



PHARMACOGNOSTIC AND PHARMACOLOGICAL REVIEW OF MATRICARIA CHAMOMILLA

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ABSTRACT

Matricaria chamomilla L.(Asteraceae) is a famous medicinal herb and it is sold all over the world. Traditional medicine uses it extensively to treat a wide range of illnesses, including infections, neuropsychiatric, respiratory, gastrointestinal, and liver ailments. Additionally, it has calming, antispasmodic, antibacterial, and antiemetic properties. Reports on the taxonomy, description of the botanical and ecological environment, ethnomedical applications, phytochemistry, biological and pharmacological properties, potential industrial applications, and encapsulation of *M. chamomilla* were thoroughly compiled and summarised in this review. On the other hand, phenolic substances such as phenolic acids, flavonoids, and coumarins predominated in *M. chamomilla* extracts. *M. chamomilla* also displayed several biological traits, including antioxidant, antibacterial, antifungal, anti-parasitic, insecticidal, anti-diabetic, anti-cancer, and anti-inflammatory actions. The biological activity of *M. chamomilla* can be improved, as well as its applications, by encapsulating the plant's essential oils or extracts. The results show that *M. chamomilla*'s pharmacological actions support its traditional applications. The essential oils and extracts from *M. chamomilla* did indeed exhibit intriguing antioxidant, antibacterial, antifungal, anticancer, antidiabetic, antiparasitic, anti-inflammatory, antidepressant, antipyretic, anti-allergic, and analgesic effects. The medical use of *M. chamomilla* on people and animals was also its most significant use.

Keywords: Chamomile; ethnomedicinal; Medicinal herb; Antioxidant activity; Antimicrobial activity; phytochemical; pharmacognosy.

INTRODUCTION

One of the most significant therapeutic herbs that is native to southern and eastern Europe is *chamomile* (*Matricaria chamomilla* L.). Additionally, it is grown in Brazil, Germany, Hungary, France, Russia, and Yugoslavia. It was brought to India during the Mughal era, and it is presently grown in Jammu and Kashmir, Punjab, Uttar Pradesh, and Maharashtra. North Africa, Asia, North and South America, Australia, and New Zealand are among the places where the plants can be found¹. The majority of plant biomass is produced in Hungary. It also thrives on Hungary's poor soils and provides a source of income for the area's underprivileged residents. Bulk flower exports to Germany are used to distil the oil. The plant had been grown in Lucknow, India, for nearly 200 years². Chandra originally introduced the plant in Lucknow's alkaline soils in 1964–1965. Blue oil as such is not currently in demand in India. However, *chamomile* flowers are very popular³. The two largest chamomile flower growers at the moment are M/s Ranbaxy Labs Limited, New Delhi, and M/s German Remedies⁴. Ancient Egypt, Greece, and Rome were all familiar with the use of *chamomile* in herbal treatments for thousands of years⁵. A medicine called *chamomile* is listed in the pharmacopoeia of 26 nations⁶. It is a

component of a number of conventional, Unani, and homoeopathic pharmaceutical preparations⁷. The blue essential oil found in *M. chamomilla* flowers, which ranges in concentration from 0.2% to 1.9%, has a number of uses. The main therapeutic properties of *chamomile* are anti-inflammatory, antibacterial, and antispasmodic. One of the most well-known herbs for traditional medicinal purposes is *M. chamomilla*. The plant parts used in traditional *M. chamomilla* applications (flower, leaves, stem, and entire plant⁸). One of the most popular herbal medications in the world is *chamomile (Matricaria recutita)*. In addition to being helpful for general anxiety disorders (GAD) and anxiolytic activity in people with mild to moderate GAD, chamomile (*M. recutita*) also heals skin sores in colostomy patients. This study aims to analyse walking and consumption of *chamomile (M. recutita)* flower infusions on depression in the elderly in Langsat City. Methods This study used a quasi-experimental design with a pretest-post-test control group design⁹. This research was conducted from September to December in Karang Nayar Village, Kech. Langsat Barro Langsat City. This study population was all elderly who met the inclusion criteria, namely: aged 60–74 years, able to walk, not to suffer from arthritis (arthritis), not using walking aids, not experiencing vision problems, not experiencing hearing loss, not participating in gymnastics. outline, free from chronic illnesses including heart disease, high blood pressure, diabetes, and mental illness¹⁰. More than 63 bioactive substances, categorised as monoterpenes (terpene, careen, myrcene, and borneol) and sesquiterpenes (foreseen, chamazulene, a compound with double conjugated bonds that was produced by hydrolysis of proxazoles during distillation and gave the volatile oil its blue colour, and bisabol), are present in chamomile volatile oil, according to Popescu and Pal¹¹. The amount and location of each of the substances varied throughout the *chamomile* inflorescence, depending mostly on the stage of plant development and the time of harvest¹². Although the concentration of volatile oil is higher and the active ingredients are richer in the flowers, it is also found in the leaves, stem, and even the root of the plant. Linalool, geraniol, and -farnesol¹³ are among the components of this plant's volatile oil that are formed from chamazulene. When plants are at their peak blooming, the amount of -bisabol and -bisabol-oxide A and B in the flowers reaches its peak concentration, and then its levels start to decline. The amount of farnesol steadily decreases as the plant grows and develops.

