

# Comparative Study of Phytochemical Screening and Antibacterial Activity of *Laurus Nobilis* and *Pleurotus Ostreatus*

K. Kesiya, B. Poorane, Agilandeswari Vinoth\*

\*Assistant Professor, Department of Biotechnology, Vivekanandha College of Engineering For Women(Autonomous), Elayampalayam, Thiruchengode, Namakkal-637205, India

**Abstract:** Bay leaf and mushroom have a bioactive component which helps in curing various human diseases. The presences of these bioactive components in plants are evaluated by phytochemical screening. The bioactive substances are of two categories. They are primary metabolites and secondary metabolites. The secondary metabolites are called as phytochemical components. These components have the ability to kill the micro organisms and they are known as antibiotics. In recent advances the phytochemicals extracted from medicinal plants are used as drugs. In this study we compared the phytochemical analysis and antibacterial activity of *Laurus nobilis* and *pleurotus ostreatus*.

**Keywords:** *Laurus nobilis*, *Pleurotus ostreatus*, bioactive components, antibiotics, Zone of inhibition

## 1. Introduction

*Pleurotus ostreatus* is a common edible mushroom belongs to the class of basidiomycetes and family agaricaceae. It is primarily used as a food for human consumption. It is rich in vitamin C and B complex. The protein in mushroom varies in the range of about 1.6 to 2.5 percent. Mineral salts required for the human body is present in this species. It acts as an anticancer, antibacterial and antioxidant agent. It is used in the treatment of anemia, hyper tension, diabetes mellitus and obesity. *Laurus nobilis* is an Indian bay leaf which belongs to the family of lauraceae. Essential oil extracted from *Laurus nobilis* which is used in various fields such as medicine, food and cosmetics etc. It also exhibits antibacterial, antifungal and antioxidant activities. The essential properties of *Laurus nobilis* are analgesic, anti-inflammatory, anti tumoral and insecticidal activity. The active ingredients such as alkaloids and glycosides which directly inhibit the bacterial activity and may interfere in the synthesis of virulence factors.

## 2. Materials and Method

Sample collection: *Laurus nobilis* collected from kerala and *Pleurotus ostreatus* collected from VCEW for comparative study of qualitative test of phytochemical analysis and antibacterial activity of *Laurus nobilis* and *Pleurotus ostreatus*. *Laurus nobilis* and *Pleurotus ostreatus* are dried in the shadow separately after completely drying the samples are powdered. Both the powdered were prepared for aqueous extract. The powdered are mixed with water and filtered. The filter is an aqueous extract. This extract is used for phytochemical analysis, The Ethanol extract used for antibacterial activity.

## 3. Methods for Phytochemical Analysis

**Test for Alkaloids:** 5ml of the sample extract was taken and 2ml of HCL was added.1ml of the dragendroff reagent

was added in HCL mixture of extract. It produced orange or red precipitated show the presence of Alkaloids.

**Test for Flavonoids:** 1ml of the sample extract was taken in test tube and adds few drops of diluted sodium hydroxide in extract then it produce yellow color presence of Flavonoids.

**Test for Saponins:** The plant extract was diluted with 80 ml of diluted water and it was agitated for 15 mins and appearance of 1cm layer of foam thorough agitation.

**Test for Steroids:** 1ml of the extract was dissolved in 10ml and add equal volume of sulphuric acid. The upper layer turns and sulphuric acid layer showed yellow color with green fluorescence show the presence of steroids.

**Test for Tannins and Phenol:** 1ml of the plant extract was taken in test tube and add ferric chloride in plant extract then it produce blue color presence of tannins and phenols.

**Test for Aminoacid: (a) Ninhydrin test:** Place 1 ml of each of the solutions in a test tube and add 2 drops of ninhydrin solution. Boil the mixture over a water bath for 2 min. Allow to cool and observe the blue color formed. A Positive test is indicated by: The formation of violet color.

**(b) Xanthoproteic test:** Add 0.5 ml of sample solution to test tubes. Add a few drops of concentrated HNO<sub>3</sub>. Compare the color using with that given by blank using water instead. A positive test is indicated by: The formation of yellow color.

