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PHYTOCHEMICAL EVALUATION AND ANTIMICROBIAL ACTIVITY OF *MATRICARIA CHAMOMILLA* LEAVES

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Abstract*:* The purpose of the study was to evaluate the phytochemical manifestations and antimicrobial efficacy of *Matricaria chamomilla* (L.) belonging to the family- Asteraceae. The first step was aimed at studying the effect of different extraction solvents (water, chloroform and methanol). In the second phase of our study, the antimicrobial activity of the extracts was cut into six Microbial subspecies such as Staphylococcus aureus, Bacillus thuringiensis, Escherichia coli and Fusarium sp.. According to disc distribution method, and provided blocking areas from 7 to 15 mm. Therefore, the release had a moderate blocking function and they respond well to at least one microbial species tested other than the fungal flora. However, the methanolic extract of *M. chamomilla* reveals potent activity against Pseudomonas sp. with a limited block 22.5 mm.

Keywords: *Matricaria chamomilla*, Antimicrobial activity, Pruritus, Sinusitus

Introduction*:* *Matricaria chamomilla* is widely known as chamomile. It belongs to Asteraceae family. Chamomilla word was derived from the Greek word "Chamaimelon" means "Earth Apple" as these plants have apple- like odour[1]. It is an annual herbal plant widely used for treating irritation and rashes of the skin. The leaves of *Matricaria chamomilla* are bipinnate or tripinnate, long and narrow. *Matricaria chamomilla* consist of powerful constituents effective against inflammation. It is a very popular medicinal plant. It may also referred as the "star species among medicinal plant" [2]. Recently, it is widely used as traditional plant in domestic as well as international market. It has a high rate of nutritional value, multiple therapeutic effects and it is also used in cosmetics. Various research and scientific use has been proved that mostly this plant is available all over the market in adulterated and substituted form. *Matricaria chamomilla* is a rich source of essential oil and it biosynthesizes various phytoconstituents. Their plant parts have various phytoconstituents. Their plant parts have various effective pharmacological effects[3].

Matricaria chamomilla is indigenous to Europe. Whereas, now it is also cultivated in Asia, Australia, Russia, Hungary, France, etc. At the time of Mughal emperor, it was introduced and grown in India. At present, it is cultivated in Uttar Pradesh, Maharashtra, Punjab, etc[4].

It is widely used as an antiseptic, anti-inflammatory and antispasmodic. Traditionally, *Matricaria chamomilla* have multi-therapeutic effect as it is widely used in multiple diseases like pruritus (i.e. very effective in treating the irritation of the skin), cold cough, headaches, conjunctivitis, dysmenorrhea, digestive disorders, hypertension, anxiety, hair loss, kidney stones, sinusitis etc. It is also effective in several ailments viz., shingles, boils, burns, wounds etc. It is very useful in GIT

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disorders (ulcers, inflammation, flatulence, pharyngitis, bloating, spasm etc.)[5].

Matricaria chamomilla may be mostly used in herbal preparations, may be taken as herbal tea, applied topically or inhaled and may be taken as oral dosage form (capsules, tablets or drops)[6].

Traditional knowledge and cultural behavior are important aspects for the use of medicinal plants. Various researchers have proved that medicinal plants have different bioactive chemicals, components and antioxidant property[7].

Treatment of infectious diseases is based primarily on the use of antibiotics. From the discovery of penicillin by Alexander Fleming in 1929 to this day antibiotics are used especially against bacterial infections. As a result of this overuse, antimicrobial resistance has improved against most antibiotics [8]. For a long time, natural remedies and above all medicinal plants have been a major step forward the medicine of our grandparents, despite the important advances in the pharmaceutical industry, has allowed modern medicine to cure a host of common ailments [9]. About 80%, the world's population benefits from traditional medicine, recognizing false knowledge to our ancestors [10]. In this regard, it is necessary to direct our research into new therapies as well especially in plants that have always been a source of inspiration for new medicines from products secondary metabolism [11]. It is often used as a medicinal plant due to anti-inflammatory, antimicrobial, anti-allergic, anti-hyperglycemic and antispasmodic effects [12]. It is also used in several food industries, cosmetics and pharmaceuticals. Among the first major properties of plants is their ability to produce a wide variety of ecosystems things. In fact, along with common basic metabolites, carbohydrates, proteins, lipids, too usually accumulates secondary metabolites[13]. The latter represents an important source of that molecule can be used by people in various fields such as pharmacology or agri-food[14]. Phenolic compounds are metabolites of the second crop. From a medical point of view, these molecules forms the basis of the practical principles found in medicinal plants [15]. Extraction of active ingredients with a high value added from plant materials, in particular case of phenolic content, which currently attracts many people because of their antimicrobial properties and antioxidant power, a very important step in isolation and phenolic detection combinations. As a result, many authors have investigated the impact of different output conditions in the extraction products of plant-based phenolic compounds [16]. The solubility of phenolic compounds depends on their chemical composition of the plant, which varies from one to other simple compounds in highly polymerized. Vegetable substances can contain various amounts of phenolic acids, phenylpropanoids, anthocyanins, and tannins. This structural diversity is responsible for the wide variety of physicochemical structures that influence the release of secondary metabolites. The purpose of this work is to examine microbial agents that deal with specific human and plant diseases to confirm the plant's medicinal properties and phytopharmaceutical preparations and cosmetics.

Materials and Methods:

A. Collection of plant material: The leaves of *Matricaria chamomilla* were collected from the campus of Shree Swaminarayan Sanskar Pharmacy College, Zundal, Gujarat, India. The leaves have been dried by air in a well-ventilated area until the humidity decreases to a minimum to be digested.

