Review Article

Unwind with Beauty: Exploring Chamomile's Cosmetic Values

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ABSTRACT

A popular ingredient in skincare and cosmetics, chamomile is a herb known for its calming and restorative qualities. The two primary species, Matricaria chamomilla (German chamomile) and Chamaemelum nobile (Roman chamomile), contain bioactive compounds like flavonoids, sesquiterpenes, coumarins, and essential oils. Chamomile is perfect for sensitive, reactive, or aging skin because of these components, which also give it potent anti-inflammatory, antioxidant, antibacterial, and skin-soothing properties. By scavenging free radicals, its antioxidant qualities shield stress and early aging, while chamomile's antibacterial qualities make it useful for acne-prone skin, it also aids in wound healing, minimizing scars and enhancing skin texture. Additionally, its moisturizing properties aid in preserving moisture. Additionally, it's hydrating properties aids in preserving moisture.

Keywords: Chamomile, properties, cosmetic value, skin care.

INTRODUCTION

Chamomile, known for its delicate flowers and soothing properties, has been a staple in both traditional medicine and modern skincare for centuries. This small, daisy-like plant, is widely recognized for its therapeutic benefits and versatile applications in cosmetics which belongs to the Astereaceae family. It is derived primarily from two species—Matricaria chamomilla and Chamaemelum nobile —it has found its way into an array of skincare and beauty products, thanks to its unique chemical composition and remarkable effects on the skin.

Historical Significance and Traditional Uses:

The history of chamomile is extensive and extends back to ancient civilizations. Egyptians, Greeks, and Romans revered it for its calming effects and used it extensively in their beauty rituals. Egyptians associated chamomile with the sun god Ra, using it to treat various skin conditions and ailments. The Greeks and Romans used chamomile in their bathwater to promote relaxation and rejuvenation. Because of its pleasant scent and therapeutic qualities, it was frequently used in strewing herbs, cosmetics, and calming balms in medieval Europe. The importance of chamomile as a natural remedy, particularly in skincare, is highlighted by its extensive historical use.

Chemical Composition and Key Components:

The cosmetic efficacy of chamomile is largely attributed to its rich chemical profile, which includes a variety of bioactive compounds. The most prominent constituents are **flavonoids** (such as quercetin, apigenin and luteolin), **sesquiterpenes** (like bisabolol and chamazulene), **coumarins**, and **essential oils**. Because of these substances' well-known anti-inflammatory, antioxidant, and antimicrobial qualities, chamomile is a potent component of cosmetic formulas.

Flavonoids: These strong antioxidants aid in shielding the skin from harm brought on by free radicals. They play a major role in reducing skin irritation and redness.

- **Sesquiterpenes**: Chamazulene and alpha-bisabolol are two primary sesquiterpenes found in chamomile. Alpha-bisabolol helps to calm irritated skin, encourage healing, and improve the absorption of other active ingredients, while chamazulene, which gives chamomile essential oil its blue hue, possesses potent anti-inflammatory and antioxidant qualities.
- **Coumarins**: These compounds contribute to chamomile's ability to fight inflammation and provide a calming effect on the skin.

Cosmetic Benefits of Chamomile:

1. **Anti-Inflammatory and Soothing Effects**: Because of its anti-inflammatory qualities, chamomile is a common remedy for skin that is reactive and sensitive. The bioactive compounds in chamomile, particularly bisabolol and chamazulene, help calm irritation, reduce redness, and symptoms associated with conditions such as eczema, rosacea, and dermatitis.
2. **Antioxidant Protection**: Flavonoids and terpenoids, which are abundant in chamomile, offer strong antioxidant defense. By assisting in the neutralization of free radicals, these antioxidants shield the skin from oxidative stress and early aging. Because chamomile reduces wrinkles, fine lines, and other aging symptoms, it is used in anti-aging formulations.
3. **Skin Repair and Regeneration**: Chamomile's wound-healing properties are beneficial for accelerating the skin's natural repair process. Because bisabolol promotes cell regeneration, it

can be used in treatments that repair damaged skin, lessen scarring, and improve the tone and texture of the skin overall.

4. **Antimicrobial and Purifying Properties**: Chamomile's essential oils, particularly azulenes and flavonoids, possess antimicrobial properties that help combat bacteria and fungi. Because it lessens breakouts and cleanses the skin, chamomile is a useful ingredient in products for acne-prone skin.