**(c) Millon's test:** Add 1ml of sample solution in test tube. Add 2ml of Millon's reagent in test tube and shake well. Place the test tubes in the boiling bath with care, for 10 min. A Positive test is indicated by: The formation of brick yellow color.

**Test for Carbohydrates: (a) Molish test:** 2ml of a sample solution in a test tube. 4 drops of the Molisch reagent (a solution of  $\alpha$ -naphthol in 95% ethanol) is added. The solution is then poured slowly into a tube containing 2ml of concentrated sulfuric acid so that two layers form, producing violet ring appears liaison between the surface separations. A Positive test is indicated by: The formation of purple layers.

**(b) Benedict's test:** 1 ml of a sample solution is placed in a test tube. 2 ml of Benedict's reagent is added. The solution is then heated in a boiling water bath for three minutes. A positive test is indicated by: The formation of a reddish precipitate within three minutes.

**(c) Barfoed's test:** 1 ml of a sample solution in a test tube. 3 ml of Barfoed's reagent a solution of cupric acetate and acetic acid. Heat the solution in a boiling water bath for three minutes. A positive test is indicated by: The formation of a brick red color within three minutes.

**Test for Lipids: (a) Solubility Test:** Add a few drops of the liquid food sample to a dry test tube. Add 2 cm<sup>3</sup> ethanol and shake it thoroughly. Add 2 cm<sup>3</sup> of deionized water. Layers of cloudy white suspension form at the top of solution-lipids are present. The solution remains colorless no emulsion is formed-lipids are not present.

**(b) Emulsification Test:** Take 3ml of water and add 5 drops of sample. In another test tube 3ml of water is added to ethanolic solution of lipid contents and are mixed and

two layers are observed and this confirms the presence of lipids.

**Antibacterial Activity:** (1) Prepare Mueller Hinton Agar and sterilize. (2) Pour equal quantity of medium in to sterile Petri dish and allow the medium to solidify. (3) Take a respective microorganism (12- 15 hours old) in a sterile cotton swab and spread on to Mueller Hinton Agar and Potato Dextrose Agar along susceptibility and maintain on control to check the sterility. (4) Make a well and load the sample into the well on the agar. (5) Then the plates were incubated at 30°C for 48 hrs. 6. After incubation, measure the zone of inhibition in diameter.

#### 4. Result and Discussion

The phytochemical analysis includes tests such as test for flavanoids, saponins, tannins, phenols, alkaloids and sterols are done. The result shows the presence of saponins, sterols and alkaloids but also indicates the absence of flavanoids, tannins and phenols in *Laurus nobilis*. In *Pleurotus ostreatus* phytochemicals such as saponins and sterols are present. Absence of flavanoids, tannins, phenols, and alkaloids is proved. *Laurus nobilis* and *Pleurotus ostreatus* have the similar components such as saponins and sterols. We have also done the tests for carbohydrate, lipid and amino acid. The zone of inhibition in the antibacterial activity of both laurus nobilis and *Pleurotus ostreatus* is in the range of 2 mm and 3mm.

**Table 1:** Phytochemical screening

Plant components	Aqueous Extract of <i>L.nobilis</i>	Aqueous Extract of <i>P.ostreatus</i>
Saponins	+	+
Flavonoids	-	-
Sterols	+	+
Tannins & Phenol	-	-
Alkaloids	+	-

**Table 2:** Carbohydrates Result

Test Name (Carbohydrate)	<i>L. Nobilis</i>	<i>P. Ostreatus</i>
Molish's Test	The formation of a purple layers(Presence of carbohydrate)	The formation of a purple layers (Presence of carbohydrate)
Barfoed's Test	The absences of formation of brick red color(Absence of carbohydrate)	The absences of formation of brick red color (Absence of carbohydrate)
Benedict's Test	The absences of formation of a reddish precipitate within three minutes(Absence of carbohydrate)	Reddish precipitate within three minutes (Absence of carbohydrate)

