COMPARITIVE STUDY ON CULTIVATION OF OYSTER MUSHROOM *pleurotus ostreatus* ON DIFFERENT SUBSTRATES

PROJECT GUIDE:

Smt. Prasanna R Kovath

Assistant Professor

Department of Biotechnology

St Mary's College, Thrissur

PROJECT PERFORMED:

Sreelakshmi N K– STASSBT031

Swathilakshmi P S – STASSBT032

Vinni N G – STASSBT033

Arunima Jithenthran – STASSBT034

Sriya V B – STASSBT035

AIM & OBJECTIVES

The Aims and Objectives of the present study is to:

- Compare the yield of *Pleurotus ostreatus (*oyster mushroom)*on* different substrates.
- Analyse various chemical characteristics of *Pleurotus ostreatus (*oyster mushroom).
- Investigate Antimicrobial activity of crude extract of *Pleurotus ostreatus (*oyster mushroom) *by gel diffusion method.*

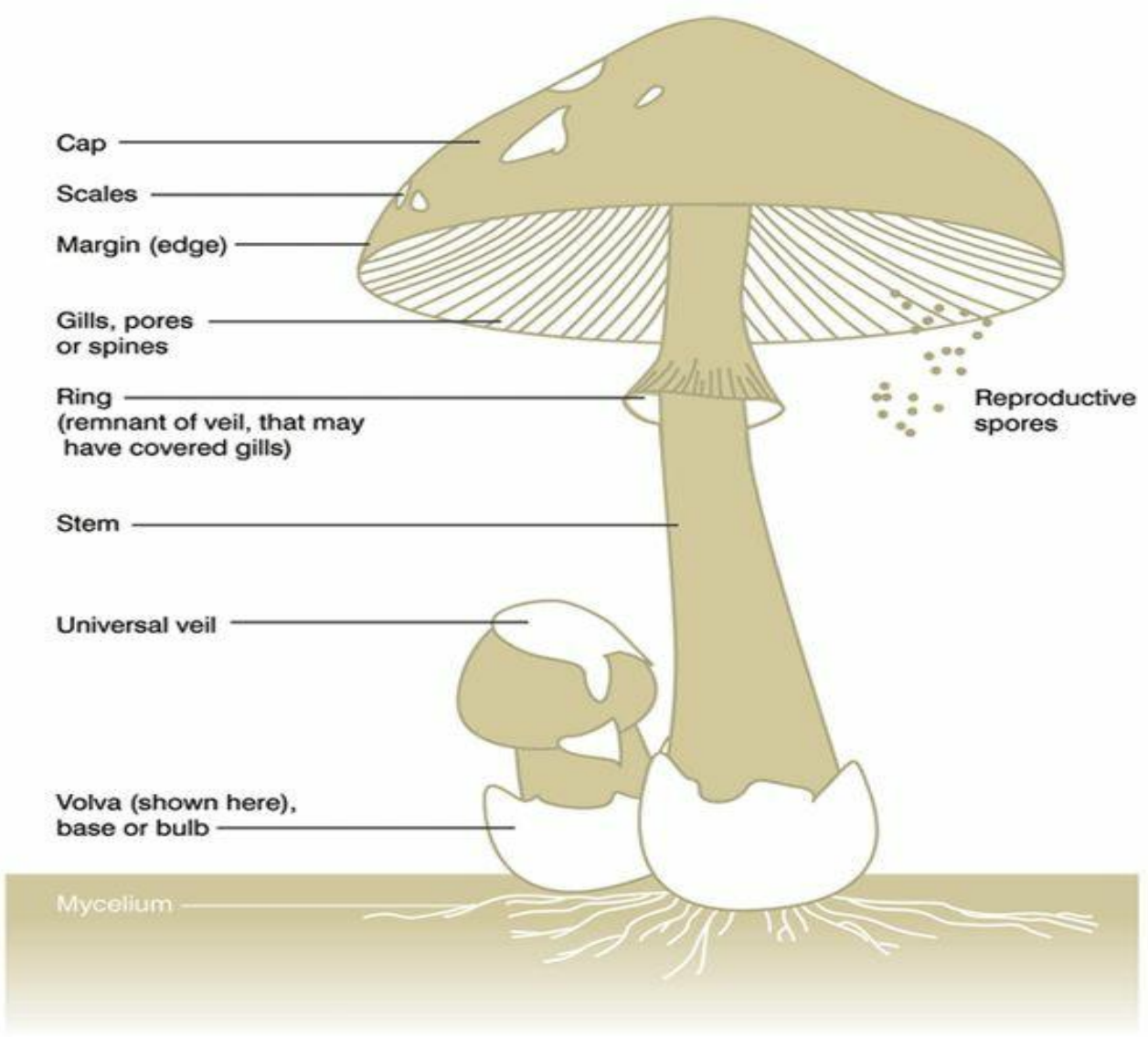
INTRODUCTION

Pleurotus ostreatus

Pleurotus ostreatus, the oyster mushroom is a common edible mushroom, grown commercially around the world for food. Oyster mushroom can also be used industrially for mycoremediation purposes.