5. **Hydration and Moisturization**: Chamomile extracts are known to enhance the skin's natural moisture retention capabilities, providing hydration and preventing trans-epidermal water loss. Because of this, it is a useful component of lotions, serums, and moisturizers, especially for dry and dehydrated skin.

Applications in Modern Cosmetics:

A versatile ingredient in many cosmetic products, such as face cleansers, toners, moisturizers, masks, serums, and even makeup products like concealers and foundations, chamomile is known for its many skin-benefitting properties. All skin types can use it because of its gentle nature, but people with sensitive or troublesome skin will benefit most from it. In addition, chamomile is frequently found in hair care products to calm the scalp, lessen dandruff, and give hair a glossy finish.

A small flowering herb with calming qualities and extensive use in traditional medicine and cosmetics, chamomile comes from a variety of geographical backgrounds, which adds to its appeal on a global scale. The two main species of chamomile used in cosmetics and skincare products are **Matricaria chamomilla** and **Chamaemelum nobile**. Both species are native to different regions and have unique growing conditions that affect their chemical composition, efficacy, and uses.

Origins and Native Regions:

1. **Matricaria chamomilla:**

Matricaria chamomilla, also known as wild chamomile or ***Matricaria recutita***, is native to **Eastern Europe and Western Asia**. It thrives in temperate climates and is particularly well-suited to regions with well-drained soils and moderate rainfall. This particular species of chamomile is widely grown for its medicinal and cosmetic properties in nations like Hungary, Bulgaria, Poland, and Egypt.Due to its adaptability, German chamomile has also spread to other parts of the world, including North America, South America, and Australia, where it grows in both cultivated fields and wild habitats.

2. **Chamaemelum nobile**:

Chamaemelum nobile, also known as English chamomile or noble chamomile, is native to **Western Europe**, particularly in regions like **England, France, Spain, and Italy**. The perennial plant Chamaemelum nobile is perfect for ground cover and lawns because it creeps and grows low to the ground. It prefers well-drained, sandy soils and cooler climates. Roman chamomile is also cultivated in parts of North America, where it has adapted to various environmental conditions.

Global Distribution and Cultivation:

Chamomile's popularity and adaptability have led to its cultivation across a wide range of geographical regions. Today, both chamomile are grown in many parts of the world, including Europe, Asia, Africa, and the Americas. Several factors, such as soil quality, climate, and growing techniques, influence the quality and yield of chamomile crops in different regions.

1. **Europe:** With major exporters including Hungary, Germany, Poland, and Croatia, Europe is one of the world's top producers of chamomile. Hungary is particularly known for producing high-quality chamomile essential oil because of its ideal climate and soil.Roman chamomile is predominantly grown in the UK and France, where it is used extensively in cosmetic and aromatherapy products.

2. **Asia:** In Asia, **Egypt and India** are notable producers of chamomile. Egypt, with its long history of herbal medicine, grows a large quantity of German chamomile, which is exported worldwide. In India, chamomile is primarily cultivated in the northern states such as **Punjab, Himachal Pradesh, and Uttar Pradesh**, where the climate is conducive to its growth. These regions have become significant suppliers to global markets due to their ability to produce chamomile with a high concentration of active compounds.

3. **North America** : Chamomile is also grown in the **United States and Canada**, particularly in areas with temperate climates such as **California, Oregon, and Washington**. The herb is cultivated both on small organic farms and larger commercial operations. Chamomile is frequently cultivated in the United States for use in essential oils, herbal teas, and cosmetic products.

4. **South America and Australia:** Chamomile cultivation has also spread to regions like **Argentina and Australia**, where the herb has adapted well to local climates. These countries have developed their own chamomile industries, contributing to the global supply of both the chamomile.

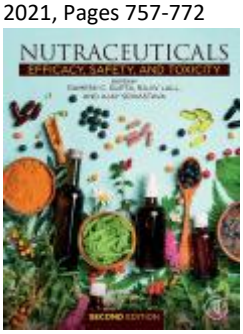
Growing Conditions and Preferences:

Chamomile grows best in temperate climates with well-drained soils and moderate rainfall. German chamomile, an annual plant, prefers full sun and can tolerate a wide range of soils, including sandy and loamy types. It is hardy in USDA zones 4-9, making it suitable for cultivation in various parts of the world. Roman chamomile, being a perennial, is more tolerant of cooler temperatures and can thrive in partial shade. Because of its mat-forming growth habit, it is frequently grown as a ground cover or in lawns and is also hardy in USDA zones 4–9.

