

# Optimal conditions for mycelial growth of edible *Lentinus* and their lignocellulolytic enzyme production

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## INTRODUCTION



*Lentinus* is one of the genera of mushrooms in the family *Polyporaceae*, classified as white-rot fungi. These mushrooms are distributed worldwide, with some species being edible and cultivated as a source of nutrition and medicinal properties. In Thailand, sixteen species of *Lentinus* have been recorded. Among these species, such as *L. sajor-caju*, also known as Hed Teen Plok, *L. polychrous*, known as Hed Lom, and *L. squarrosulus*, which is called Hed Khon Khao, are commonly cultivated for consumption. Cultivation methods can be categorized into two types, including laboratory and farm cultivations. Factors that affect the mycelial growth in the laboratory include culture media, temperature, pH, illumination, and aeration. By the way, farm cultivation various factors influence the development of mushrooms, including temperature, pH, illumination, humidity, gaseous environment, and one key factor is the type of substrate because it plays a critical role in the production of lignocellulolytic enzymes. These enzymes are essential for breaking down the substrate, making the nutrients available for the growth of mushrooms and fruiting body production.

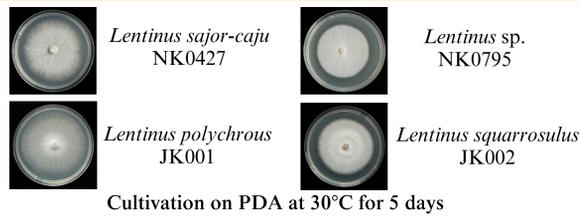
## OBJECTIVES

- To optimize the conditions for mycelial growth of edible *Lentinus*
- To study the production efficiency of lignocellulolytic enzymes of edible *Lentinus*

## METHODOLOGY

### 1. Mushroom strains

Mushroom cultures obtained from the Research Center of Microbial Diversity and Sustainable Utilization, Chiang Mai University



Cultivation on PDA at 30°C for 5 days

### 2. Optimal conditions of mycelial growth

#### 2.1 Effect of culture media

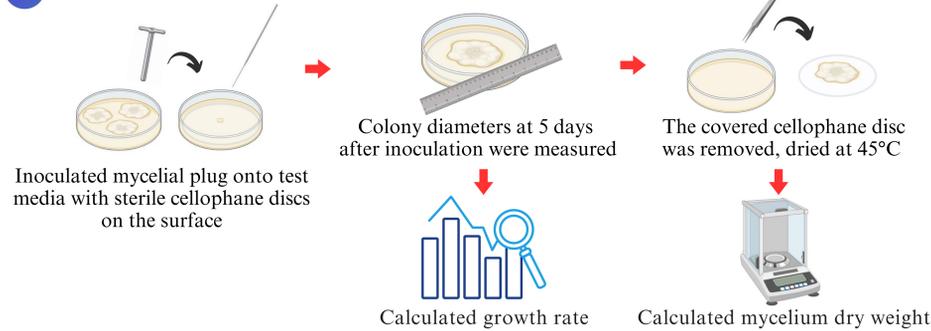
Culture of all strains on seven different types of culture media including potato dextrose agar (PDA), Czapek dox agar (CDA), malt extract agar (MEA), yeast glucose agar (YGA), yeast malt agar (YM), glucose peptone agar (GPA) and glucose yeast peptone agar (GYPA). The pH was adjusted to 6.0 and incubated at 30°C

#### 2.2 Effect of temperature

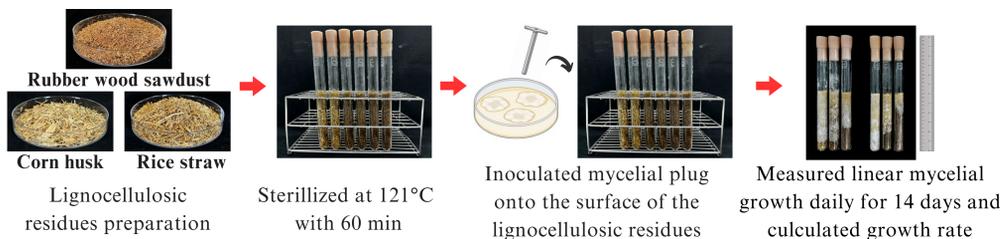
Cultivation of all strains on the optimal medium with pH at 6.0 and incubation at six different temperatures, including 20, 25, 30, 35, 37 and 40°C

