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Research Article

**MENTHAPIPERITA LINN. AN INSIGHT INTO CURRENT
RESEARCH ON PHYTOCHEMISTRY AND PHARMACOLOGY****Raj Kishor¹, Dr. Shailesh Kumar Ghatuary², Sarika Chaturvedi³, Mamta
Dubey⁴, Mohit kumar⁵**Undergraduate student^{1,5}, Principal², Assistant Professor^{3,4},Department of Pharmaceutics², Department of Pharmacology^{3,4}Shri RLT Institute of Pharmaceutical Science & Technology, Etawah,
Uttar Pradesh, India**Abstract:**

Among the several plants, Mentha Piperita Linn, usually known as peppermint, is an important medicinal herb that belongs to the family called Laminaceae. It's one of the earliest medicinal herb or species majorly used in food, medicines, and cosmetics. The leaf of this drug has been proven useful in relief of ordinary cold decreases the symptom of irritable bowel disease; digestive problems, such as nausea, vomiting, diarrhoea, flatulence, and dyspepsia. The herb is used as analgesic topically and helps to treat the minor headache. M. Piperita is in the Food and Drug Administration's (FDA) Generally Recognized as Safe (GRAS) list, but this herb has its own few side effects. The peppermint oil leads to very strong sense in heart or irritation in perennial region so that it's contraindicated in patients who suffer from bile duct obstruction, inflammation in gall bladder, and sever damage in liver and precaution should be taken in patients with gastrointestinal tract (GIT) reflex. Menthol and their derivatives are not used directly under the nose of small children and infants due to the risk of apnea. The result of the phytochemical screening revealed that the leave extract contained tannin, steroids, flavonoids, terpenoids, phenols and cardiac glycosides while anthraquinones and saponins were not determined.

Keywords: Mentha Piperita, Peppermint, Phytoconstituents, Medicinal benefits, Pharmacological activity.

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1. INTRODUCTION:

Herbal medicines are now an integral part of standard healthcare, so that they are used both in ongoing research and traditionally. Herbal medicinal compounds are the major source for phytochemicals; hence, they are rich in bioactive substance. The herb is hybrid between spearmint (*Mentha Spicata* L.) and water mint (*Mentha aquatic* L.) containing wide range of antioxidant properties and phytochemicals are capable for neutralizing the free radicals that results in slowing down of various chronic disease progression, which is associated with oxidative stress. The plants that have several phytoconstituents in addition to polyphenols highly act as antioxidants and are less toxic compared to synthetic ones, and this property makes the herb of great interest to the food industry. The herb is also of great interest for medicinal use, because of its medicinal benefits, such as antinociceptive, anti-inflammatory, anti-diabetic, antioxidant, antiemetic, etc. *Mentha Piperita* commonly known as peppermint is an important medicinal herb that belongs to the family Lamiaceae. It is one of the oldest medicinal known species found in eastern and western countries. The main aim to cultivate this plant is to produce peppermint oil (waxy white crystalline monoterpene substance, solid at room temperature) around the world. India plays a dominant role in the production of mint oil and menthol in the world market. Cultivation of peppermint is usually best with good supply of water; as the herb is hybrid so it is sterile, and its plantation is done in the months of December and January last week. Peppermint is rhizomatous [1, 2]

2. MATERIAL AND METHODS:

2.1 PLANT MATERIAL

Fresh peppermint was collected from our SRLT college garden, Etawah. All chemicals and reagents used of the highest grade commercially available in my college.

2.2 STEAM DISTILLATION:

Steam distillation is one of the most popular ways will be used to extract essential oils from plants, leaves and flowers. During steam distillation process, 100g of the plant raw material was being placed in the chamber of the essential oil distillation still, and steam passed through the plant matter. When the steam passed through the plant matter it picked up the oils and moved into another chamber where it is cooled and condensed. Then, essential oil was separated from the water and bottled for used [3]

2.3 SOLVENT EXTRACTION:

Sixty g of peppermint fresh and dry were mixed with 700 ml of ethyl alcohol using a shaker for 6 hour (70°C). The oil was then recovered by evaporating off the solvent using a rotary evaporator and the solvent was removed under a laboratory fume hood for 30 min at 37°C stream and was then stored in a refrigerator in dark bottle.