Factors Affecting Chemical Composition:

The geographical origin of chamomile plays a significant role in determining its chemical profile, particularly the concentration of active compounds such as **chamazulene, bisabolol, and flavonoids**. For instance, chamomile grown in Egypt and Hungary tends to have higher concentrations of chamazulene, giving the essential oil a more intense blue color and enhanced anti-inflammatory properties. Meanwhile, chamomile from regions with cooler climates, like Germany or England, may have slightly different compositions, affecting its fragrance and therapeutic benefits.

Research papers published on chamomile

Sr.no	Name of the paper	Therapeutic uses
1	Antioxidant activity of Matricaria chamomilla L. extract and clinical efficacy of cosmetic formulations containing this extract and its isolated compounds[1]	• Effective in protecting skin against oxidative damage. • Due to their antioxidant properties botanical extracts have generated a lot of interest in the cosmetic & skin care industries because of complex makeup & therapeutic qualities. It also has antiallergic, antioxidant and anti-infective properties
2	Chamomile: A Review of Its Traditional Uses, Chemical Constituents, Pharmacological Activities and Quality Control Studies[2]	• It accelerates the healing of skin wounds and is a component of skin-whitening products.
3	*Euterpe oleracea*, *Matricaria chamomilla*, and *Camellia sinensis* as promising ingredients for development of skin care formulations[3]	Used as an antioxidant
4	Nutraceuticals (Second Edition) Efficacy, Safety and Toxicity 2021, Pages 757-772  Chapter 44 - German chamomile[4]	• Used in treatment of small boils. • Used as an antimicrobial • Used as an anti-inflammatory Antioxidant properties
5	A Comprehensive Study of Therapeutic Applications of Chamomile[5]	• Used as antioxidant agent Antimicrobial agent
6	Exploring the Potential of Supercritical Fluid Extraction of *Matricaria chamomilla* White Ray Florets as a Source of Bioactive (Cosmetic) Ingredients[6]	• Used to strengthen the skin barrier • It restores damaged skin cells • It also provides further skin protection against phototoxic effects
7	Extraction of Aromatic Oil from the Flowers of Chamomile Obtained from Palampur, Himachal Pradesh[7]	• Used as an antibacterial • Used as an antifungal agent Using the oil's activity, the essential oil was employed in the production of cosmetic items like cream, gel and soap.
8	A Review of the bioactivity and potential health benefits of chamomile tea (*Matricaria recutita* L.)[8]	• Used as an antimicrobial Antioxidant agent
9	Evaluation of chamomile oil and nanoemulgels as a promising treatment option for atopic dermatitis induced in rats[9]	• Used as an anti-inflammatory Skin inflammations can be treated with chamomile oil
10	Chamomile oil loaded solid lipid nanoparticles: A naturally formulated remedy to enhance the wound healing[10]	• Used as an antimicrobial • Used as an antioxidant • Used as an anti-irritant It has wound healing properties
11	Anti-Inflammatory and Skin Barrier Repair Effects of Topical Application of Some Plant Oils[11]	• Used as an antioxidant Used as an anti-inflammatory
12	A Comprehensive Review on Biology, Genetic Improvement, Agro and Process Technology of German Chamomile (*Matricaria chamomilla* L.)[12]	• Used as an anti-inflammatory Used as an antimicrobial