Scientific Classification

Kingdom: Fungi
Phylum: Basidiomycota
Class: Agaricomycetes
Order: Agaricales
Family: Pleurotaceae
Genus: Pleurotus


Cap
Scales
Margin (edge)
Gills, pores
or spines
Ring
(remnant of veil, that may
have covered gills)
Stem
Universal veil
Volva (shown here),
base or bulb
Mycelium
Reproductive
spores

SPAWN COLLECTION

Pleurotus ostreatus spawns grown on sorghum grains were collected from Department of Microbiology, Kerala Agricultural University Mannuthy Thrissur Kerala India.

PREPARATION OF MUSHROOM BED

The substrates used as mushroom bed are banana leaves, coir pith, paper, saw dust and paddy straw.

RESULTS

Substrate	Colonisation	Pin head formation	Avg. yield	No. of flesh	Cap colour (pin head stage)	Cap colour(mature stage)
Banana leaves (S1)	***20 th day***	***20 th day***	***160 g***	***34***	***Pure white***	***Pure white***
Coir pith (S2)	***14 th day***	***27 th day***	***10 g***	***05***	***Pure white***	***Pure white***
Paper (S3)	***17th day***	***25 th day***	***10 g***	***05***	***Pure white***	***Pure white***
Saw dust (S4)	***14 th day***	***19 th day***	***30 g***	***10***	***Pure white***	***Pure white***
Straw (S5)	***14 th day***	***19 th day***	***100 g***	***15***	***Pure white***	***Pure white***

Mushroom growth on different substrates.

SUBSTRATE : BANANA LEAVES (S1)

	Cover I	**Cover II**
Inoculation	***17-11-2020***	***17-11-2020***
First harvest	***09-12-2020(22nd day)***	***12-12-2020(25th day)***
Flesh No. on 1st harvest	*34*	*14*
Total weight	*160g*	*95g*
Length × breadth	*7.5* ×5.5cm	*14* ×11.5cm
Texture	*White soft*	*White soft*
Second harvest	***19-12-2020(32nd day)***	***21-12-2020(34th day)***
Flesh No. on 2nd harvest	*26*	*07*
Total weight	*55g*	*90g*
Length × breadth	*7 ×7cm*	*7.5 ×6cm*
Texture	*White soft*	*White soft*
Third harvest	***30-12-2020(43rd day)***	***02-01-2021(46th day)***
Flesh No.	*09*	*18*
Total weight	*50g*	*50g*
Length × breadth	*8×5cm*	*7.5×6.5cm*
Texture	*White soft*	*White soft*

SUBSTRATE: COIR PITH (S2)

	Cover I	**Cover II**
Inoculation	***17-11-2020***	***20-11-2020***
First harvest	***24-12-2020***	***Nil***
Flesh No. on 1st harvest	*02*	*Nil*
Total weight	*09 g*	*Nil*
Length × breadth	*5×5.5 cm*	*Nil*
Texture	*White soft*	*Nil*
Second harvest	***Nil***	***Nil***
Third harvest	***Nil***	***Nil***

SUBSTRATE: PAPER (S3)

	Cover I	**Cover II**
Inoculation	***16-11-2020***	***16-11-2020***
First harvest	***30-12-2020***	***Nil***
Flesh No. on 1st harvest	*02*	*Nil*
Total weight	*15g*	*Nil*
Length × breadth	*10 × 6cm*	*Nil*
Texture	*White soft*	*White soft*
Second harvest	***Nil***	***Nil***
Third harvest	*Nil*	*Nil*

