

## EFFECT OF SUPPLEMENTATION OF C-SERUM FROM RUBBER (*HEVEA*) LATEX ON GROWTH AND FRUITING IN THE SHIITAKE MUSHROOM, *LENTINULA EDODES*

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### Introduction

The shiitake mushroom, *Lentinula edodes* has traditionally been cultivated on hardwood logs. However due to a shortage of logs, long gestation period and poor yield, an alternative technology of cultivation on a sawdust-mix has been developed (Tan and Chang, 1989). In Malaysia shiitake has been found to grow very well on sawdust from the rubber (*Hevea brasiliensis*) tree but not on others like the meranti (*Shorea* sp.). The component, which is present in large quantities in rubber sawdust but much less in others, is latex. Latex contains, in addition to rubber hydrocarbons, a large number of non-rubber constituents in small amounts. We aim to investigate whether C-serum in latex could function as a growth promoter for mycelial growth and fructification in shiitake.

### Materials and Methods

Latex collected from rubber trees was ice-cooled and then ultracentrifuged at 21,000 rpm (59,000 g) for an hour at 4°C according to Cook and Sekhar (1953). After centrifugation, the polyallomer tube was pierced to allow for the C-serum sediment to drain out. 5% serum (v/v) was added to 25 ml of media in 250 ml conical flasks, one being a chemically-defined medium (Leatham, 1983) and another potato dextrose broth (PDB). These substrates and a control without serum addition were inoculated with mycelial plugs of *L. edodes*, incubated stationary at 25°C for four weeks, then transferred to a cooler 20°C where fruiting occurred. Mycelial and fruit body dry weights were recorded each week over an eight-week period.

### Results and Discussion

Rubber latex can be separated into rubber particles (cis-1, 4 polyisoprene), Frey Wyssling particles, clear serum (C-serum) and bottom fraction (mainly lutoids). C-serum sup-

plemented synthetic medium resulted in a 1-408% increase in total biomass of *L. edodes* compared to the control, particularly in the early weeks. The increase recorded for PDB ranged from 150-290%. Fruiting was found to be more marked with serum supplementation on both media. Dry fruit body weight on synthetic medium recorded a 40-160% increase with supplementation, while fruit body yields of 109 mg (6<sup>th</sup> week) and 21 mg (7<sup>th</sup> week) were obtained only on supplemented PDB with no fruit bodies formed on unsupplemented PDB. C-serum is enriched with proteins, sugars, vitamins and inorganic nutrients. In fact, 48% of the total protein in latex comes from this fraction (Tata, 1980; Hashim, 1993). Sugars from the serum consist of glucose, sucrose, galactose, fructose, pentoses and quebrachitol. This rich array of nutrients in C-serum could possibly account for the trigger effect on mycelial growth and fruit body yield, and the compatibility of rubber tree sawdust to growth and fructification in shiitake.

### Conclusions

Supplementation of C-serum from the latex of the rubber tree has a stimulatory effect on growth and fruiting of *L. edodes* on both a synthetic and natural culture medium, resulting in a few fold increase in biomass. The addition of this nutritious concentrate to a substrate, be it an agro-waste material or sawdust from a hitherto non-suitable tree species to promote growth and fruiting may open up new horizons in shiitake cultivation.

### References

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