13	Classification, Distribution, Biosynthesis, and Regulation of Secondary Metabolites in *Matricaria chamomilla*[13]	Used as an anti-inflammatory
14	Health Benefits, Pharmacological Effects, Molecular Mechanisms, and Therapeutic Potential of α-Bisabolol[14]	Used as an antimicrobial
15	German and Roman Chamomile[15]	• Used as an anti-inflammatory • Used as bacteriostatic Used as an antimicrobial
16	A systematic review study of therapeutic effects of Matricaria recuitta chamomile (chamomile)[16]	• Used as an antioxidant Used as an antimicrobial
17	Chamomile, a novel and selective COX-2 inhibitor with anti-inflammatory activity[17]	Used as an anti -inflammatory
18	Extraction, Characterization, Stability and Biological Activity of Flavonoids Isolated from Chamomile Flowers [18]	• Used as an antibacterial • Used as an anti-inflammatory Used as an anti -fungal
19	STUDY OF ANTIMICROBIAL ACTIVITY OF CHAMOMILE OIL[19]	Used as an antifungal
20	Chemical Composition, Antioxidant and Antimicrobial Activity of Chamomile Flowers Essential Oil (*Matricaria chamomilla* L.)[20]	• Used as antimicrobial Used as an anti-oxidant
21	Chapter Chamomile Oil *By*Ompal Singh, Zakia Khanam, Leo M.L. Nollet BookGreen Pesticides Handbook [21]	• Used as an astringent • Also used as an antioxidant Used as an anti -inflammatory
22	Plant hydrolates – Antioxidant properties, chemical composition and potential applications[22]	Used as antioxidant to fight against skin ageing
23	Antiproliferative potential and phenolic compounds of infusions and essential oil of chamomile cultivated with homeopathy[23]	• Used as anti-inflammatory Used as soothing agent and aromatherapy
24	Registration of a new variety of chamomile (Chamomilla recutita (L.) Rauschert) CIM-Ujjwala: A novel source of acetylinic compound [(2z,8z)-matricaria acid methyl ester] for use in cosmetics and pharmaceuticals[24]	Used to reduce hyper-pigmentation of human skin and has great potential applications in the cosmetic and pharmaceutical industries
25	Variability of chamomile (Matricaria Chamomilla L.) populations as a valuable medicinal plant in Albania evaluated by morphological traits[25]	• Used as antibacterial Used as an antifungal
26	EVALUATION OF ANTIOXIDANT CAPACITY FOR SOME WILD PLANT EXTRACTS USED IN COSMETICS[26]	Used as an antioxidant
27	The influence of the extraction temperature on polyphenolic profiles and bioactivity of chamomile (*Matricaria chamomilla* L.) subcritical water extracts[27]	• Used as antioxidant • Used as an antibacterial Used as an anti-inflammatory
28	Supercritical fluid extraction of chamomile flower heads: Comparison with conventional extraction, kinetics and scale-up[28]	Used as anti-inflammatory
29	Valorization of Bioactive Compounds from By-Products of *Matricaria recutita* White Ray Florets[29]	• Used as an antioxidant Used as an antibacterial
30	Characterization of carbonated beverage fortified with chamomile herbal extract[30]	• Used as an anti-inflammatory • Used as an astringent Used as an antioxidant

CONCLUSION

Chamomile's cosmetic values make it a versatile and valuable ingredient in the beauty industry. Its anti-inflammatory, antioxidant, and soothing properties provide numerous benefits for the skin, hair and nails. Its natural, soothing and protective properties provide a range of benefits, making it popular choice for those seeking gentle, effective and sustainable beauty solutions.