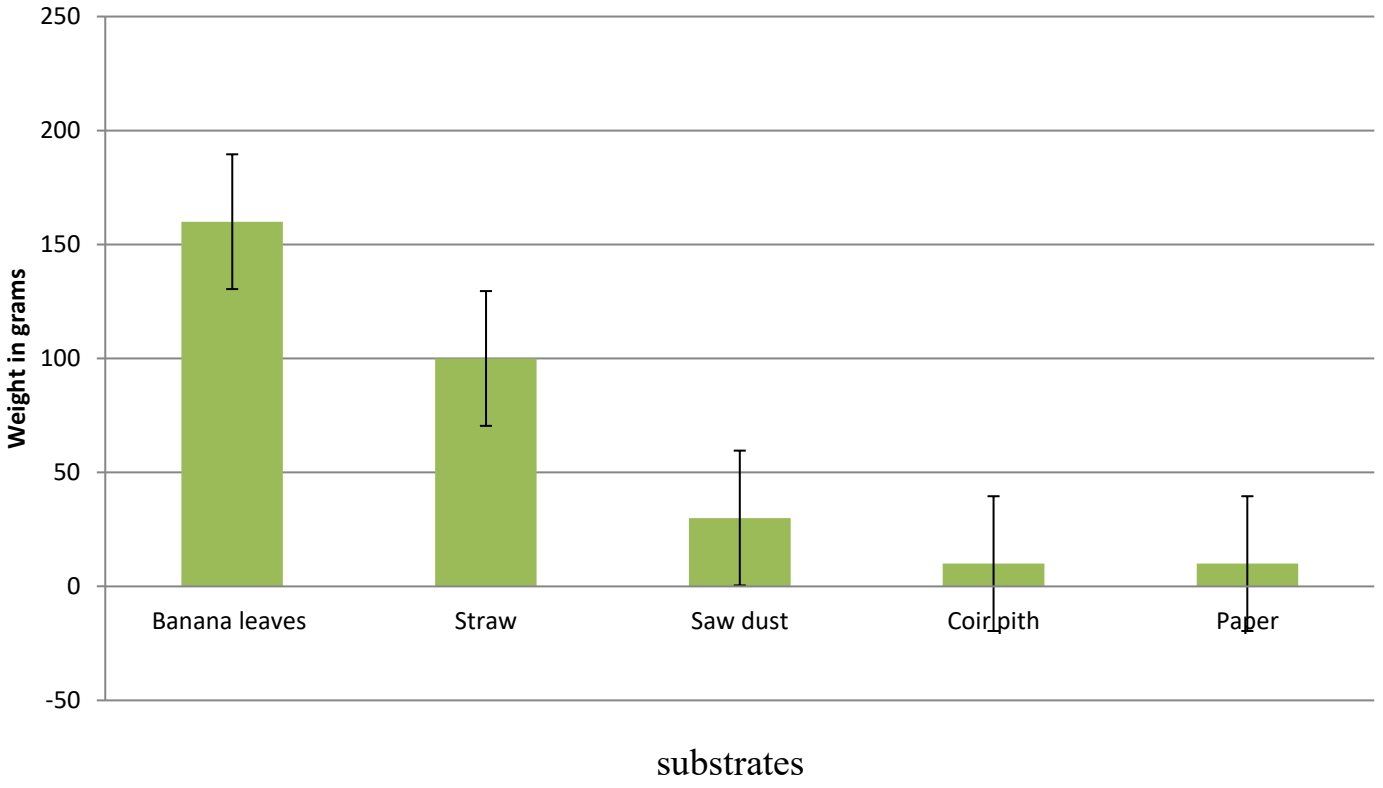
SUBSTRATE: SAW DUST (S4)

	Cover I	**Cover II**
Inoculation	***27-11-2020***	***10-12-2020***
First harvest	***02-01-2021***	***Nil***
Flesh No. on 1st harvest	*02*	*Nil*
Total weight	*29 g*	*Nil*
Length × breadth	*10× 8 cm*	*Nil*
Texture	*White soft*	*White soft*
Second harvest	***Nil***	***Nil***
Third harvest	***Nil***	***Nil***

SUBSTRATE: STRAW (S5)

	Cover I	**Cover II**
Inoculation	***16-11-2020***	***27-11-2020***
First harvest	***09-12-2020 (23d day)***	***15-12-2020 (18th day)***
Flesh No. on 1st harvest	*10*	*15*
Total weight	*54g*	*100 g*
Length × breadth	*12×7.5 cm*	*14 ×8 cm*
Texture	*White soft*	*White soft*
Second harvest	***Nil***	***Nil***
Third harvest	***Nil***	***Nil***

AVERAGE YIELD ON DIFFERENT SUBSTRATES



CHEMICAL ANALYSIS

Determination of Moisture Content

The moisture percentage was found out using the formula:

Moisture%= initial weight – final weight/initial weight *100.