Objectives proposed:

- Obtaining volatile oil,
- Analysis of volatile oil by thin-layer chromatography,
- Analysis of the antimicrobial activity of the volatile oil¹⁴.

Geographic distribution

Matricaria chamomilla (Asteraceae) is indigenous to northern and western Asia, as well as southern and eastern Europe. In addition, it has spread widely and become a native of several nations, including Britain, Australia, and North America. It is now widely cultivated and dispersed. Germany, Hungary, France, Yugoslavia, Russia, Brazil, New Zealand, and North Africa are among the countries that grow the plant. *M. chamomilla* can be found in two distinct regions of Morocco, the first being the region bounded by Tangier, Ouezzane, Souk Larbaa, Moulay Bousseham, and Azilah, and the second by Kenitra, Sidi Slimane, Khemisset, and Rabat¹⁵.

Morphology

The flower heads are heterogamous, pedunculate, and have a diameter of 10 to 30 mm. They are arranged independently. The 1.5-2.5mm long golden yellow tubular florets with 5 teeth always finish in a glandulous tube. The 11–27 white plant blossoms are placed concentrically and range in length from 6–11mm to 3.5mm wild. The container is 6-8 mm broad, initially flat, then subsequently conical, cone-shaped¹⁶. The leaves are tall and slender and bipinnate or tripinnate. The paniculate flower heads, or capitula, are where the flowers are born. The ray flowers in white are equipped. Early to midsummer is when the flowers bloom, and they have a pleasant scent. The blooms have a blue essential oil in them, which gives them a distinctive scent and unique qualities. The oil's distinctive colour, which is chamazulene-related, explains why the plant is also known by the common name blue chamomile. Achene the fruit, is a yellowish-brown colour¹⁷.

- Yellow disc florets.
- White ray florets.

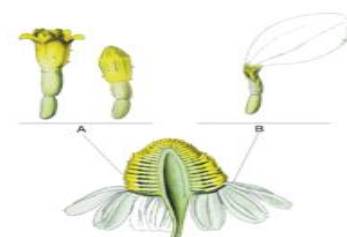


Fig:1 Flowers of *Matricaria recutita*

Taxonomical classification¹⁸:

Kingdom : Plantae

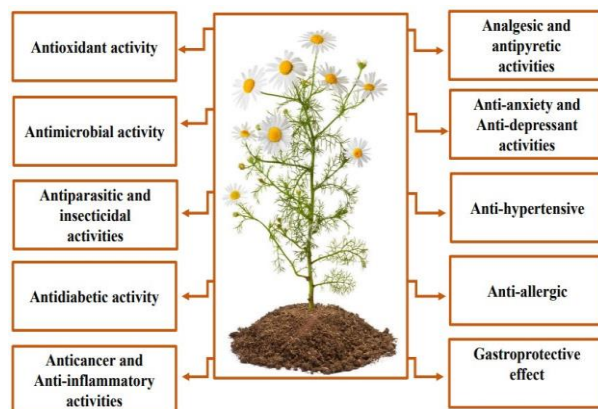
Order : Asterales

Family : Asteraceae

Clade: Angiosperms

Genus : *Matricaria*Species : *chamomilla*

Fig:2 Chamomile flower.