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REFERENCES

1. Nóbrega AT, Wagemaker TA, Campos PM. Antioxidant activity of Matricaria chamomilla L. extract and clinical efficacy of cosmetic formulations containing this extract and its isolated compounds. Biomedical and Biopharmaceutical Research. 2013; 10(2):249-61.
2. Dai YL, Li Y, Wang Q, Niu FJ, Li KW, Wang YY, Wang J, Zhou CZ, Gao LN. Chamomile: a review of its traditional uses, chemical constituents, pharmacological activities and quality control studies. Molecules. 2022;28(1):133-8.
3. Garbossa WA, Campos PM. Euterpe oleracea, Matricaria chamomilla, and Camellia sinensis as promising ingredients for development of skin care formulations. Industrial Crops and Products. 2016;83:1-0.
4. Kolanos R, Stice SA. German chamomile. In Nutraceuticals, Academic Press, 2021; 757-772.
5. Sah A, Naseef PP, Kuruniyan MS, Jain GK, Zakir F, Aggarwal G. A comprehensive study of therapeutic applications of chamomile. Pharmaceuticals. 2022; 15(10):1284-9.
6. Pastare L, Berga M, Kienkas L, Boroduskis M, Ramata-Stunda A, Reihmane D, Senkovs M, Skudrins G, Nakurte I. Exploring the Potential of Supercritical Fluid Extraction of Matricaria chamomilla White Ray Florets as a Source of Bioactive (Cosmetic) Ingredients. Antioxidants. 2023;12(5):1092-7.
7. Mithbaokar NA, Bugade SS, Choudhary MM, Rane A, Barve SS, Breed AS. Extraction of Aromatic Oil from the Flowers of Chamomile Obtained from Palampur, Himachal Pradesh. International Journal of Research in Engineering, Science and Management; 2020;3(5):8-14.
8. McKay DL, Blumberg JB. A review of the bioactivity and potential health benefits of chamomile tea (*Matricaria recutita* L.). Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives. 2006 ;20(7):519-30.
9. El-Salamouni NS, Ali MM, Abdelhady SA, Kandil LS, Elbatouti GA, Farid RM. Evaluation of chamomile oil and nanoemulgels as a promising treatment option for atopic dermatitis induced in rats. Expert opinion on drug delivery. 2020 ;17(1):111-22.
10. Gad HA, Abd El-Rahman FA, Hamdy GM. Chamomile oil loaded solid lipid nanoparticles: A naturally formulated remedy to enhance the wound healing. Journal of Drug Delivery Science and Technology. 2019 ;50:329-38.
11. Anti-Inflammatory and Skin Barrier Repair Effects of Topical Application of Some Plant Oils by Tzu-Kai Lin, Lily Zhong and Juan Luis Santiago. *Int. J. Mol. Sci.* 2018;*19*(1):70-76.
12. Chauhan R, Singh S, Kumar V, Kumar A, Kumari A, Rathore S, Kumar R, Singh S. A comprehensive review on biology, genetic improvement, agro and process technology of German chamomile (Matricaria chamomilla L.). Plants. 2021;11(1):29.
13. Wu H, Yang K, Dong L, Ye J, Xu F. Classification, Distribution, Biosynthesis, and Regulation of Secondary Metabolites in Matricaria chamomilla. Horticulturae. 2022;8(12):1135-40.
14. Eddin LB, Jha NK, Goyal SN, Agrawal YO, Subramanya SB, Bastaki SM, Ojha S. Health benefits, pharmacological effects, molecular mechanisms, and therapeutic potential of α-bisabolol. Nutrients. 2022;14(7):1370-8.
15. Sharafzadeh S, Alizadeh O. German and Roman chamomile. Journal of applied pharmaceutical science. 2011(Issue):01-5.
16. Miraj S, Alesaeidi S. A systematic review study of therapeutic effects of *Matricaria recuitta* chamomile (chamomile). Electronic physician. 2016;8(9):3024-32.
17. Srivastava JK, Pandey M, Gupta S. Chamomile, a novel and selective COX-2 inhibitor with anti-inflammatory activity. Life sciences. 2009;85(19-20):663-9.
18. Srivastava JK, Gupta S. Extraction, characterization, stability and biological activity of flavonoids isolated from chamomile flowers. Molecular and cellular pharmacology. 2009;1(3):138-45.
19. Aggag ME, Yousef RT. Study of antimicrobial activity of chamomile oil. Planta medica. 1972 ;22(06):140-4.
20. Stanojevic LP, Marjanovic-Balaban ZR, Kalaba VD, Stanojevic JS, Cvetkovic DJ. Chemical composition, antioxidant and antimicrobial activity of chamomile flowers essential oil (Matricaria chamomilla L.). Journal of essential oil bearing plants. 2016 ;19(8):2017-28.
21. Singh O, Khanam Z, Nollet LM. Chamomile Oil. InGreen Pesticides Handbook 2017. CRC Press. 365-376.
22. Jakubczyk K, Tuchowska A, Janda-Milczarek K. Plant hydrolates–Antioxidant properties, chemical composition and potential applications. Biomedicine & Pharmacotherapy. 2021;142:112033.
23. Ubessi C, Tedesco SB, da Silva CD, Baldoni M, Krysczun DK, Heinzmann BM, Rosa IA, Mori NC. Antiproliferative potential and phenolic compounds of infusions and essential oil of chamomile cultivated with homeopathy. Journal of ethnopharmacology. 2019 ;239:111907.
24. LAL VS, SINGH CC, VERMA R, PADALIA MS, VENKATESHA RV, SARKAR SD, CHANDRA AY, CHATURVEDI NS, SHUKLA S. Registration of a new variety of chamomile (*Chamomilla recutita* (L.) Rauschert) CIM-Ujjwala: A novel source of acetylinic compound [(2z, 8z)-matricaria acid methyl ester] for use in cosmetics and pharmaceuticals. Journal of Medicinal and Aromatic Plant Sciences. 2019;41(1-4):72-8.
25. ZHURI N, GIXHARI B, IBRALIU A. Variability of chamomile (Matricaria. Albanian j. agric. sci. 2019; (Special edition)
26. Stanciu G, Oancea IA, Oancea E, Chirila E. Evaluation of antioxidant capacity for some wild plant extracts used in cosmetics. Rev. Roum. Chim. 2017;62(6-7):553-8.
27. Cvetanović A, Švarc-Gajić J, Zeković Z, Jerković J, Zengin G, Gašić U, Tešić Ž, Mašković P, Soares C, Barroso MF, Delerue-Matos C. The influence of the extraction temperature on polyphenolic profiles and bioactivity of chamomile (*Matricaria chamomilla* L.) subcritical water extracts. Food Chemistry. 2019;271:328-37.
28. Kotnik P, Škerget M, Knez Ž. Supercritical fluid extraction of chamomile flower heads: Comparison with conventional

