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Pharmacological Properties of *Matricaria recutita*: A Review

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Abstract: Context and Background: The present review describes the morphological, phytochemical and pharmacology aspects of *Matricaria recutita* (Asteraceae). Chamomile, *Matricaria recutita* L., is a well-known medicinal plant in folk medicine cultivated all over the world. Chamomile essential oil is widely used in pharmaceutic, cosmetic and food industries. The pharmacological effect of chamomile is mainly connected with its essential oil for its spasmolytic, antimicrobial and disinfective properties. **Results:** The pharmacognostical and Pharmacological activity has been studied with phytochemistry. **Conclusion:** From the study, it was concluded that antidiabetic activity on other parts of the plant has not been carried out. Therefore, there is a need and opportunity to carry out the antidiabetic activity on other parts of the plant.

Key words: *Matricaria recutita*, pharmacognosy, phytochemistry, pharmacological profile and antidiabetic activity

INTRODUCTION

Chamomile, a member of the daisy family, is native to Europe and western Asia. *Matricaria recutita* is widely distributed in the tropics and subtropics. German chamomile is the most commonly used. It grows freely everywhere. Chamomile is one of the most widely used and well-documented medicinal plants in the world. It is included in the pharmacopoeia of 26 countries (Salamon, 1992a).

German chamomile (*Matricaria recutita*) and Roman chamomile (*Chamaemelum nobile*) are the two major types of chamomile used for health conditions and both are form compositae family. They are believed to have similar effects on the body, although German chamomile may be slightly stronger. Most research has used German chamomile, which is more commonly used everywhere except for England, where Roman chamomile is more common. German chamomile is considered the more potent of the two, has received more scientific evaluation, and is more widely cultivated than Roman chamomile, it is believed to possess anti-inflammatory, vulnerary, deodorant, bacteriostatic, antimicrobial, anticatarrhal, carminative, sedative, antiseptic and spasmolytic properties (Newall *et al*., 1996a; Blumenthal, 1998). Roman chamomile is believed to possess carminative, antiemetic, antispasmodic and sedative properties.

Chamomile is widely used throughout the world. Its primary uses are as a sedative, anxiolytic and antispasmodic and as a treatment for mild skin irritation and inflammation. Chamomile's main active constituents are chamazulene, apigenin and bisabolol. Despite its widespread use as a home remedy, relatively few trials have evaluated chamomile's many purported benefits. Randomized controlled studies have shown conflicting results for the treatment of dermatologic and mucosal irritations including eczema and mucositis. Animal trials suggest efficacy as a sedative, anxiolytic and antispasmodic, but clinical studies in humans are needed. Chamomile is generally safe for consumption. Although patients with hypersensitivity to ragweed and other family members of the Compositae family should use caution (Salamon, 1992a).

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 (Chamomile, 1993). Chamomile's essential oil is also a treatment for malaria and parasitic worm infections, cystitis, colds and flu (Nemecz, 1998; Anonymous, 1991).

The use of chamomile as a medicinal plant dates back to ancient Greece and Rome. The name "chamomile" comes from two Greek words meaning "ground apple" for its apple-like smell. The ancient Egyptians considered the herb a sacred gift from the sun god and used it to alleviate fever and sun stroke. In the sixth century, it was used to treat insomnia, back pain, neuralgia, rheumatism, skin conditions, indigestion, flatulence, headaches and gout.

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In Europe it is considered a "cure all" and in Germany it is referred to as "alles zutraut", meaning capable of anything (Berry, 1995).

MORPHOLOGY

***M. recutita*:** The annual form of chamomile is also called German chamomile. It grows to 20 inches and has feathery foliage with daisy-like flowers like its cousin. The flowers are scented, but the foliage is not. Roman chamomile is an aromatic creeping perennial which grows only one foot in height. The flower heads are one inch in diameter, with a broad conical disk that is covered in yellow florets surrounded by white florets. It has many freely branching hairy stems and finely divided leaves.

***C. nobile*:** This perennial is also known as Roman chamomile. It can be used as a ground cover since it grows only 4 to 12 inches in height. The foliage is feathery with an apple scent and it is accented by white, daisy-like flowers with down-turned petals. German chamomile is an apple-pineapple scented, smooth, branched annual, which grows two to three feet tall. Its flower head is one inch in diameter and has a hollow conical center covered with tiny yellow florets surrounded by silver-white to cream colored florets. It has erect branching with finely divided leaves.