Determination of *Total Ash Content*

The total ash content was found using the formula:

Total ash content (%) = weight of ash * 100 / weight of mushroom taken.

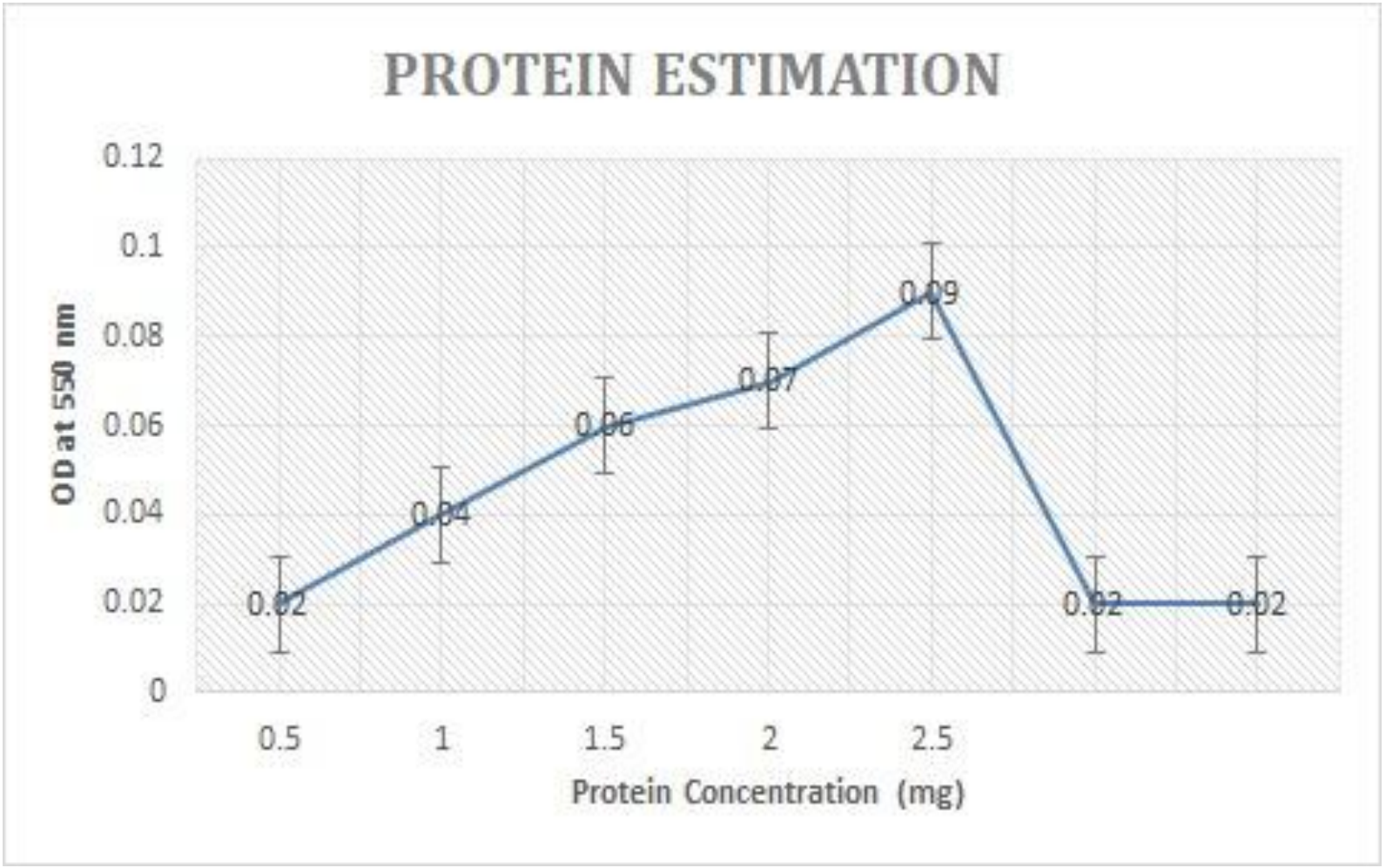
Estimation of protein

Protein content present in oyster mushroom were estimated using biuret protein estimation method.

