



## Review on Antibacterial Activity of Mentha Piperita.

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### ABSTRACT:

The peppermint, *Mentha piperita* is a plant that represents the oldest and traditional medicinal herbs used in both Eastern and Western traditions until recent time. The peppermint has a history of use in herbal medicine dating back to the ancient Egyptian, Greek and Roman times and also important for microbial management program. The present study was carried out in vitro to determine antibacterial activity of *M. piperita* leaf extracts against Pathogenic bacteria like *Bacillus subtilis*, *Staphylococcus aureus*, *Salmonella typhi*, *E. coli*. The organic extracts of the leaves were found to possess strong antibacterial activity against a range of pathogenic bacteria as revealed by in vitro agar well diffusion method.

**KEYWORDS:** - Antibacterial activity; *Mentha piperita* ; zone of inhibition ]

### INTRODUCTION:

Flavonoids are frequently present in fruit, vegetables, nuts, seeds, stems, flowers, tea, wine, propolis, and honey and are widely distributed in photosynthesising cells. These substances have been the main physiologically active ingredients in medicines used to cure human illnesses for ages. This category of natural compounds is the focus of anti-infective research more and more, and numerous teams have isolated and mapped the structures of flavonoids with antifungal, antiviral, and antibacterial properties. [1]

Flavonoids in flowers serve to give them colours that plant pollinators find appealing. These compounds are thought to help the plant's physiological survival in the leaves by shielding it from things like UV-B radiation and fungal infections. Moreover, flavonoids play a role in photosensitization, energy transfer, plant growth hormone and growth regulator effects, control of respiration and photosynthesis, morphogenesis, and gender differentiation [2].

More and more research is being done on flavonoids' antimicrobial properties. Many research teams have tested the in vitro antibacterial activity of crude extracts from plants that have a history of usage in traditional medicine. *Hypericum*, *Capsella*, and *Chromolae* species have flavonoid-rich plant extracts that have been shown to have antibacterial properties. It has also been observed that numerous other phytochemical preparations with high flavonoid concentration have antibacterial activity. Propolis has also been examined extensively, and samples with significant flavonoid concentrations have repeatedly been claimed to possess antibacterial properties. [3]

Numerous research teams have taken things a step further by either isolating and characterising the structure of flavonoids with antibacterial activity or measuring the activity of flavonoids that are sold commercially. These flavonoids include apigenin, galanin, pinocembrin, poncirtin, genkwa, sophor, naringin and naringenin, epigallocatechin gallate and its derivatives, luteolin and luteolin 7-glucoside, quercetin, 3-O-methylquercetin, and other quercetin glycosides, as well as kaempferol and its derivatives. There have also been discoveries of more flavones, flavone glycosides, isoflavones, flavanones, isoflavanones, flavons, flavonols, flavonol glycosides, and chalcones with antibacterial activity. [4]

*The plant Mentha piperita L., also known as peppermint, is a perennial member of the Lamiaceae family and is globular in shape. It is most frequently cultivated in temperate regions of Europe, Asia, the United States, India, and Mediterranean nations because it flourishes in humid and temperate climates. [5]*

The peppermint (*Mentha × piperita* L.), a member of the diverse Lamiaceae family, is one of the oldest and most well-known plants for its medicinal and culinary uses. A perennial herbaceous non-native with a four-sided stem that can grow as tall as 100 cm (40 inches), peppermint is. It is also referred to as Vilayati pudina, Lamb mint, Brandy mint, Candy mint, and peppermint. [5]

Menthol works as an anti-irritant and analgesic, reducing discomfort and enhancing blood flow to the affected area. Due to their antibacterial properties against both Gram-negative and Gram-positive bacteria, mint essential oils are thoroughly investigated and have the potential to replace some antibiotics as well as fight bacterial resistance to antimicrobials. [6]

**OBJECTIVE:-**

1. To extract *Mentha Piperita* by using organic solvent .

To evaluate antibacterial activity of various plant extract by using different microorganism.

**MATERIAL AND METHOD: -****1. Raw herbs collection :-**

In this work , the leaves of *M. Piperita* were procured from a limb, satara . identified and confirmed by a taxonomist , a voucher specimen was deposited at the herbarium in the institute.