extraction, kinetics and scale-up. The journal of supercritical fluids. 2007 ;43(2):192-8.

29. Nakurte I, Berga M, Pastare L, Kienkas L, Senkovs M, Boroduskis M, Ramata-Stunda A. Valorization of bioactive compounds from by-products of *Matricaria recutita* white ray florets. Plants. 2023;12(2):396-404.

30. Aamir M, Abid A, Azam I, Ikram A, Saeed F, Afzaal M, Ateeq H, Akram N, Hussain S, Khan MR. Characterization of carbonated beverage fortified with chamomile herbal extract. Food Science & Nutrition. 2024.

31. Srivastava JK, Shankar E, Gupta S. Chamomile: A herbal medicine of the past with a bright future. Molecular medicine reports. 2010 ;3(6):895-901.

32. Singh O, Khanam Z, Misra N, Srivastava MK. Chamomile (Matricaria chamomilla L.): an overview. Pharmacognosy reviews. 2011 ;5(9):82-8.

33. McKay DL, Blumberg JB. A review of the bioactivity and potential health benefits of chamomile tea (*Matricaria recutita* L.). Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives. 2006 ;20(7):519-30.

34. Sah A, Naseef PP, Kuruniyan MS, Jain GK, Zakir F, Aggarwal G. A comprehensive study of therapeutic applications of chamomile. Pharmaceuticals. 2022 ;15(10):1284-9.

35. Miraj S, Alesaeidi S. A systematic review study of therapeutic effects of *Matricaria recuitta* chamomile (chamomile). Electronic physician. 2016;8(9):3024-9.

36. Srivastava JK, Gupta S. Extraction, characterization, stability and biological activity of flavonoids isolated from chamomile flowers. Molecular and cellular pharmacology. 2009;1(3):138-44.

37. Dai YL, Li Y, Wang Q, Niu FJ, Li KW, Wang YY, Wang J, Zhou CZ, Gao LN. Chamomile: a review of its traditional uses, chemical constituents, pharmacological activities and quality control studies. Molecules. 2022 Dec;28(1):133-41.

38. Chauhan ES, Jaya A. Chamomile an ancient aromatic plant-A review. Journal of Ayurveda Medical Sciences. 2017;2(4):8-16.

39. Zadeh JB, Kor NM, Kor ZM. Chamomile (*Matricaria recutita*) as a valuable medicinal plant. International journal of Advanced Biological and Biomedical Research. 2014;2(3):823-9.

40. Sebai H, Jabri MA, Souli A, Rtibi K, Selmi S, Tebourbi O, El-Benna J, Sakly M. Antidiarrheal and antioxidant activities of chamomile (*Matricaria recutita* L.) decoction extract in rats. Journal of ethnopharmacology. 2014;152(2):327-32.