#### 2.3 Effect of pH

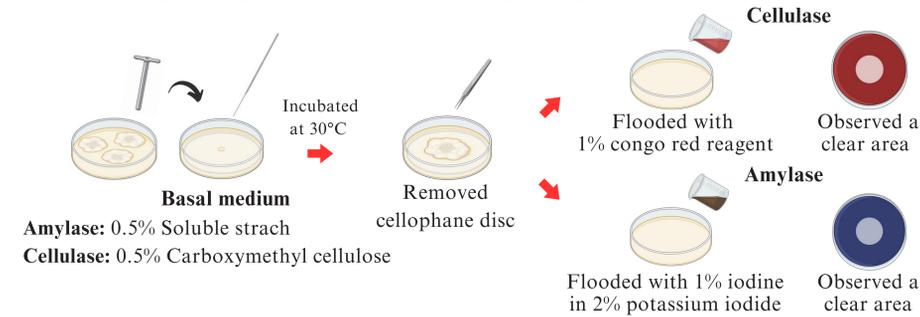
Cultivation on suitable medium with pH from 3.0 to 9.0 and incubation at the optimal temperature for each strains



### 3. Mycelial growth on different lignocellulosic residues



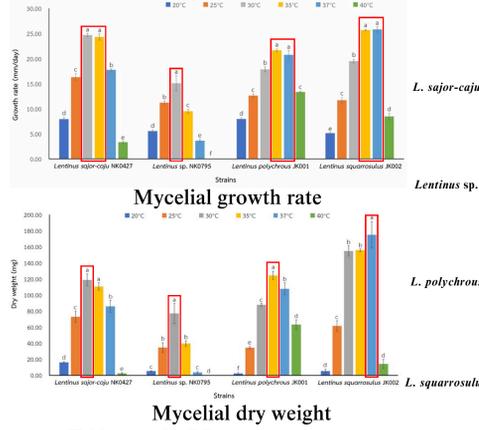
### 4. Screening of lignocellulolytic enzyme production



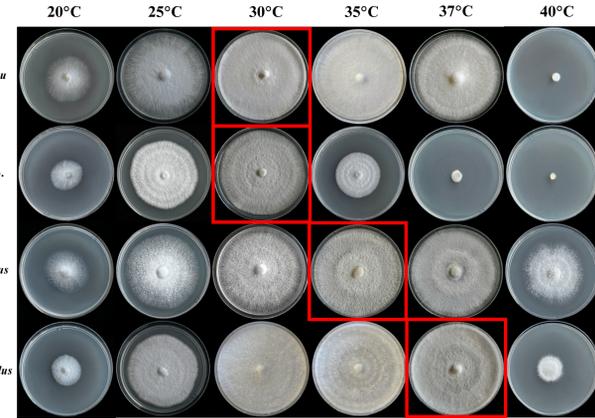
## RESULTS

### 1. Optimal conditions for mycelial growth

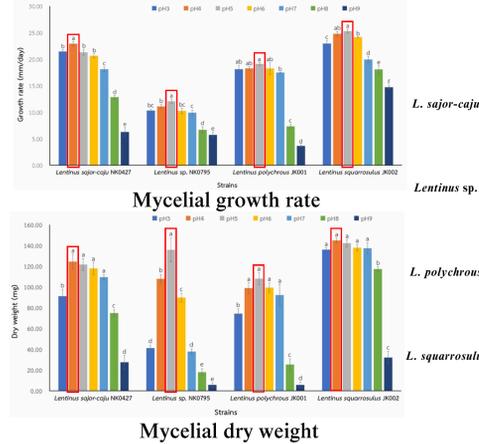
#### • Effect of temperature



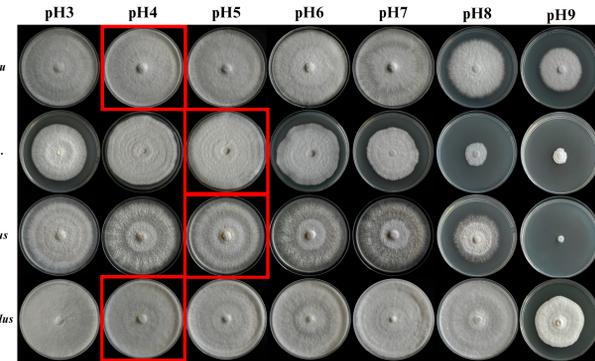
#### Colonies on PDA at different temperatures