PHYTOCHEMISTRY

German chamomile:

- **Terpenoids:** α-bisabolol, α-bisabolol oxide A and B, chamazulene, sesquiterpenes
- **Flavonoids:** Apigenin, luteolin, quercetin
- **Coumarins:** Umbelliferone
- **Spiroethers:** En-yn dicycloether
- **Other constituents:** Anthemic acid, choline, tannin, polysaccharides (Newall *et al*., 1996b).

Roman chamomile:

- **Terpenoids:** Chamazulene, bisabolol
- **Flavonoids:** Apigenin, luteolin, quercetin
- **Coumarins:** Scopoletin-7-glucoside
- **Other constituents:** Angelic and tiglic acid esters, anthemic acid, choline, phenolic and fatty Acids

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 (Salamon, 1992b). The essential oil of both German and Roman 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 (Anonymous, 1991).

PHARMACOLOGICAL ACTIVITIES

Antispasmodic activity: An alcoholic extracts of German chamomile inhibited acetylcholine- and histamine-induced spasms. Essential oil of chamomile was comparable to papaverine in reducing isolated guinea pig ileum spasm. Apigenin and bisabolol have dose-dependent spasmolytic effects on isolated guinea pig ileum (Achterrath-Tuckermann *et al*., 1980).

Antiulcer activity: In rats, chamomile flowers and bisabolol inhibited stomach ulcers caused by stressful stimuli, alcohol and indomethacin (Mann and Staba 1986; Szelenyi *et al*., 1979). Healing times for ulcers induced by chemical stress or heat coagulation were reduced by α-bisabolol. Extracts of the flowers of German chamomile had an inhibitory effect on gastric acid secretion (Tamasdan *et al*., 1981).

Anxiolytic and sedative activity: Chamomile extracts significantly reduced locomotor activity in rats (Avallone *et al*., 1996). In ovariectomized rats, inhaling chamomile oil vapor decreased the stress-induced increase of plasma ACTH. The plasma ACTH level decreased further when diazepam was administered along with the chamomile oil vapor. A benzodiazepine antagonist, flumazenil, blocked the decrease in plasma ACTH caused by inhalation of chamomile (Yamada *et al*., 1996).

Uterine tonic activity: An aqueous extract of chamomile enhanced guinea pig and rabbit uterine tone.

Anti inflammatory and antiallergic activity: The anti-inflammatory effects of chamomile are well documented in animals. Bisabolol reduced inflammation, fever and adjuvant arthritis in animal studies. Bisabolol was also an antipyretic in yeast-induced fever in rats. Apigenin has demonstrated anti inflammatory properties in animal studies. It demonstrated potent anti-inflammatory activity in carrageenan-induced rat paw edema and delayed type hypersensitivity in mice (Gerritsen *et al*., 1995; Isaac, 1979; Jakovlev *et al*., 1979; Ammon *et al*., 1996).

Antimicrobial: Antibacterial, antifungal, antiviral activity: The antibacterial and antiviral effects of chamomile have been well documented (Aggag and

Yousef, 1972). An ethanolic extract of German chamomile inhibited the growth of Herpes and Poliovirus (Suganda *et al*., 1983). Compounds in the essential oil of chamomile were effective against *Staphylococcus* and *Candida*. Chamomile's essential oil components, α-bisabolol had the strongest activity against Gram-positive and Gram-negative bacteria. Chamazulene also had strong antimicrobial activity. Spiroethers had weak activity against Gram-positive bacteria but were inactive against Gram-negative bacteria (Kedzia, 1991). German chamomile esters and lactones showed activity against *Mycobacterium tuberculosis* and *M. avium* (Lu *et al*., 1998). Chamazulene, α-bisabolol, flavonoids and umbelliferone displayed antifungal properties against *Trichophyton mentagrophytes*, *T. rubrum*and *Candida albicans* (Kedzia, 1991; Szalontai *et al*., 1976, 1977; Ahmed *et al*., 1994).

CONCLUSION

The multiple benefits of *Matricaria recutita* made it a true miracle of nature. Numerous studies have been conducted on different parts of *Matricaria recutita* but, this plant has not yet developed as a drug by pharmaceutical industries. A detailed and systematic study is required for identification, cataloguing and documentation of plants, which may provide a meaningful way for the promotion of the traditional knowledge of the herbal medicinal plants. In view of the nature of the plant, more research work can be done on humans so that a drug with multifarious effects will be available in the future market.

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