Fig:3 Biological properties of *Matricaria chamomilla***Antimicrobial activity:**

An anti-microbial is an agent that kills micro-organism or stops their growth, anti-microbial activity refers to the process of killing or inhibiting the disease-causing microbes, in order to investigate anti-microbial of *chamomile* flowers different cultures of micro-organism has been used. *Chamomilla* has been shown to have strong antibacterial potential against Gram-positive and Gram-negative bacteria. The referent cultures were kept in incubation at 37°C for 18hrs along with nutritive broth. Inhibition of pathogenic bacteria growth was determined by agar diffusion medium on a solid sterile broth²⁰.

Antioxidant activity;

Antioxidants are substances that prevent oxidation, a chemical process that can lead to the production of free radicals. Anti-oxidation leads to degradation of organic compound including living matters a diet high in antioxidants may reduce the risk of many diseases including heart diseases and certain cancers²¹. In order to investigate antioxidant activity of the isolated *chamomile* flowers DPPH assay was used for the determination of the *chamomile* flower essential oil ability to scavenge free DPPH radicals. Essential oil obtained from chamomile flowers was dissolves in the ethanol and serie of different concentration was prepared. Absorbance at 517 nm was measured immediately after DPPH radical at incubation period of 20,30,60 and 90mins²².

PHYTOCHEMICAL SCREENING OF CHAMOMILE FLOWER (*Matricaria chamomilla*)

Using a standard procedure, fifteen different solvent extracts of the chosen plant species were examined for the presence of various secondary metabolites, such as alkaloids, anthraquinones, glycosides, coumarins, flavonoids, phenols, steroids, saponins, tannins, carbohydrates, and terpenoids²³.

1. Alkaloids test:

- Mayer's technique: A test tube was filled with 2 ml of the extract, 0.2 ml of diluted hydrochloric acid, and 1 ml of Mayer's reagent. Alkaloids are present when yellow precipitate forms²⁴.
- Wagner's test: The Wagner's reagent was applied to 2 ml of the extract. Alkaloids are present when a brown to reddish precipitate forms.

- Dragendorff's experiment: A test tube included 2 ml of the extract, 0.2 ml of diluted hydrochloric acid, and 1 ml of Dragendorff's reagent. Alkaloids are present when an orange-brown precipitate forms²⁵.
2. **Test for flavonoids:**
 - Shinoda's test: 5 ml of 95% ethanol, a little piece of magnesium foil metal, and 5 ml of the extract were combined with a few drops of strong hydrochloric acid. The presence of flavonoids is thought to be indicated by pink coloration.
 - Test for lead acetate: A yellow precipitate that formed after the extract was treated with a few drops of lead acetate solution shows the presence of flavonoids²⁶.
 3. **Anthraquinones test:** 2 ml of the extract was combined with 1 ml of benzene and 1 ml of a 10% ammonia solution. Anthraquinones are indicated by the presence of a pink, red, or violet coloration²⁷.
 4. **Test for glycosides:**
 - Test Keller-Killiani :A trace amount of FeCl₃, 1 ml of extract, 0.4 ml of glacial acetic acid, and 0.5 ml of concentrated H₂SO₄ were also added. Glycosides are shown by the colour blue.
 - Liebermann test: 2 ml of acetic acid and 2 ml of chloroform were combined with crude extract. Ice was used to chill the concoction. A carefully diluted H₂SO₄ solution was added. The presence of glycoside was detected by a shift in colour from violet to blue to green²⁸.
 5. **Test for coumarins:** In a test tube, 2 ml of the extract was treated with 3 ml of 10% sodium hydroxide. If the hue of the solution changes to yellow, coumarins are present²⁹.
 6. **Test for Phenols:**
 - Ferric Chloride: Three to four drops of ferric chloride solution were applied to test extracts. The presence of phenols is indicated by the formation of a bluish-black colouration³⁰.
 7. **Test for Saponins:** 2 ml of plant extracts were combined with 5 ml of distilled water, and the mixture was rapidly shaken for around 30 seconds. The presence of saponins is confirmed if the appearance of foam lasts for at least 15 minutes³¹.
 8. **Test for steroids:**
 - Salkowski test: A test tube containing 2 ml of extract was treated with 2 ml of acetic anhydride acid, 1 ml of chloroform, and 0.5 ml of concentrated sulfuric acid (applied carefully along the test tube's edges). When the test fluid changes colour from violet to blue to green, it means that steroids are present³².
 9. **Test for Tannins:**
 - Lead acetate test: A few drops of 1% lead acetate were added to 2 ml of extract. If yellowish precipitate forms, tannins are present.
 - Braymer's test: After being treated with a 10% ferric chloride solution, 2 ml of the extract was tested for the development of a blue or greenish-colored solution³³.
 10. **Test for terpenoids:** 2 ml of extract were treated with 2 ml of acetic acid, 1 ml of sulphuric acid, and maybe the development of blue-green rings. This demonstrates that terpenoid is present³⁴.
 11. **Salkowki test:** In a test tube, 2 ml of extract was dissolved in 2 ml of CHCl₃. Acetic anhydride, 1 ml, was added. The layer was then created by carefully adding a few drops of concentrated H₂SO₄ along the test tube's wall. Terpenoids are present when a contact has a reddish-brown coloring³⁵.
 12. **Test for Carbohydrates:**
 - Molisch test: 2 ml of the extract was placed in a tube, and 2 drops of the 20% ethanolic solution of -naphthol were added. Without mixing, 1 cc of concentrated sulfuric acid was carefully run down the tube's slides. In the positive test, a reddish violet ring was visible where the two liquids met³⁶.
 - Fehling's Test: Filtrates were heated with Fehling's A & B solutions, neutralised with alkali, and hydrolyzed with diluted HCl. The presence of lowering sugar is shown by the formation of red precipitate³⁷.