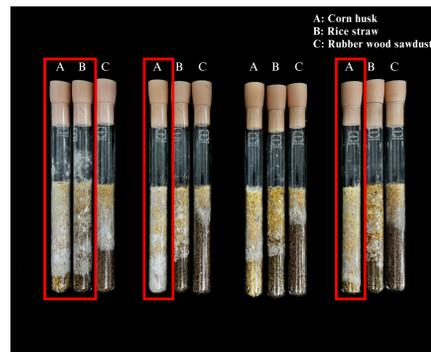
#### • Effect of pH



#### Colonies on PDA at different pH



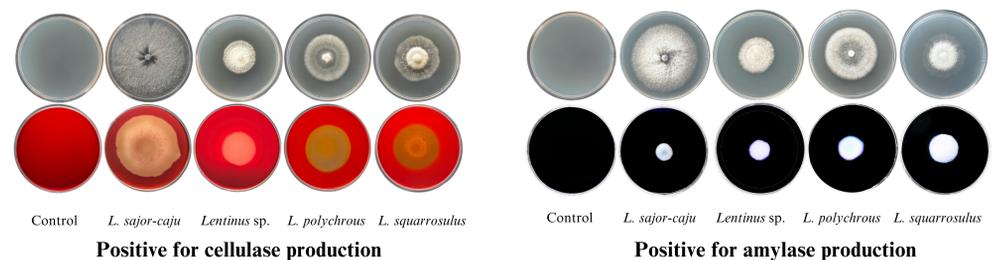
### 2. Mycelial growth on different lignocellulosic residues



Mushroom strains	Growth rate (mm/day)		
	Corn husk	Rice straw	Sawdust
<i>L. sajor-caju</i>	5.40±0.57 a	5.44±0.95 a	3.83±0.28 b
<i>Lentinus sp.</i>	5.08±0.73 a	3.96±0.42 b	1.85±0.34 c
<i>L. polychrous</i>	3.83±0.34 a	3.48±0.65 a	1.98±0.23 b
<i>L. squarrosulus</i>	5.10±0.28 a	4.52±0.28 b	2.25±0.30 c

Significant level at P<0.05

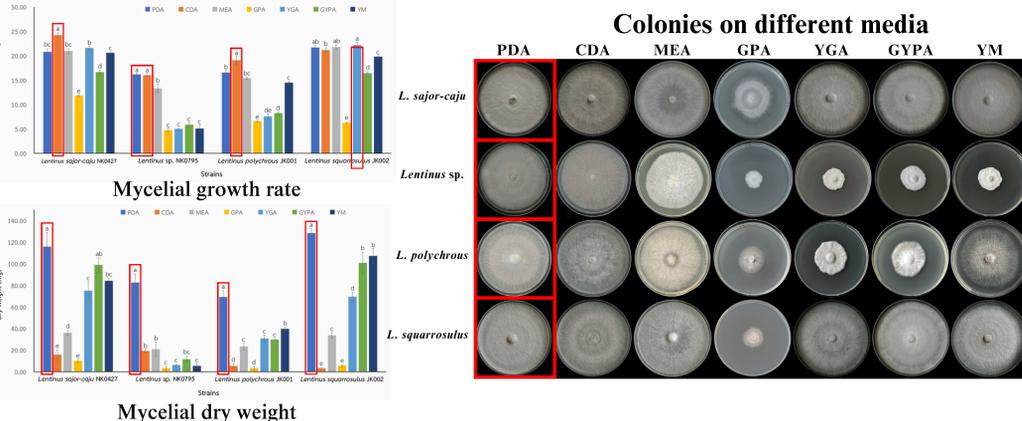
### 3. Screening of lignocellulolytic enzyme production



## RESULTS

### 1. Optimal conditions for mycelial growth

#### • Effect of culture media



## CONCLUSIONS

- PDA is the best culture media for all strains which support the maximum mycelium dry weight.
- The most suitable temperature and pH were 30 to 37 °C and 4-5, respectively.
- Corn husk are suitable lignocellulosic substrate for all strains.
- All strains have the ability to produce cellulase and amylase enzymes.

## ACKNOWLEDGEMENTS

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## REFERENCES

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- Sysouphanthong, P., Taliang, W., Wannasawang, N., Thongklang, N., (2023). The genus *Lentinus* in Thailand: taxonomy, cultivation tests, nutritional analysis and screening for the biological activity of wild strains. *Current Research in Environmental & Applied Mycology*, 13(1), 136-161. DOI: 10.5943/cream/13/1/10