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Compatibility of *Pleurotus florida (*oyster mushroom) with systemic and non-systemic fungicides *invitro* conditions

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ABSTRACT

In order to evaluate the effects of different systemic and non-systemic fungicides on the growth of *Pleurotus florida* (oyster mushroom), an experiment was conducted during 2022-23 at Mushroom Laboratory, Polytechnic in Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Deesa, Gujarat. Thetreatment consisted of six different systemic fungicides *viz.* Thiophanate methyl (70% WP), Hexaconazole (5% EC), Propiconazole (25% EC). Carboxin (75% WP), Carbendazim (25% EC), Tebuconazole (25% WG) with 100, 250 and 500 ppm concentration and four non-systemic fungicides*viz* Captan (50 WP), Mancozeb (75 WP), Chlorothalonil (75 WP), Copperoxychloride (50 WP) with 250, 500 and 1000 ppm concentrations. The compatibility of *P. florida* with different systemic and non-systemic fungicides which were tested in factorial CRD replicated thrice. Among the six systemic fungicides, carbendazim 25% EC recorded the highest colony diameter at 100, 250, and 500 ppm (75.67, 30.33, and 22.67 mm, respectively). Among the four non-systemic fungicides, copper oxychloride 50% WP recorded the highest colony diameter at all three concentrations: 49.00, 42.25 and 34.75 mm, respectively.

Keywords: Oyster mushroom, *Pleurotusflorida*, Systemic fungicide, Non-systemic fungicide and compatibility.

INTRODUCTION

Mushrooms have been favoured as food by mankind since time immemorial. They could not be domesticated much because of their complex nature. One thousand years ago, the Chinese were the first to do the artificial cultivation of tropical and subtropical mushrooms. The real commercial ventures were started in Europe. It comprises a large, heterogeneous group with various shapes, sizes, and colours. They differ in character, appearance and edibility. However, our struggle to achieve nutritional security is still going on. They occur naturally in fields, forests, manure heaps, water channels and hilly areas, mostly during and just after rains.

Oyster mushroom be grown on a part-time schedule and which need minimum care. Indirectly, mushroom cultivation improves the sustainability of small farming systems by recycling agro-waste, which can be used as a growing substrate and then returned to the ground as an organic fertilizer (spent mushroom substrate). Successful mushroom growing and selling can build livelihood assets that not only reduce vulnerability to shocks but also improve an individual's and a community's ability to pursue other economic opportunities by providing income and improving health. There is a need to develop different technologies and use locally available agro-waste as substrates for mushroom cultivation to increase farmers' income and provide quality food (nutritional and medicinal properties).

MATERIAL AND METHODS

The present investigation entitled “Compatibility of oyster mushroom (*Pleurotusflorida*) with systemic and non-systemic fungicides under north Gujarat condition” was carried out in the Mushroom laboratory, Polytechnic in Agriculture, Sardarkrushinagar Dantiwada Agricultural

University, Deesa during the year 2022-23. Six systemic fungicide treatments were used:T_1-Thiophanate methyl (70% WP), T_2-Hexaconazole (5% EC), T_3-Propiconazole (25% EC), T_4-Carboxin(75% WP), T_5-Carbendazim (25% EC), T_6-Tebuconazole(25% WG) with100, 250 and 500 ppm concentration and four non-systemic fungicides*viz.* T_1-Captan (50 WP), T_2-Mancozeb (75 WP), T_3-Chlorothalonil (75 WP), T_4-Copperoxychloride(50 WP) with 250, 500 and 1000 concentration. The principle of this method is to poison the medium with the test fungicides and then allow a test fungus to grow on the poisoned medium. The poisoned food technique was adopted for in vitro testing of fungicides (Nene and Thapliyal, 2000). The efficacy of different fungicides at various concentrations was studied by using the poisoned food technique (Nene and Thapliyal, 2000). The measured quantities of different fungicides were incorporated separately into melted, sterilized PDA medium in conical flasks at a lukewarm stage, aseptically, to obtain the desired concentrations at the time of pouring the medium. The medium was shaken well to give uniform dispersal of the fungicides and then poured into sterilized Petri plates under aseptic conditions. The Petri plates were inoculated in the centre by placing a 5 mm seven days old mycelial disc and then incubated at 25 ± 2^0C temperature for seven days. Simultaneously, a control was maintained by growing the fungus on fungicide-free PDA medium. The mycelial growth of *P. florida* was measured as colony diameter when the control reached full mycelial growth. Radial growth of *P. florida* was measured at 24-hour intervals. This was done from the second day until full growth of the fungus was observed in the control plates.

RESULT AND DISCUSSION

Compatibility of *P. florida* with systemic fungicide

The compatibility of different systemic and non-systemic fungicides was tested using the poisoned food technique to study the radial growth of *P. florida*. Among systemic fungicides, carbendazim 25% EC recorded highest mycelial growth at 100, 250 and 500 ppm concentration which was 75.67 mm, 30.33 mm and 22.67 mm, respectively which was followed by hexaconazole 5% EC at 100 ppm concentration (64.00 mm), propiconazole 25% EC at 200 ppm (18.00 mm) and carboxin 75% WP at 500 ppm concentration (12.67 mm).