RESULTS

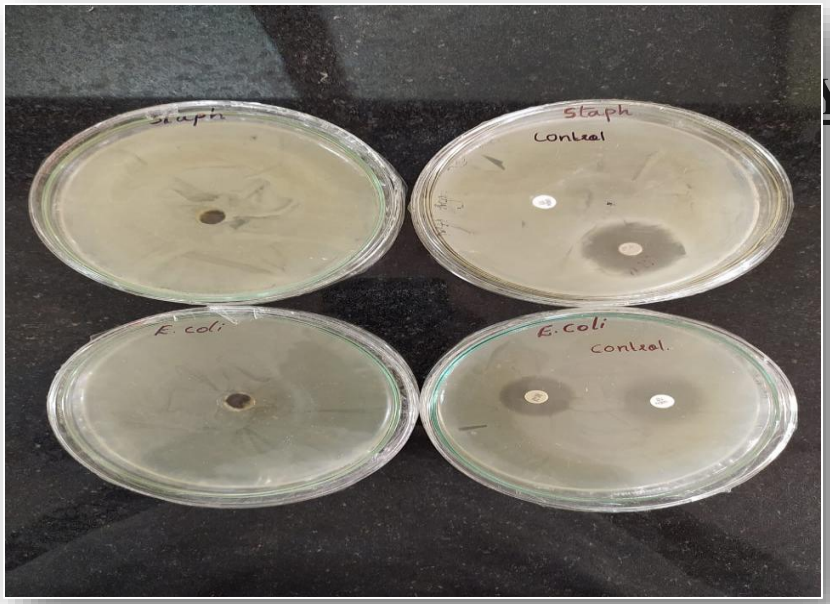
Moisture and Ash Content of Mushroom

Initial weight	***145 g***
Dried weight	***7.5 g***
Moisture percentage	***0.0094 %***
Ash weight	***0.1052 g***
Total ash content	***10.52 %***



The total protein content in oyster mushroom was found to be 0.02 g /ml.

ANTIMICROBIAL ACTIVITY



•In our study, no zone of inhibition was observed, which indicate that both the organism *Escherichia coli* (Gram negative) and *Staphylococcus aureus* (Gram positive) are resistant to the extract.

•In the petriplates incubated with antibiotic discs Gentamycin(10mcg) and Tetracycline(30mcg), clear zone were developed around both discs in *E.coli* while in Staphylococcus aureus clear zone is only developed around Tetracycline disc, due to antimicrobial activity.

•Further investigations can be carried in future by increasing the extract concentration, choice of method of extraction.

CONCLUSION

- Oyster mushroom is an edible mushroom which can be grown on various substrates like banana leaves, coir pith,vpaper, straw, saw dust etc. This study confirmed that the Oyster mushroom, Pleurotus ostreatus grown well in banana leaves when compared with other substrates.
- Total protein content present in fruitbodies of the oyster mushroom was analyzed by the Biuret method. The protein concentration was finally determined using standard curve with concentration of protein on x-axis and the absorbance on y-axis. And it is found to be 0.02g/ml.

- In our study of antimicrobial properties of the oyster mushrom, no zone of inhibition was observed, which indicate that both the organism Escherichia coli (Gram negative) and Staphylococcus aureus (Gram positive) are resistant to the extract.

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RESEARCH ARTICLE OPEN ACCESS

Comparative Study on Cultivation of Oyster Mushroom *Pleurotus Ostreatus* on Different Substrates

Prasanna R Kovath*

Arunima Jithenthran, Sreelakshmi N K, Sriya V B, Swathilakshmi P S, Vinni N G

*(Department of Biotechnology, St.Mary's College Thrissur,Kerala,India

Email: prasanna.r.kovath@smctsr.ac.in)

Abstract:

Mushroom is an edible macro fungus, *Pleurotusostreatus* (oyster mushroom)is an edible mushroom that also has high medicinal values. In this study, the effect of substrate on growth, yield and nutritional composition of domestically-grown oyster mushroom (*Pleurotusostreatus*) was investigated. The substrates used were straw, coir pith, newspaper, sawdust and banana leaves. The substrates were pasteurized with hot water (90°C for 4 h) before spawns of oyster mushroom were inoculated to them. After inoculation, the substrates were kept in a controlled environment. Various chemical characteristics like moisture content, total ash content, protein was estimated. Lastly antimicrobial activity of oyster mushroom was studied using gel diffusion method .The **study concluded that** *Pleurotusostreatus*(oyster mushroom) can be grown on any of the five substrates, but maximum yield was observed on Banana leaves.

Keywords *—Pleurotusostreatus* ,substrates ,Yield ,Nutrition,antimicrobialactivity,*gel diffusion method*.

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THANK YOU!