2.4 SOXHLET EXTRACTION:

100g of fresh and dry peppermint were weighted and put in soxhlet apparatus 300 mL of hexane solvent were added. The solvent was heated to reflux then vapor travels up a distillation arm and floods into the chamber housing the thimble of solid. The condenser ensures that any solvent vapor [5]

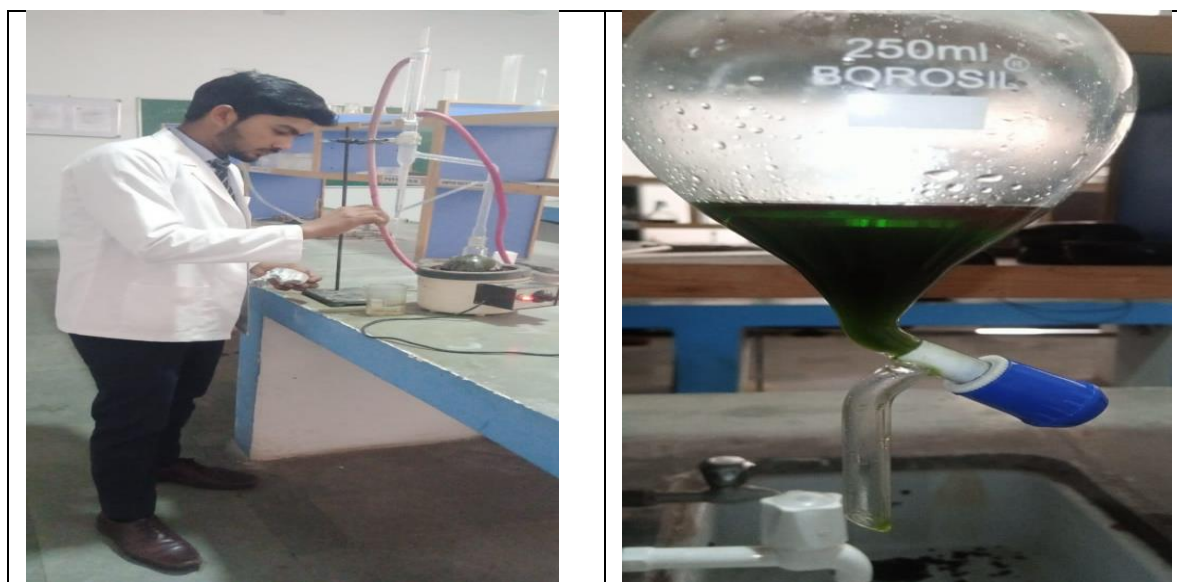


Fig no 1 Clevenger extraction apparatus

3. PHYTOCHEMICAL ANALYSIS [17]

Qualitative phytochemical screening of *Mentha piperita* was carried out using the following methods to test only for the presence of secondary metabolites.

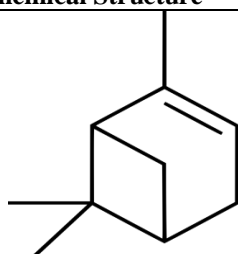
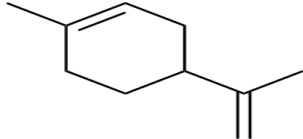
- **Test for Tannins:** 0.008 M Potassium ferricyanide was added to 1 ml of the extract in a test tube. 1 ml of 0.02 M Ferric chloride containing 0.1 N Hydrochloric acid was also added. A blue-black colouration was observed.
- **Test for Saponins:** 5 ml of distilled water was added to crude extract. The mixture was shaken vigorously with some drops of olive oil in a test tube. Stable foam was observed which an indication of the presence of saponins.
- **Test for Flavonoids:** Crude extract was added to 5 ml of diluted ammonia solution and concentrated H₂SO₄. Yellow colouration which disappeared on standing indicates the presence of flavonoids.
- **Test for Terpenoids (Salkowski test):** 2 ml of chloroform and 3 ml of concentrated H₂SO₄ was added to 5 ml of extract to form a layer of reddish brown colourat
- **Test for Phenols:** 2ml of 10% ferric chloride was added to 2ml of the leaf oil extract. A bluish green color was formed to show the presence of phenols.
- **Test for Steroids:** To 1ml extract 1ml of chloroform and equal volume of concentrated H₂SO₄ acid was added from the walls of the test tube. A red colour in the upper layer and yellow with green fluorescence was observed to show the presence of steroids.