Table1:Effect of systemic fungicideson mycelia growth of oyster mushroom (*Pleurotus florida*)

	Treatments	100	250	500	Mean
T1	Thiophanatemethyl (70%WP)	49.67	8.33	6.00	21.33
T2	Hexaconazole (5% EC)	64.00	18.00	6.00	29.33
T3	Propiconazole (25% EC)	47.67	20.00	6.33	24.67
T4	Carboxin (75% WP)	44.33	17.67	12.67	24.89
T5	Carbendazim (25% EC)	75.67	30.33	22.67	42.89
T6	Tebuconazole (25% WG)	50.67	15.00	6.33	24.00
T7	Control	90.00	90.00	90.00	90.00
	Mean	60.29	28.48	21.43	-
		S.Em. ±	C.D. at5%	C.V. %	
	Treatment (T)	0.218	0.623	1.78	
	Concentration (C)	0.143	0.408		
	Treatment×Concentration (T×C)	0.378	1.079		

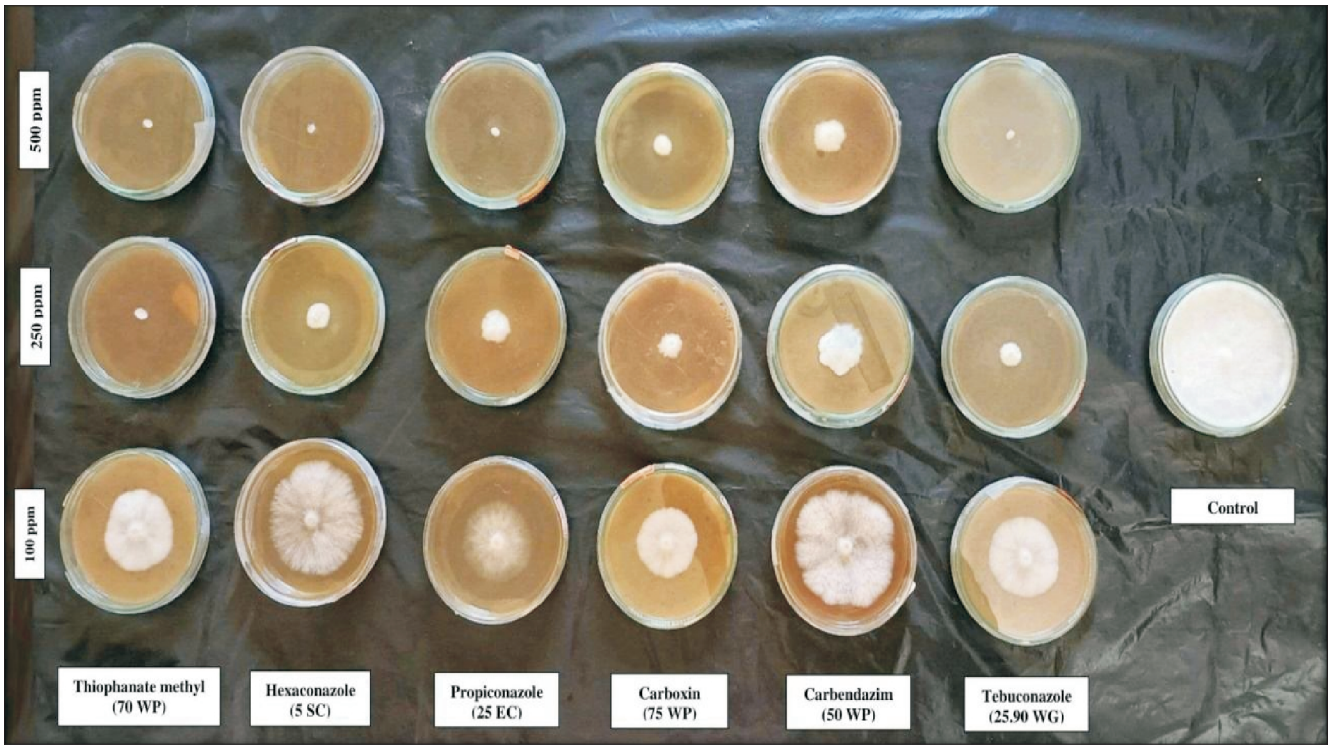


Plate 1: Compatibility of systemic fungicides with *Pleurotus florida* under *in-vitro* conditions

