



# ANTIFUNGAL ACTIVITY OF MELISSA OFFICINALIS (LEMON BALM)

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## ABSTRACT-

A difficulty are fungal diseases and the increasing emergence of resistance. In this particular situation, a species known to have antifungal activity and be utilized in folk medicine is lemon balm. Determining the chemical composition of lemon balm leaves' antifungal action was the goal of this investigation. Minimum inhibitory concentration (MIC), minimum lethal concentration (MLC), minimum biofilm inhibition concentration (MBIC), minimum biofilm eradication concentration (MBEC), and time-kill were used to assess lemon balm's antifungal efficacy against *Candida albicans*. We employed the checkerboard method to ascertain the impact of lemon balm on antifungal activity. The findings show that, in addition to inhibiting the development of every tested *Candida albican*, lemon balm was able to produce a zone 17 mm barrier against the common antifungal medication ketoconazole.

## INTRODUCTION-

One of the biggest health concerns of the twenty-first century is antimicrobial resistance, which has grown dramatically in the last few years. An estimated 700,000 people worldwide pass away from diseases brought on by resistant strains of bacteria each year and if action is not taken, this figure may rise to roughly 10 million globally by 2050<sup>1</sup>. Fungal infections arise as a result of health issues frequently linked to immunosuppression. The antifungal therapy's response determines the clinical outcome, which has a significant death rate<sup>2</sup>. Unfortunately, the limited availability of antifungals limits the possibilities for treatment<sup>3</sup>. *Candida* species are opportunistic pathogens that can cause a variety of illnesses, from systemic infections to infections of the skin and mucous membranes<sup>4</sup>. More than 70% of all *Candida* infections are caused by *Candida albicans*; however, options for the management of these microbes, lowering the dosages and, as a result, the side effects of the medication<sup>5</sup>. Lemon balm, or *Melissa officinalis* L., is an aromatic herb belonging to the mint family (Lamiaceae). It is native to Europe and central Asia and is grown in most temperate and subtropical regions of the world. Other names for it include balm, English balm, garden balm, balm mint, common balm, melissa, sweet balm, and heart's delight. This section's content has been lifted verbatim from The Herb Society of America's guide to lemon balm<sup>6</sup>. Because *Melissa*'s name is derived from a Greek word meaning "bee," and because *Melissa* has a strong affinity for bees, it is also known as "bee balm"<sup>7</sup>. *Badrangboya*<sup>8</sup>, *taragarbha* in Persian, and *Mufarrehal qhalb*<sup>8,9</sup> are the names given to it. *Billi lotan* in Hindi, *Utrajul Raihath*<sup>10</sup>, *Warqe habaqe Rauhawi*<sup>11</sup> in Arabic In English<sup>12</sup>, mountain balm is also known as sweet balm or lemon balm. In recent decades<sup>13</sup>, lemon balm has become a significant commercial plant and a medical herb. Traditionally, it has been used to treat a wide range of illnesses. For example, a plant infusion, juice, or cream is used to promote sleep, ease nervous agitation, and treat functional gastrointestinal complaints, hysteria, melancholia, chronic bronchial catarrh, migraine, toothache, earache, headache, high blood pressure, and externally, rheumatism, nerve pains, and stiff necks (compress)<sup>13</sup>. The Unani medical system uses grass and seeds to treat conditions like epilepsy, paralysis, bell's palsy, arthritis, mastitis, and halitosis<sup>14</sup>.

## Materials-

### 1) Lemon Balm-

*Melissa officinalis* L., commonly referred to as lemon balm, sweet balm, garden balm, English balm, common balm, melissa, and heart's pleasure, is a fragrant member of the mint family (Lamiaceae). Volatile substances (geranial, neral, citronellal, and geraniol), triterpenes (ursolic acid and oleanolic acid), phenolic acids (rosmarinic acid, caffeic acid, and chlorogenic acid), and flavonoids (quercetin, rhamnocitrin, and luteolin) are the primary active ingredients of *Melissa officinalis*.

### 2) Candida Albicans-

A type of fungus called *Candida albicans* is found naturally on human bodies. Yeast, or candida, is a form of fungus that is normally present in trace levels in your mouth, skin, and intestines. The microbiome, or healthy bacteria, in your body regulates the equilibrium of *Candida*.

## Methods-

### 1) Extraction Of Lemon Balm Leave-

#### Steps-

- 1) Dry The Leaves At Sunlight And Then Grind Into Fine Powder
- 2) Then 100gm Powdered Sample Put In Thimble
- 3) Then Place The Thimble In Extractor
- 4) Fill The Solvent In Round Bottom Flask
- 5) Heat The Soxhlet Extraction Unit
- 6) Reflux The Solvent
- 7) Then Collect The Extract For Further Procedure.

