

# Evaluation of the Inhibition Effectiveness of Some Plant Extracts Against Bacterial and Fungal Isolates that Pathogenic Humans

Hajar S. Al-Meziraa<sup>1</sup>, Rasha K. Hamza<sup>2</sup>, Nadia N. Hamed<sup>3</sup>

<sup>1</sup>Al-Basrah Agricultural Directorate, Iraq

Department of Horticulture and Landscape Gardening, College of Agriculture, University of Basra, Basra, Iraq

<sup>2</sup>Faculty of Agriculture - Basra University / Iraq

## 1. Introduction

Plants and medicinal herbs and aromatic of the oldest plants known to man and used in food as well as in the treatment of many diseases, as many plants that have a inhibitory efficacy against pathogens with their compounds and effective elements after extraction and purification because the intensive and long use of industrial drugs, including antibiotics have many side effects on human health such as allergies, poisoning and others in addition to many symptoms resulting from the misuse of these antibiotics and led to the acquisition of pathogenic microbes Because of its formation of mutations against it (Al-Janabi, 2014). Therefore, many pharmaceutical companies have begun to try to produce extracts based on a range of medicinal herbs studied scientifically in toxic therapeutic doses (Baraka and Zarkai, 2012). There are several studies on the use of plant extracts to inhibit the growth of microbiology when scientific progress with all its potential to cure certain diseases as well as being an economical, safe and highly efficient treatment (Al- sayed, 2004). Therefore, many studies have addressed the inhibiting effect of the extracts of some plants on bacteria, fungi, viruses and parasites that affect various organs of the inner human beings.

The foreign ministry, which has been used in the field of alternative medicine to treat many diseases and injuries, either alone or in partnership with some chemically manufactured drugs (Al-Khalidi, 2000 and Amira, 2001).

Because of the importance of basil and mint as a food and medical source, it has been used in the treatment of many diseases that caused by bacteria and fungi.

### Basil: *Ocimum basilicum*

#### Vegetarian rating:

Rank	Scientific Name and Common Name
Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Asteridae
Order	Lamiales
Family	Lamiaceae/Labiatae – Mint family
Genus	Ocimum
Species	basilicum

Basil plant is a plant around summer and semi-shrub scents according to its varieties grown in gardens as an ornamental plant or to obtain its leaves and seeds, which contain a percentage of the flying oil ranging from 0.1 to 0.45% depending on the surrounding environment conditions and plant service and has a distinctive aromatic scent (El- Gendy *et al.*, 2001) (50-60 cm high), its leaves are simple oval-shaped and the flowers are fairly large sideways of symmetry clustered in overcrowded lights and are white or slightly reddish The plant is characterized by medically effective compounds such as glycosides, alkaloids and terpenes, and uses basil as a medicinal plant to treat head pain, ear, cough, diarrhea and as a popular treatment for poor digestion, nausea and gastroenteritis (Adam and Omer, 2015).

Its seeds are also used to remove melasma and eye bulge (myocarcetry, 2001), treat some respiratory problems and sewage inflammation, relieve rheumatism with anticancer substances, activate the immune system by increasing antibodies by 20% and anti-arthritis Antirthritis, (Newmark and Schulick, 1996) and treat acne, fever and headache Head. (Ducke, 2002)

### The inhibition of basil extracts in the growth of some human pathogenic bacterial species:

Amir *et al.*, study (2001) to find out the effect of the pilot oil extracted from the leaves of the basil plant was found to have a inhibitory effect on the growth of both *Escherichia coli* and *Staph aureus* as well as other types as several concentrations were used ranging from 18 to 36 micrograms.ml<sup>-1</sup>.

In a study conducted by Yahya (2001) on the efficacy of several concentrations of ethanol alcohol extract for basil leaf, namely 20, 40, 60, 80, 100 mg. ml<sup>-1</sup> against *Staphylococcus aureus* bacterium *Staph aureus* was observed as inhibition effectiveness of these extracts was observed by giving inhibition diameters of 12.2, 15.0, 16.0, 18.5, 20.0 mm respectively.

Kazim (2016) showed the effect of ethanol and methanol extracts for plant parts of basil (leaves, flowers, seeds) by stacking 50, 100, 150, 200 mg. ml<sup>-1</sup> on *staph aureus* bacterium to exceed the methanol extract by concentration of 200 mg. ml<sup>-1</sup> is morally inhibiting bacteria with a

inhibition diameter of 12.50, 12.50 mm, and 10.50 mm for plant parts respectively.