Table 1: Phytochemical analysis of different solvent extracts of *Matricaria chamomilla*

Sl. No.	Phytochemical	Petroleum ether	Acetone	Ethanol	Water
1	Alkaloids	+	+	+	-
2	Saponins	-	+	-	+
3	Glycosides	+	-	+	+
4	Tannins	-	+	+	+
5	Flavonoids	+	+	+	+

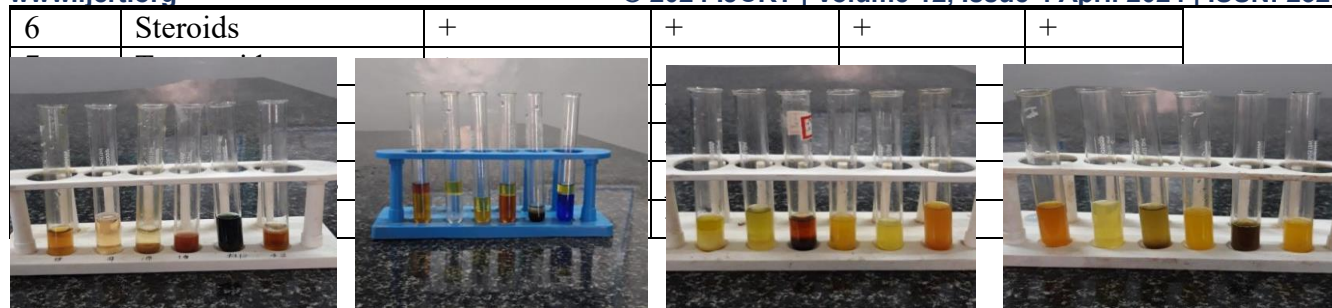


Fig:4 Phytochemical analysis of different solvent extracts of *Matricaria chamomilla*

DISCUSSION AND CONCLUSION:

Traditionally, *M. chamomilla* was used to treat a variety of diseases, including diabetes, nervous disorders, diarrhoea, angina, canker sore, abscess, microbial infections, painful menstruation, antiseptic, anti-inflammatory, sciatic pain, throat, ear, and skin, and stomach disorder. Antioxidant, antibacterial, antifungal, cancer-fighting, antidiabetic, antiparasitic, antipyretic, anti-inflammatory, osteoporosis-fighting, and analgesic properties are also present. Many plants contain different types of phytochemical substances possessing pharmacological properties. These compounds existence in medicinal plant species from the *Matricaria chamomilla* genus has been examined. These phytochemicals existence in this species of medicinal plant (*M. Chamomilla*) has been examined in this study. It has been found that most of the phytochemical compounds are present in all the studies, with variations in the chemical constituents of each solvent extract (Petroleum ether, Acetone, Ethanol, Water).

The presence of phytoconstituents may be responsible to treat various diseases such as microbial infections, antiseptic, anti-inflammatory, antifungal, skin, antibacterial, antioxidant etc. Further, the plant can be studied in detail for its evaluation of various diseases.

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