Sci*, **2003**, 92, 50-55.
- [48] Nmecz G. *U.S. Pharmacist* **2000**, 23, 115-123.
- [49] E Szoke, E Maday, E Tyihak, IN Kuzokina, E Lemberkovics. *J Chromatogr*, 800 2004, **800**, 231-238.
- [50] Gardiner P. Chamomile. *Longwood Herbal Task*. **1999**, 30, 1-15
- [51] T Balazs, R Tisserand. German chamomile. *Int. J. of Aromatherapy*, **1998**, 1, 15-21
- [52] H Mirheydar, *Herbal Knowledge*. leather 1-7, Book publishing Farhang-Islamic, 1372
- [53] B Dianati. Sides effects and herbal drugs, Spreads August **1380**.
- [54] N Yavari. Secrets of herbs, Spreads and scientific, 1363.
- [55] M Rafieian-Kopaei. *J HerbMed Pharmacol*, **2012**, 1(1), 1-2

- [56] RDE Sewell, M Rafieian-Kopaei. *J HerbMed Pharmacol*, **2014**, 3(1), 1-3.
- [57] A Baradaran , H Nasri , M Rafieian-Kopaei . *J Res Med Sci*, **2014** ,19(4),358-67.
- [58] H Nasri, M Rafieian-Kopaei. *Iranian Journal of Public Health*, **2014**, 43(2),255-257.
- [59] M Rafieian-Kopaei, A Baradaran, M Rafieian. *J Res Med Sci*,**2013**, 18(7), 628.
- [60] N Kafash-Farkhad, M Asadi-Samani, M Rafieian-Kopaei. *Life Sci J*, **2013**,10(8),360-367.
- [61] SA Karamati, H Hassanzadazar, M Bahmani, M Rafieian-Kopaei. *Asian Pac J Trop Dis* ,**2014**,4(2),599-601.
- [62] M Bahmani, M Rafieian-Kopaei, M Jeloudari, Z Eftekhari, B Delfan, A Zargaran, SH Forouzan. *Asian Pac J Trop Dis*, **2014**, 4(2), 847-849.
- [63] B Delfan, M Bahmani, M Rafieian-Kopaei, M Delfan, K Saki. *Asian Pac J Trop Dis* ,**2014**,4(2), 879-884.
- [64] K Saki, M Bahmani, M Rafieian-Kopaei, H Hassanzadazar, K Dehghan, F Bahmani, J Asadzadeh. *Asian Pac J Trop Dis*, **2014**, 4(2), 895-901.
- [65] M Bahmani, SA Karamati, H Hassanzadazar, SH Forouzan, M Rafieian-Kopaei, B Kazemi-Ghoshchi, J Asadzadeh, AGh Kheiri, E Ehsan Bahmani. *Asian Pac J Trop Dis* ,**2014**, 4(2), 906-910.
- [66] B Delfan, M Bahmani, Z Eftekhari, M Jelodari, K Saki, T Mohammadi. *Asian Pac J Trop Dis*, **2014**, 4(2),938-942.
- [67] M Bahmani, M Rafieian, A Baradaran, S Rafieian, M Rafieian-kopaei. *J Nephropathol.* ,**2014**, 3(2),81-85.
- [68] M Bahmani, k Saki, M Rafieian-Kopaei, SA Karamati, Z Eftekhari, M Jelodari. *Asian Pac J Trop Biomed*, **2014**, 4(12), 930-937.