Mohammed (2018) noted in a study conducted to assess the efficacy of water basil extracts, ethanol and acetone by stacking 20, 50, 70, 100% in inhibition of five isolates of bacteria *subtilis*, *Bacillus aureus*, *Staphylococcus aeruginos pseudomonas* and *Ecoli Escherichia*, *Sal. Cholerasuis* all extracts have shown a clear inhibition effect against insulation, especially when concentration is 100%, as it is caused by inhibition of bacterial growth with an inhibitive diameter of 13.33, 11.67, 11.00, 11.00, 10.67 mm respectively while basil extract was given using the astonesolvent 12.67, 10.67, 11.33, 9.33, 11.67 mm respectively.

#### The inhibition of basil extracts in the growth of some human pathogenic fungal species:

In a study to determine the effect of hydroponic, methanol and alcoholic extracts of the bark and basil stems in inhibiting the growth of some types of microbiology, including the *c. albicans*, it was found that the inhibition diameter of microbiology under study ranged from 8-20, 2-12 and 0-8 mm for methanol, ethanol and aquatic extracts, respectively.

#### Mentha

##### Vegetarian rating:

Kingdom	Plantae – Plants
Subkingdom	Viridiplantae – green plants
Infrakingdom	Streptophyta
Superdivision	Embryophyta – land plants
Division	Tracheophyta
Class	Magnoliopsida
Superorder	Asteranae
Order	Lamiales
Family	Lamiaceae– mints, menthes
Genus	<i>Mentha</i> L. mint
Species	<i>Mentha spicata</i> L. bush mint, spearmint

The oral plant mint is one of the most important plants spread around the world with about 200 species and 2000-5000 aromatic species (Azadlbakt, 1999).

These species are of great importance because they are frequently used in many fields, they are frequently used in folk medicine, food and beauty, and are important industrial crops for the production of essential oils used worldwide (Sonawane et al., 2016). Mint has a wide range of medical, biological and pharmaceutical effectiveness as it is known as an tonic for the body's immunity and for the treatment of many digestive diseases such as stomach acidity and motherhood as it acts as a sedative for the central nervous system, head pain and migraine and is used in cold conditions and fluenza (Ferreira et al., 2006).

The mint plant is of great medical and economic importance because it contains many important chemical compounds with common medicinal uses such as Pulegone, acetate, Menthyl, Menthol and others.

#### The inhibition of peppermint extracts in the growth of some human pathogenic bacterial species

In a study conducted by Ali (2013) to find out the inhibition effect of the various plant parts of the mint plant (dry leaves, green leaves, stems and flowers) extracted watery (boiled and soaked) against the negative pathological bacteria of *salmonella* spp. *Proteusspp*, *Pseudomonas aeruginosa* and pathological bacteria positive to the pigment of the *chrem Streptococcus* spp, *Enterococcus* spp, *Staphlococcus epidermidis* where the results showed the susceptibility of the leaves of the dry mint To inhibit all types of bacteria under study and in all types (boiled and soaked) where the rate of inhibition diameter ranged from 20-22 mm compared to other plant parts that showed mixed results in inhibitiability, as well as the reduction ability of inhibition was found to increase the concentration of the plant extract.

Among Zamin et al., (2013) the use of cold-water extract for peppermint leaves has inhibited the bacteria that are positive for the pigment of the cream *Escherichia coli*, *S. typhimurium* with a inhibitory diameter of 29.31, 27.21 mm respectively and the negative bacteria of the *Staph aureus* tincture with a inhibitory diameter of 24 mm.

#### The inhibition effectiveness of peppermint extracts in the growth of some human pathogenic fungal species:

Al Ameri and Muhammad (2006) found that the water extract of the mint plant has concentrations of 5, 10, 15, 20, 25 mg. cm<sup>3</sup> is a inhibitory activity against *geotrichum candium* mushrooms, which causes inhibition of mushrooms with a inhibitory diameter of 4.6, 2.6, 1.9, 1.8, 0.8 cm for all concentrations, respectively.

Wenji et al., (2019) concluded that the use of methanol and chlorophome extract for candida albicans was more effective than chloropone extract and exceeded 80% concentration for both extracts.