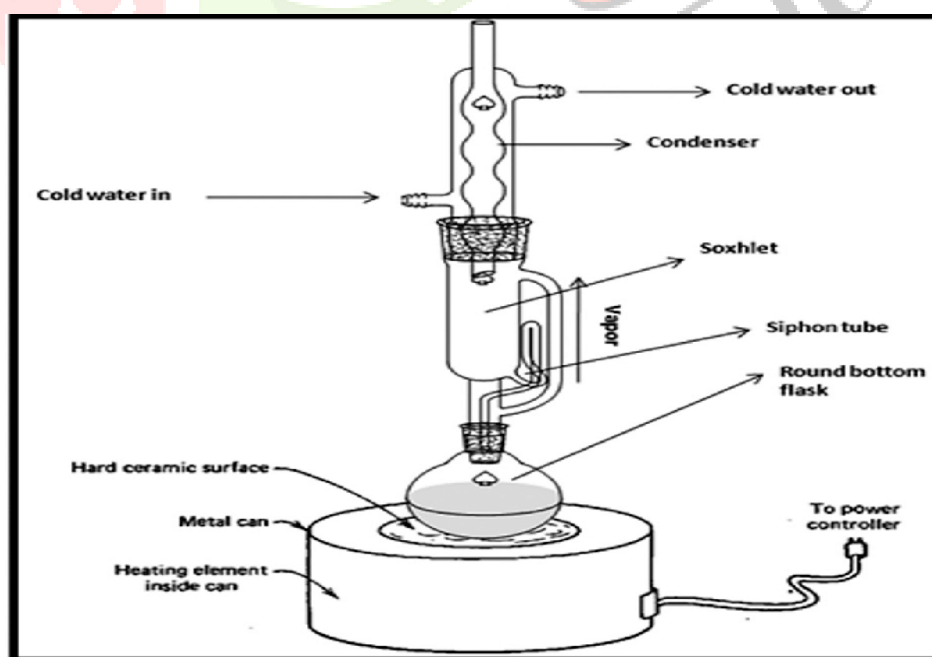


Fig- Soxhlet Extraction

## 2)Media Preparation-

Agar plate media was prepared by adding 28 g of a nutrient agar powder in 1 liter of distilled water heat the mixture and dissolve all components. The dissolved mixture is put in autoclave at 121°C for 15 min, allow cooling but not solidifying. Then inoculated the given microorganism into nutrient agar medium and poured into plates allow until solidified. Then by using the agar well diffusion method, holes about 9 mm diameter in the same medium with a borer. Then the antifungal solution of lemon balm extract directly poured into holes. Then plates are incubated and reported.

## Result-

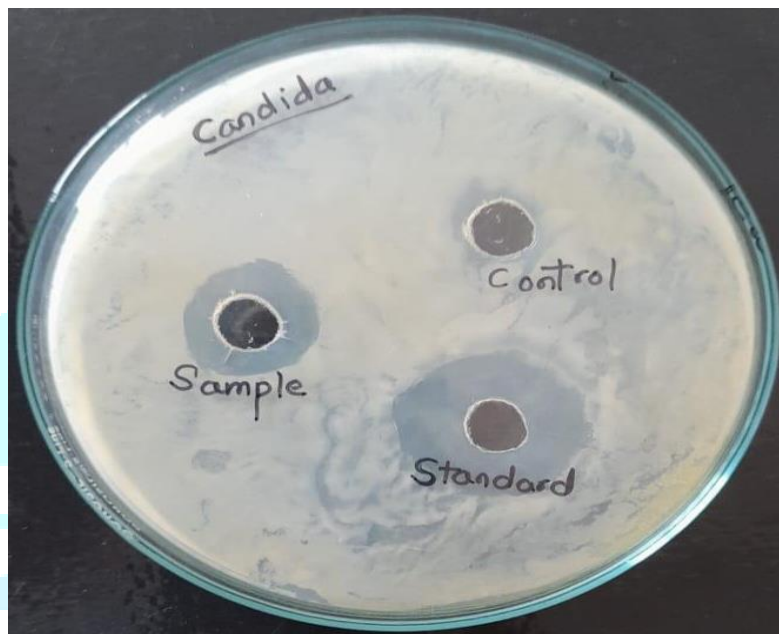


Fig- Antifungal Test

Sr.no	Sample name	Lemon balm	Standard antifungal agent (ketoconazole)
1	Zone of inhibition (in mm)	17 mm	26 mm

The findings show that, in addition to inhibiting the development of every tested *Candida albicans*, lemon balm was able to produce a zone 17 mm barrier against the common antifungal medication ketoconazole.

## Discussion-

The study found that Lemon balm extract inhibited the growth of *Candida albicans* strains and reduced biofilm formation in the early hours of incubation. Lemon balm extract effectively removes biofilm and has superior antifungal activity compared to other treatments on the market. Lemon balm extract has been shown to modulate the activity of clinically used antifungal drugs, perhaps reducing their concentration while improving their effectiveness.

## Conclusion-

When it comes to *Candida albicans*, lemon balm has outstanding antifungal activity. When administered with antifungals, particularly ketoconazole, it positively modified the anti-*Candida* effect. On the other hand, studies were done on the antifungal activity of lemon balm extract against *Candida albicans*.

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