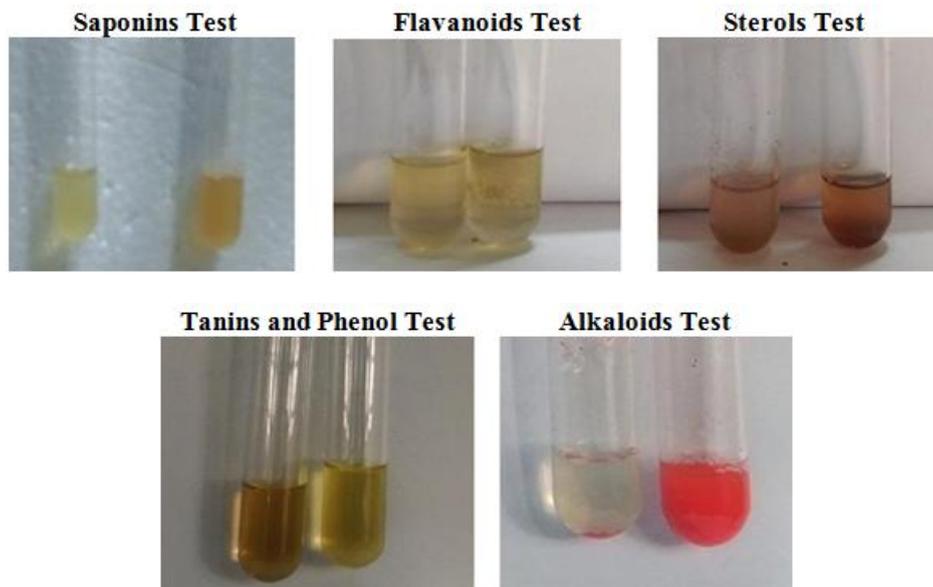
**Table 3:** Amino acids Result

Test Name (Amino Acid)	Specificity of the test	<i>L. Nobilis</i>	<i>P. Ostreatus</i>
Ninhydrin test	Amino acid & protein	Absence of Purple color	Presence of purple color
Xanthoproteic test	(a) Tyrosine	Absences of light yellow color	Presence of light yellow color
	(B) Tryptophan	Presence of dark yellow color	Absence of dark yellow color
	(C) Glycine	Absence of yellow color	Absence of yellow color
Millon Test	Tyrosine	Absence of red color	Absence of red color

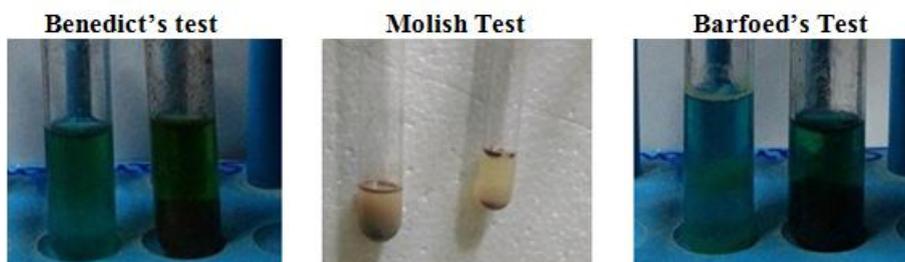
**Table 4:** Lipids Result

Test Name (Lipid Test)	<i>L. Nobilis</i>	<i>P. Ostreatus</i>
Solubility test	Formation of layer at the top of the solution (Presence of lipid)	Formation of layer at the top of the solution (Presence of lipid)
Emulsification test	Absence of 2 layer formation (Absence of lipid)	Absence of 2 layer formation (Absence of lipid)