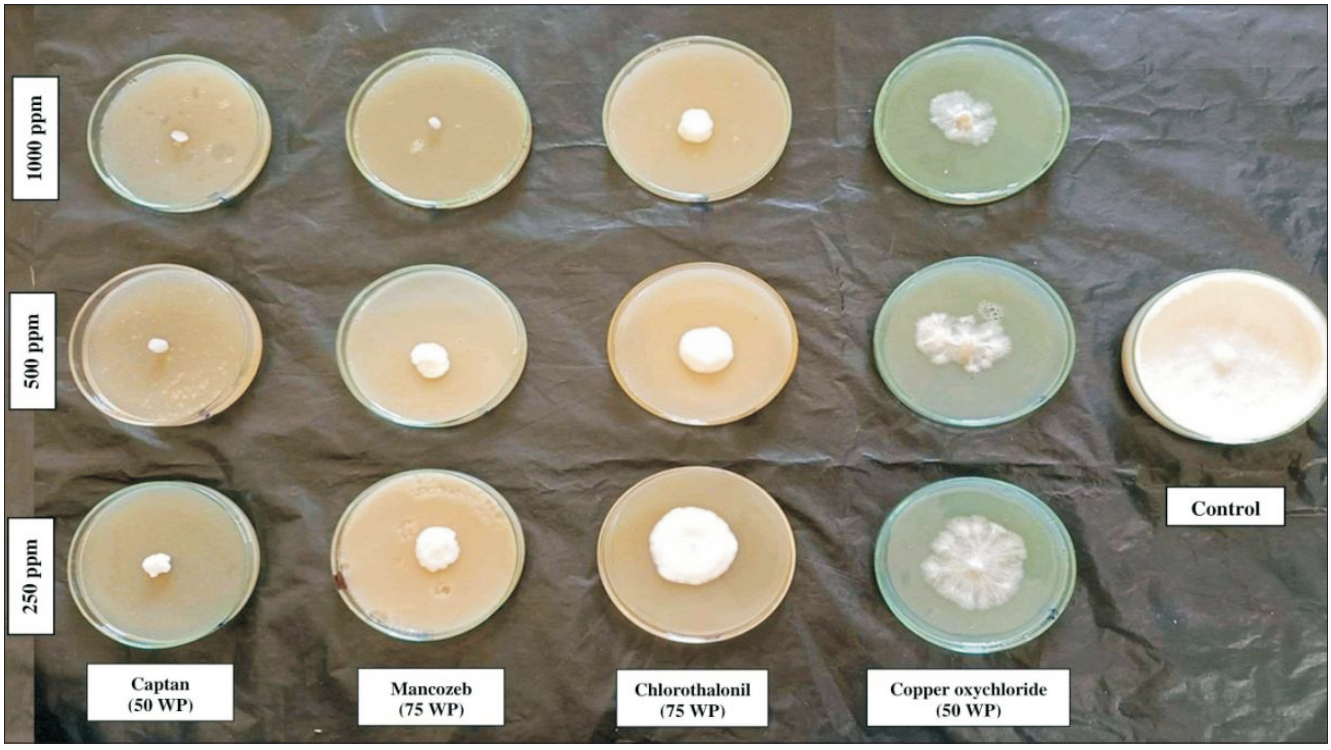


Plate 2: Compatibility of non-systemic fungicides with *Pleurotus florida* under *invitro* conditions

Compatibility of *P. florida* with non-systemic fungicide

Among non-systemic fungicides, copper oxychloride 50% WP exhibited the highest compatibility with *P. florida*, supporting mycelial growth of 49.00 mm, 42.25 mm, and 34.75 mm at 250, 500, and 1000 ppm, respectively which was followed by chlorothalonil 75% WP 40.25 mm, 25.25 mm and 16.75 mm, respectively. As there is less work on fungicide compatibility with different mushroom fungi, this study was carried out. Hence, the present objective was to determine the compatibility of fungicides with oyster mushroom (*P. florida*). While prior research by Rout (2011), Khan *et al.* (2012), and Sharma *et al*. (2018) documented that chlorothalonil, carbendazim, and hexaconazole possess safe compatibility margins with certain mushroom fungi chlorothalonil.

Table 2:Effect of non-systemic fungicides on mycelia growth of *Pleurotus florida*

Tr. No.	Concentration(ppm) / Treatments	Colonydiameter(mm) 250	500	1000	Mean
T1	Captan (50WP)	11.25	8.50	7.00	8.92
T2	Mancozeb (75 WP)	19.00	21.25	6.00	15.42
T3	Chlorothaloni l(75 WP)	40.25	25.25	16.75	27.42
T4	Copperoxychloride (50 WP)	49.00	42.25	34.75	42.00
T5	Control	90.00	90.00	90.00	90.00
	Mean	41.90	37.45	30.90	-
		S.Em. ±	C.D. at5%	C.V. %	
	Treatment (T)	0.229	0.651		
	Concentration (C)	0.177	0.505	2.16	
	Treatment×Concentration (T×C)	0.396	1.128		

CONCLUSION

Overall, oyster mushroom (*P. florida*) showed moderate to high compatibility and incompatibility with some systemic and non-fungicides tested. Among systemic fungicides, carbendazim 25% EC and hexaconazole 5% EC (each @ 100, 250 and 500 ppm) were compatible. Among non-systemic fungicides, copper oxychloride 50% WP and chlorothalonil 75% WP (each @ 250, 500, 1000 ppm) were compatible.

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