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Effect of various surface sterilant on tissue germination and contamination of *Lentinus edodes*

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ABSTRACT

Surface sterilant at various conc. viz., ethanol (75; 80; 85%) mercuric chloride (0.05; 0.1; 0.2%) and sodium hypochlorite (1; 2; 3%) were tested on tissue germination and contamination of Lentinus edodes. After the incubation period, observations were recorded on percent tissue germination, radial growth and contamination percentage.

Keywords: *Lentinula edodes presents an exciting opportunity for research and development*

Introduction

Lentinula edodes, commonly known as shiitake mushroom, has been highly esteemed in traditional Asian medicine for its wide array of health-promoting properties. Research has identified its efficacy in exhibiting antiviral, antifungal, antioxidant, and antitumor activities, contributing significantly to immune system enhancement [1]. The bioactive compounds present in *L. edodes* not only bolster immune function but also play a role in lowering cholesterol levels, acting as anticoagulants, and providing therapeutic benefits in cancer treatment [2].

Lentinula edodes is recognized for its substantial nutritional value. The mushroom is rich in protein, dietary fibers, and essential minerals, making it a valuable addition to a balanced diet [3]. Its diverse range of health benefits extends to antidiabetic, hypotensive, hypocholesterolaemia, and antimicrobial activities, further highlighting its role in promoting overall health and well-being. *Lentinula edodes* presents an exciting opportunity for research and development in functional foods and nutraceuticals. The ongoing exploration of its phytochemical composition and health effects underscores the potential of this mushroom not only as a culinary delicacy but also as a powerful ally in health promotion and disease prevention. Thus, understanding the cultivation and optimization of *Lentinula edodes* is crucial for maximizing its health benefits and nutritional contributions.

Materials and Methods

Different surface sterilants at various conc. viz., ethanol (75; 80; 85%) mercuric chloride (0.05; 0.1; 0.2%) and sodium hypochlorite (1; 2; 3%) were tested. The tissue bits isolated from the junction of pileus and stipe of a matured mushroom was dipped in different sterilants separately for 30 sec. and serially washed using sterile dist. water in order to remove the excess chemical and then placed aseptically into Petri dishes containing PDA medium. Six replications were maintained for each treatment and the plates were incubated at 25±2^{0}C for 15 days. After the incubation period, observations were recorded on per cent tissue germination, radial growth and contamination percentage.

Result and Discussion

The result of experiment clearly indicated that sodium hypochlorite (@ 2 per cent conc.) used as surface sterilant recorded the maximum tissue germination (99.2) with nil contamination. This was followed by ethanol @ 85 per cent which recorded 95 per cent germination with nil contamination but delayed the mycelia growth. Mercuric chloride @ 0.1 per cent successfully checked the contamination but recorded a poor germination percentage of the mushroom tissue.

The mushroom tissue bits treated with sodium hypochlorite @ 2 per cent recorded the minimum days to cover the Petri plate (11 days).Though sodium hypochlorite @ 1 percent recorded higher germination of 97.5 per cent, it recorded a contamination percentage of 11.9 per cent. In contrast, sodium hypochlorite @ 3 per cent recorded nil contamination but drastically reduced the germination per cent (52.7). The maximum contamination per cent was observed with untreated control (Table 1). The beneficial effect of sodium hypochlorite as surface sterilant on oyster mushroom [4-6] has been reported. The highest germination percentage of *Pleurotus ostreatus* was obtained from the treatment of sodium hypochlorite 2 per cent conc. and treatment of sodium hypochlorite at the rate of higher than 2 per cent conc. resulted in reduced germination [7].

Conclusion

The results of this study demonstrate that sodium hypochlorite at a concentration of 2% is the most effective surface sterilant for *Lentinula edodes* tissue, achieving a remarkable germination rate of 99.2% with no contamination. While ethanol at 85% also exhibited high germination (95%), it negatively impacted mycelial growth. Conversely, mercuric chloride at 0.1% effectively controlled contamination but resulted in low germination rates. Lower concentrations of sodium hypochlorite (1%) offered a higher germination rate (97.5%) but at the expense of increased contamination. Higher concentrations (3%) eliminated contamination but drastically reduced germination to 52.7%. The findings align with previous studies indicating the beneficial effects of sodium hypochlorite as a surface sterilant, emphasizing that optimal concentrations are crucial for maximizing tissue culture success. This research underscores the importance of selecting appropriate sterilization methods to enhance tissue germination and subsequent mycelial growth in mushroom cultivation, ultimately contributing to improved yield and productivity in the industry.

Table : Effect of various surface sterilants on tissue germination and contamination

Tr.no	Surface sterilants	Germination (%)	Radial growth(mm)			Contamination (%)
			7th day	9th day	11th day	
1	Ethyl alcohol 75 %	90 c	42.2 g	60.2 f	78.4 f	21.6 d
2	Ethyl alcohol 80 %	93 c	47.5 f	62.5 e	80.1 d	19.9 c
3	Ethyl alcohol 85 %	95 b	50.2 c	70.3 c	86.4 c	0.0
4	Mercuric chloride 0.05%	78.5 d	51.3 c	70.8 c	85.3 c	14.7 b
5	Mercuric chloride 0.1 %	58.5 e	49.3 f	65.2 d	81.4 d	0.0
6	Mercuric chloride 0.2%	30.1 g	27.2 h	51.4 g	78.1 f	0.0
7	Sodium hypochlorite 1%	97.5 b	53.2 b	73.5 b	88.1 b	11.9 a
8	Sodium hypochlorite2%	99.2 b	55.5 a	75.3 a	90.0 a	0.0
9	Sodium hypochlorite 3%	52.7 f	48.5 f	66.2 d	80.2 d	0.0
10	control	99.9 a	25.2 h	50.3 g	62.8 g	37.2 e

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