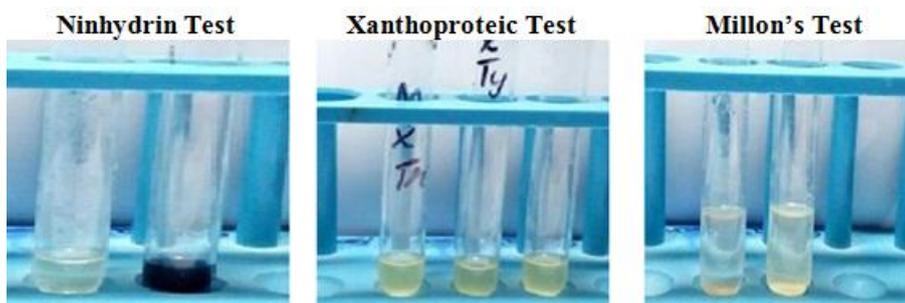
## 5. Result of Phytochemical Analysis



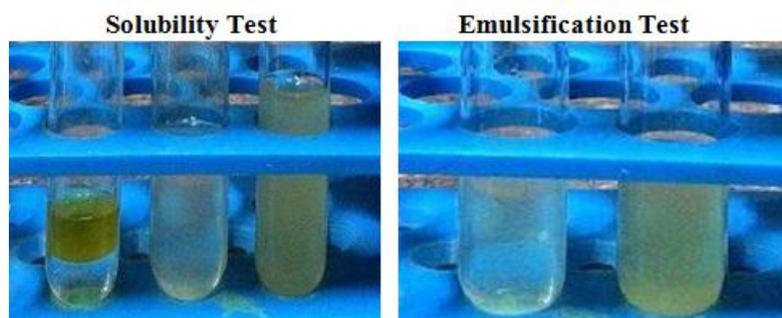
### Result of Carbohydrates



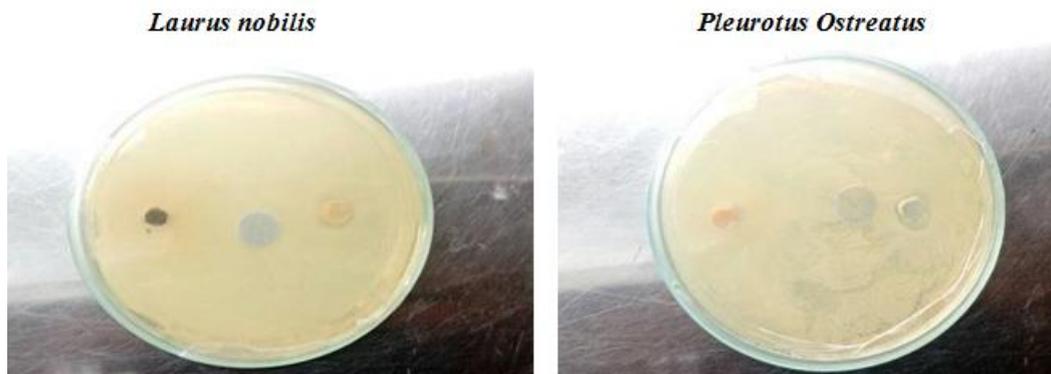
### Result of Aminoacid



### Result of Lipids



## Result of Antibacterial Activity



Diameter of Zone Of Inhibition=2mm Diameter of Zone Of Inhibition=3mm

## 6. Conclusion

The presence of a phytochemical of interest may lead to its further isolation, purification and characterization. Then it can be used as the basis for a new pharmaceutical product. The antibacterial activity of plant extract is a traditional support for the treatment of bacterial infections. They also provide an important basis for the use of various extract of the plant uses to control infectious diseases.