B. Extract Preparation: 100 g of *Matricaria chamomilla* was extracted sequentially with petroleum ether, ethyl acetate and methanol using the soxhlet extractor apparatus. Then, quotes evaporated under reduced pressure using the evaporator material rotates and is allowed to dry in the middle [17]. The incubator is completely dry. Then, dried quotes are reconstituted by 10% DMSO (Methylesulphoxide) for final concentration 100 mg / ml from each extract. The 10% of DMSO is antibacterial.

C. Phytochemical analysis: Appropriate phytochemical testing of other bio-active systems is performed using standard method [18].

D. Cultural adaptation of bacteria: 1 ml of aliquots for 24 h custom test broth organic matter is added aseptically to the agar of nutrients slopes and

incubated at 37 ° C for 24 hours. Bacteria tested Staphylococcus aureus contained two gram-positives ATCC 25923, Bacillus subtilis NCTC 8236) as well two grams of negatives (Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 27853). Bacterial growth was harvested and washed removed by adding ordinary sterile salt. The harvested germs were hung in the right place a standard of normal saline to prepare the suspension containing approximately 108 -109 units for each colony ml (CFU \ ml). The suspension was saved to Refrigerator at 4 ° C until used. Middle number of active organic per ml of stock suspension was determined by the performance of the area method of calculation [19].

E. Anti-bacterial activity: The cup-plate agar method was used with minor modifications to check the antibacterial activity of extracts. 1 ml suspension of bacterial stock suspension (108 -109 C.F.U / ml) were well mixed with 100 ml of sterilized agar agar stored at 45ºC. 20 ml aliquots for nutritious agar was distributed to it sterile Petri-dishes. Agar is left to settle and enter per plate 4 cups (10 mm wide) were cut using sterile cork seed (No. 4), and agar discs removed. Another cup was filled with a sample of 0.1 ml of each extract and allowed disperse at room temperature for two hours. The plates were then incubated for 18 hours at 37ºC. After alternating in incubation, the growth block areas were measured and re-measured median values of two duplicates were recorded. Ampicillin and Gentamicin (10 µg / disc) discs were available used as fine control, while the discs are full by 10% DMSO was used as a negative controller[20].

Results and Discussion: As shown in Table 1, phytochemical research reveals many combinations of bio-active structures. *Matricaria chamomilla* has been revealed presence of sterols, triterpens, flavonoids, saponins, tannins and alkaloids. Ethanol, methanol and petroleum ether for *Matricaria chamomilla* had shown different levels of antibacterial activities against bacteria understudy, whereas, ethyl acetate did not show any clear antibacterial functions[21]. This may be due to the nature of phytochemical components of experimental plants, which showed different parts.

Table I: The result of phytochemical screening of *Matricaria chamomilla* leaves.

Phytochemical Constituents	**Existence**
Flavonoids	+++
Alkaloids	++
Sterols	++
Triterpenes	+++
Saponins	+
Tannins	++

+ Traces, ++ Moderate, +++ High

Table II: Antibacterial activity of following extracts of *Matricaria chamomilla* leaves.

Test	**Concentration**	**Standard tested organism**			
		S. aureus	**E. coli**	**B. subtillis**	**P. aeruginosa**
Methanol extract	100mg/ml	-	-	-	-
Ethanol Extract	100mg/ml	22±2.5	25±4.0	23±3.5	22±2.5
Chloroform Extract	100mg/ml	22±2.5	25±4.0	23±3.5	22±2.5
Petroleum ether Extract	100mg/ml	23±3.0	25±4.0	25±2.0	23.5 ± 2.0
Ethyl Acetate Extract	100mg/ml	22±2.5	25±4.0	23±3.5	22±2.5
DMSO	10%	-	-	-	-
Gentamicin	10µg/ml	12±1.5	20±3.0	-	13±2.5
Ampicillin	10µg/ml	20±1.0	30±3.0	18±3.5	21±1.0

A phytochemical value analysis and a split quote for both plants were available, required for antibacterial testing were very efficient. Negative control, DMSO (10%) did not show any antibacterial effect, while good control; Ampicillin as well as gentamicin (10µg / disc) had shown antibacterial properties function. However, gentamicin was very effective. Many previous studies from different countries worldwide a certain antibacterial has been reported activities of these plants against different types of germs. According to various report, water *Matricaria chamomilla* extract showed strength preventive effect against *Staphylococcus aureus*, *Bacillus cereus*, *Pseudomonas aeruginosa* and *Escherichia coli*[22].

Conclusion: Phytochemical experiments performed showed the richness of *Matricaria chamomilla* in total tannins, gallic tannins, reversible tannins, saponosides, alkaloids, flavonoids, mucilages and glucosides, as well as the complete absence of starch and anthocyanins. In terms of dose level, the total phenolic value calculated by the Folin-Ciocalteu method revealed the presence of moderate phenolic concentrations in the leaves of *Matricaria chamomilla* plant[23]. The extraction of phenolic compounds is an important step in making these active ingredients effective; it depends on the method and the appropriate solvent that keeps their organisms[24]. From this study, it appeared that aqueous decoction and maceration with methanol were the best ways to remove phenolic. A study of the antimicrobial activity of chloroformic extract showed a moderate inhibitory effect against *Bacillus sp. and P. aeruginosa*. The failure of methanolic and chloroformic extraction may be due to the extraction method used. The results described in this paper have shown an abundance of phenolic compounds in the leaves of *Matricaria chamomilla* indicating the importance of their use in local medicine as antimicrobial agents. Future research should focus on the effect of other bioactive molecules associated with this plant such as alkaloids and tests for antimicrobial activity in a variety of bacteria.

Matricaria chamomilla are good sources of antibacterial agents and current research provides a scientific evidence of the use of these plants in Traditional medicine worldwide [25].

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