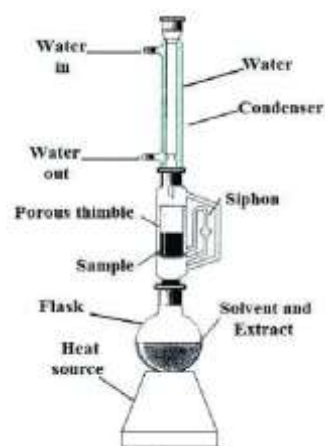
**2. Extraction: -****➤ Construction And Working Of Soxhlet Apparatus:-**

A Soxhlet extractor is a piece of laboratory apparatus invented in 1879 by Franz von Soxhlet. Soxhlet extraction is also known as the hot continuous extraction process the main advantage of this method is complete extraction in minimum amount of solvent.[19] Soxhlet extraction is a modern extraction technique in which we circulate the same solvent through the extractor several times. It is a type of continuous extraction technique but we can call it a series of short maceration. Soxhlet extractor needs the desired compound to be soluble in the solvent at a high temperature. One cycle of the soxhlet extraction method involves extraction following the evaporation of the solvent. And theoretically, we can perform this cycle as many times as we want to get the maximum yield of the desired compound. [20]

**➤ Experimental Setup for Extraction:-**

The experimental setup of Soxhlet Extractor consists of

1. Soxhlet Extractor
2. Mantle Heater (Electric)
3. Water Condenser.
4. Flash Evaporator



**Fig 3: - SOXHLET APPARATUS**

Soxhlet extraction is a continuous solid / liquid extraction. A solid which contains the material to be extracted is placed in what is called a thimble. A thimble is made out of a material which will contain the solid but allow liquids to pass through. A lot like filter paper. The thimble containing the material is placed in the Soxhlet extractor. An organic solvent is then heated at reflux. As it boils its vapors rise up and are condensed by a condenser. The condensed solvent then fills up the thimble. After it fills with enough solvent it automatically siphons back down into the container of organic solvent. This process takes place over and over again until all the material to be extracted from the solid in the thimble is now extracted into the organic solvent.[21]

➤ **Advantages :-**

- Efficient and continuous extraction.
- It needs less solvent to yield concentrated extract.
- We can continue the process until the powder gets completely exhausted. Due to which extraction efficiency is much greater than the traditional extractor.
- We can use modified Soxhlet extractors to meet different needs and increase efficiency further.
- By modifying certain things, we can use the Soxhlet extractor on the industry level.

➤ **Disadvantages :-**

- Extraction by Soxhlet is only possible with boiling solvents or azeotropes.
- The desired components must be soluble in the solvent at a high temperature.
- We cannot extract from more than one sample at a time
- There is no automation in place yet. [20]

➤ **Application :-**

- Useful apparatus for solid-liquid extraction in various fields such as:
  - a. Pharmaceuticals
  - b. Environment
  - c. foodstuffs
- Nowadays, Soxhlet apparatus is still common and widely used as a reference and standard method in many laboratories for extraction of all from various material'

**3. Methanol Soluble Extraction:**

10 gm of fresh plant leaves was dried leaf powder of *Mentha piperita* was packed loosely in the thimble of the Soxhlet apparatus, and the 250 ml of Methanol is added from the top of the condenser than the powder was moisten then Methanol was reached at the round bottom flask. The solvent was heated to reflux. A portion of non – volatile compound dissolve in the solvent. After some time the desired compound is concentrated in the distillation flask. After extraction the solvent was removed, typically by means of evaporator, yielding the extracted compound . Reflux for 24 hours at 50 degree celcius. [22]

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**CONCLUSION: -**

In conclusion, medicinal plant might be considered as precursor for antibacterial drugs. Our study result suggested that *Mentha piperita* has significant antibacterial activity. The present study proved that *Mentha piperita* can be used as a potential source of antibacterial compounds. Finally, it can be concluded that the active chemical compound present in *Mentha piperita* should certainly find place in the treatment of various bacterial infections diseases as well.