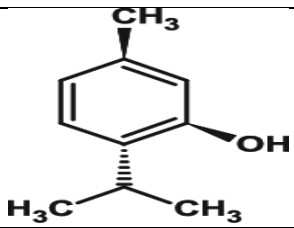
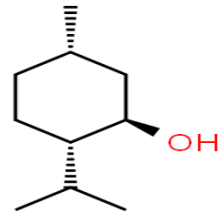
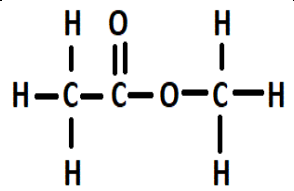
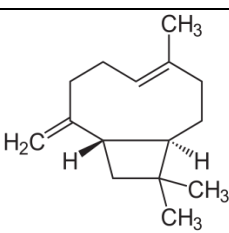
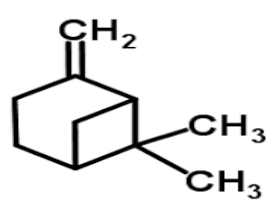
- **Test for Cardiac Glycosides:** Glacial acetic was added to 1ml of the leaf extracts. Few drops of ferric chloride was added with concentrated H₂SO₄. A reddish brown at the junction of two layers was observed this indicates the presence of cardiac glycosides.
- **Test for Anthraquinones:** 10ml of sulphuric acid was boiled with 5ml plant extract and filtered. The filtrate was shaken with 5ml of chloroform. The chloroform layer was pipetted out into another test tube then 1ml of dilute ammonia was added. The resulting solution was observed for colour changes.

4. MEDICINAL USES

- In alternative medicine, peppermint extract is used to treat symptoms of the common cold and the flu, and to relieve bloating and flatulence. It is also used to treat symptoms of arthritis and rheumatism, to relieve menstrual cramps, and as a remedy for toothache. [13, 14]
- There is suggestive but still inconclusive evidence for peppermint extract's effectiveness in treating irritable bowel syndrome with constipation, and in treating tension headaches.
- Peppermint has been found to be an effective antispasmodic during upper gastric endoscopy, and has shown at least some effectiveness as a general GI tract antispasmodic.
- Peppermint may help with "Hell's Itch", an extreme itching sensation that can occur several days after a sunburn[4]

TABLE NO 1 LIST OF CHEMICAL CONSTITUENTS PRESENT IN MENTHA PLANT

Sr. No	Chemical Name	Chemical Structure
1.	Alpha pinene	
2.	Limonene	 Limonene

3.	Menthol	
4.	Isomenthol	
5.	Menthyl acetate	
6.	Caryophyllene	
7.	Beta pinene	

5. PHARMACOLOGICAL ACTIVITY

4.1 ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY

The antibacterial activity of peppermint oil and different extracts of *Mentha piperita* against some Gram-positive and Gram-negative bacterial strains was evaluated in the present research work by agar well diffusion method. It was found that the distilled concentrations of essential oil inhibited the growth of microorganisms and the results were comparable with those of antibiotic gentamycin. Essential oils showed a wider spectrum of activity but less strong inhibition as compared to the investigated commercial antibiotic. Minimum inhibitory

concentrations (MICs) for the bacterial species ranged from 0.4% to 0.7% v/v. The oil and extracts also exhibited significant antioxidant activity and the oil showed about half potency when compared to the standard BHT. These results indicated the strong antibacterial and antioxidant activities of peppermint oil but additional investigations need to be performed in order to confirm the safety of these concentrations (MIC) for human consumption. Peppermint oil could be used as a good conservation agent by inhibiting some food borne pathogens. [6]