Jafar et al., (2020) noted the inhibition effectiveness of aquatic and alcoholic extracts of the *Mentha Spicata* type mint plant by stacking 5, 10, 15, 20, 25, 30 mg. ml<sup>-1</sup> has led to the superiority of the water extract in inhibiting *aspergillus fumigatus* mushrooms with a inhibitive diameter of 8, 8, 8, 6, 5.5, 3.5 cm for all concentrations respectively, while the alcohol extract caused the inhibition of the fungus with a inhibition diameter of 0.5, 0.5, 0.3, 0.2, 0.1, 0.0 cm respectively.

#### References

- [1] **Adam, Z.A.**; and **Omer, A.A.**; (2015). Antibacterial Activity of *Oci- mum basilicum* (Rrhan) Leaf Extract against Bacterial pathogens in Sudan. American Journal of Research Communication, Vol.3 (8):94-99.
- [2] **Al-Ameri, H. A.**; and **Saleh I. M.**; (2006). Study of the inhibition effect of some aquatic extracts against *geotrichum candium* mushrooms. Journal of Rafidain Sciences, 17 (10): 90-99.
- [3] **Ali, R.S.**; (2013). evaluation of the inhibitory effectiveness of the parts of the *mint plant* L. against some types of pathological bacteria causing food contamination, Kufa Journal of Agricultural Sciences, 5 (1): 408-419.

- [4] **Al- Janabi**, J. K.; and **Saberin**, A. K.; (2014). The efficiency of green tea extracts and scholars in the growth of mentagrophytes mushrooms, The Journal of The University of Babylon Pure and Applied Sciences, 22 (2): 651-660.
- [5] **Al-Mayah**, A. A.; (2001). Medicinal plants and herbal medicine. Ebadi Center for Studies and Publishing / Yemen: 293 a.m.
- [6] **Amir**, M. D. M.; **S. Jalal**, M. P.; and **Jalil**. D. S.; (2011). Antimicrobial activity of essential oil extract of *Ocimum basilicum* L. leaves on a variety of pathogenic bacteria. J. Med Plants Res., Vol 5 (15): 3453- 3456.
- [7] **Amira**, A.; (2001). Brief in pharmacology. Jaffa Publishing and Distribution House / Amman.
- [8] **Azadbakht**, M.; (1999). Classie Fiction of Medicinal Plants. Tymourzadeh Publications, Iran.
- [9] **Mourad**, A.;and **Ahmed**, M. Al.; (2012). Study of the association of antibiotic resistance to plasmid content in two isolations of salmonella bacteria and its role in the expansion of the range of drug resistance among intestinal bacteria, Department of Zoology, Faculty of Science, University of Sabha- Libya.
- [10] **Ducke**, J. A.; (2002). Hand book of Medicinal herbs. Boca Raton. CRC Press. **El-Gendy**, S.A.; **Hosni**, A.M.; **Ahmed**, S.S.; **Omer**, E.A.; and **Reham**, M.S.; (2001) . Variation in herbage yield and oil composition of sweet basil (*Ocimum basilicum* L.) var. 'Grande Verde' grown organically in a newly reclaimed land in Egypt. Arab Univ. J. Agric. Sci., 9: 915-933.
- [11] **Jafer**, T.S.;**Abdul Karim**, Al-Nuaymi., A.S.H.; and **Mohammed**, S. E.; (2020). The Inhibitory Effect of Some Medical Plants Extracts in The Fungus *Aspergillus fumigatus*. Journal of Education and Science, Vol.29 (1): 107- 120.
- [12] **Newmark**, T. M.; and **Schulick**, P.; (1996). Herbal Cox-2 inhibition- natures challenge to arthritis, cancer and alzheimers disease. Hohm Press, Prescott, AZ.
- [13] **Sonawane**, H; **Shinde**, A.; **Jadhav**, J.; (2016). Evaluation of Anti-Angiogenic Potential of Mentha Arvensis Linn. Leaf Extracts Using Chorioallantoic Membrane Assay, World Journal of Pharmaceutical Research, Vol 5, Issue 2, p677-689.
- [14] **Yahya**, N. Z.; (2011). In vitro and In vivo evaluation of antimicrobial effect of leaves *Ocimum basilicum* of ethanolic extract against Staphylococcus aureus. Al-Anbar J. Vet. Sci., Vol 4 (2): 67-75.