## References

- [1] Tajhmiri, A., Issapour, F., Moslem, M.N., Lakeh, M.T. and Kolavani, M.H. (2014) 'Invitro antimicrobial activity of artemisia annua leaf extracts against pathogenic bacteria' *Advanced Studies in Biology*, 6(3): 93-9.
- [2] Shree, A.K.G., Balamurugan, T.S.B., Manivasagan, V. and Babu, R.N.G (2016) 'Phytochemical, Antioxidant and Antitumor activity of edible mushroom *Pleurotus ostreatus*' *International Journal of Advanced Research in Biological Sciences*, 3(9): 170-177.
- [3] Gomashe, A.V., Gulhane, P.A., Junghare, M.P. and Dhakate, N.A. (2014) 'Antimicrobial Activity Of Indian Medicinal Plants: *moringa Oleifera* And *Saraca Indica*', *International Journal of Current Microbiology And Applied Sciences*, 3(6): 161-169.
- [4] Judaibi, A.A., Zahrani, A.A., Altammar, K.A., Ismail, S.B. and Darweesh, N.T. (2014) 'Comparative Study Of Antibacterial Activity Of Plant Extracts From Several Regions Of Asia' *American Journal Of Pharmacology And Toxicology*, 9(2): 139-147.
- [5] Basri, D.F. and Nor, N.H.M. (2014) 'Phytoconstituent Screening and Antibacterial Activity of the Leaf Extracts from *Canarium odontophyllum* Miq' *American Journal of Plant Sciences*, 5: 2878-2888.
- [6] Gracelin, H.S.D., Britto, J.D.A. and Kumar, B.J.R.P. (2014) 'Qualitative and Quantitative Analysis of Phytochemicals in Five *Pteris* Species' *International Journal of Pharmacy and Pharmaceutical Sciences*, 5(1): 105-107.
- [7] Joseph, B.S., Kumbhare, P.H. and Kale, M.C. (2013) 'Preliminary phytochemical screening of selected Medicinal Plants' *Int. Res. J. of Science & Engineering*, 1(2): 55-62.
- [8] Ganesan, K., Kumar, S.P., Letha, N.N., and Gani, S.B. (2016) 'Phytochemical Screening of Different Solvent Extract of Soap Berry (*phytolacca Dodecandra* L'herit)-a Native Ethiopian Shrub' *International Journal of Pharmacy and Pharmaceutical Research*, 5(2): 100-109.
- [9] Yadav, M., Chatterji, S., Gupta, S.K., and Watal, G. (2014) 'Preliminary Phytochemical Screening Of Six Medicinal Plants Used In Traditional Medicine' *International Journal Of Pharmacy And Pharmaceutical Sciences*, 6(5): 539-542.
- [10] Joshi, M., Pathania, P., Sagar, A. (2015) 'Phytochemical Analysis and *In vitro* Antibacterial Activity of *Russula lepida* and *Pleurotus ostreatus*' *International Journal of Pharmacognosy and Phytochemical Research*, 6(4): 1032-1034.
- [11] Menaga, D, Mahalingam, P.U., Rajakumar, and Ayyasamy P.M (2012) 'Evaluation of Phytochemical Characteristics and Antimicrobial Activity of *Pleurotus Florida* Mushroom' *Asian Journal of Pharmaceutical and Clinical Research*, 5(4): 102-106.
- [12] Nandagoapalan .V, A. Doss, Marimuthu, C. (2016) 'Phytochemical Analysis of Some Traditional Medicinal Plants' *Bioscience Discovery*, 7(1): 17-20.
- [13] Ouibrahim1 .A, Tlili-Ait-kaki, Y., Bennadja, S., Amrouni, S., Djahoudi, A.G., and Djeba, A.M., (2013) 'Evaluation of antibacterial activity of *Laurus nobilis* L., *Rosmarinus officinalis* L. and *Ocimum basilicum* L. from Northeast of Algeria' *African Journal of Microbiology Research*, 7(42): 4968-4973
- [14] Pauliuc.I., Dorica, B. (2013) 'Antibacterial activity of *Pleurotus ostreatus* gemmotherapeutic extract' *Journal Of Horticulture, Forestry And Biotechnology* 17(1): 242-245.
- [15] Patrakar, R., Mansuriya, M., and Pati, P. (2012) 'Phytochemical And Pharmacological Review On *Laurus Nobilis*' *International Journal of Pharmaceutical and Chemical Sciences*, 1(2): 595-602
- [16] Pandey, S., Pandey, R., and Singh, R. (2014) 'Phytochemical screening of selected medicinal plant *cinnamon zeylanicum* bark extract, Area of research; Uttarakhand, India' *International Journal of Scientific and Research Publications*, 4(6)
- [17] Francine, U., Jeannette, U., and Pierre, R.J. (2015) 'Assessment of antibacterial activity of Neem plant (*Azadirachta indica*) on *Staphylococcus aureus* and

*Escherichia coli*' Journal of Medicinal Plants Studies,  
3(4): 85-91

- [18] Vardapetyan .H, Tiratsuyan .S, Hovhannisyan .A,  
Rukhyan .M, Hovhannisyan .D (2013)  
'Phytochemical composition and biological activity of  
*laurus nobilis* leaves collected from two regions of  
south caucasus' Journal of Experimental Biology and  
Agriculture sciences, 1(2): 49-51