4.2 ANTIMICROBIAL ACTIVITY

In the present study, an antimicrobial activity of the Aqueous extract of *Mentha* species was assessed using both well diffusion and microdilution method

in multi-well micro-titer plates. Mint extract investigated for its antibacterial activity against seven selected pathogenic bacteria: *Bacillus fastidiosus*, *Staphylococcus aureus*, *Proteus mirabilis*, *Proteus vulgaris*, *Salmonella choleraesuis*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Serratia odorifera*. Mentha extract at different concentrations (1:1, 1:5, 1:10, and 1:20) was active against all tested bacteria except for *S.aureus*, and the highest inhibitory effect was observed against *S. mutans* using the well diffusion method. Antibacterial activity of Aqueous extracts of selected commonly used Mint were screened against multi drug resistant bacteria, which concludes that their extracts can be used against multi drug resistance bacteria capable of causing both nosocomial and community acquired infections.[7]

4.3 ANTIFUNGAL ACTIVITY

Oral health is an important thing that must be prioritized because the entire intake is first processed in the mouth. The most common disease found in the oral cavity is candidiasis, caused by *Candida albicans* which is an opportunistic intraoral pathogen that inhabits the oral cavity. Peppermint (*Mentha piperita* L.) is one of the herbal plants which has proven in laboratory scale have antifungal activity. This research aimed to know the antifungal activity of methanolic and chloroform extract of *M. Piperita* L. leaves against *C. albicans*. Mint leaf extract was obtained by maceration method using methanol and chloroform as solvents. The extract concentration for antifungal activity test were 40%; 60% and 80% w/v solution in DMSO 100%. The Kirby-Bauer method was used to examine the antifungal activity of both extracts. The results showed that both methanolic and chloroform extract has antifungal activity against *C. albicans*[15,16]. The antifungal of methanolic better than the chloroform extract. Both extracts at all concentration showed a greater antifungal activity compared to 25.000 µg ketoconazole as a positive control. The best antifungal activity of methanolic mint leaves extracts found at 80% concentration. It is no different in antifungal activity of chloroform mint leaves extract at all concentration taste [8]

4.4 ANTISTRESS ACTIVITY

Stress is the emotional and tangible exertion caused by our response to pressure from the outside world. Common stress reactions include tension, irritability, inability to concentrate and a variety of physical symptoms that include headache and a fast heart beat. The present study investigates stress relieving effects of an herbal extract *Mentha piperita* in rats. Methods:

Animals are divided into test and control group. Peppermint extract (0.1gm/kg) given to test animals. Control animals were received an equal volume of water. A group of test and control animals were restraint for 2 hours. 24 hours following the restraint stress different behaviors were monitored. After monitoring the behaviors rats were decapitated. Neurochemical estimation were performed by High Performance Liquid Chromatography using EC detector. Results: Exposure to 2h restraint stress increased circulating levels of plasma corticosterone. Brain Serotonin and Dopamine metabolism also increased.[11,12] Prior administration of *Mentha piperita* leave extract for 5 week reversed the effect of stress on plasma corticosterone levels, brain Serotonin and Dopamine metabolism. Decrease in stress induced anxiety levels also observed in mint treated animals. Conclusion: The results are consistent with antistress effect of *Mentha piperita* and suggest a role of brain Serotonin and Dopamine in antistress effect.[9]

4.5 ANTINOCICEPTIVE ACTIVITY

Mentha piperita L. (Labiatae) is an herbaceous plant, used in folk medicine for the treatment of several medical disorders.[10]

6. RESULT & CONCLUSIONS:

Phytochemical screening

Phytochemical Components	Inference
Tannins	+
Terpenoids	+
Flavonoids	+
Cardiac glycosides	+
Phenols	+
Steroids	-
Saponins	-

Present + Absent-

It is concluded that use of *mentha piperita* in the form of medicine for humans can be considered beneficial in the prevention and treatment of risk factors of diseases that rank among the main causes of death in the globalized world. Therefore, it is possible to suggest that this plant can be used as a functional ingredient to the food processing industry such as snacks, cereal bars, drinks and blends. This can be attractive to the consumers who are interested in meals with more benefits than the usual.

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