Spent mushroom substrate as mulch for yield enhancement and management of rhizome rot complex disease of ginger

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Introduction

- Spent mushroom substrate (SMS) is the composted organic materials remained after the harvest of a mushroom crop
- Creates various environmental problems if not handled properly
- Rich in plant nutrients including minerals
- Can be used for disease management
- Full of microflora- fungi, bacteria and actinomycetes

Objectives

- To study the effectiveness of spent mushroom substrate as mulch for ginger
- To evaluate its efficacy in the management of rhizome rot complex disease caused by *Pythium aphanidermatum* and *Ralstonia solanacearum*

Methodology

- For the production of SMS,
  mushroom species : *Pleurotus florida* and *P. sajor-caju*
  substrates : paddy straw, saw dust and neopeat
- Quantitative estimation of bacteria, fungi and actinomycetes from different SMS - by serial dilution method
- Evaluation of SMS against rhizome rot and bacterial wilt of ginger was conducted under pot culture condition
- Spent mushroom substrate was used as mulch at the time of planting, 60 DAP and 120 DAP
- Control- Dried paddy straw as mulch

Results and discussion

- Maximum number of microbial colonies was noticed in paddy straw, whereas it was minimum in neopeat
- In pot culture experiment, all the treatments with SMS as mulch showed better growth parameters and yield compared to control. Disease incidence was also less in these treatments
- Among the various treatments for the management of *P. aphanidermatum* and *R. solanacearum*, the treatment paddy straw SMS of *P. sajor-caju* as mulch were found to be the best giving cent per cent disease control
- In control treatment, cent per cent disease incidence was noticed
- The growth parameters like number of tillers, number of leaves per tiller and height of tillers and rhizome yield were also highest in the treatment paddy straw SMS of *P. sajor-caju* as mulch

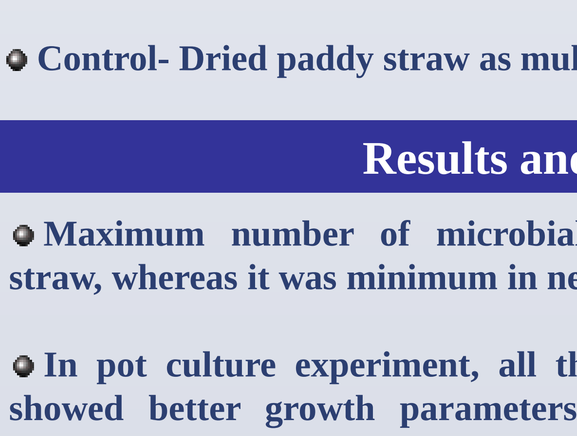


Fig.1 Comparison of Paddy straw SMS of *P. sajor-caju* (T_2) with Control (T_8)

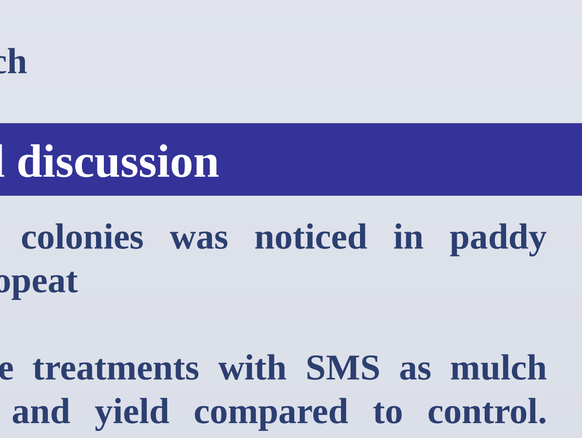
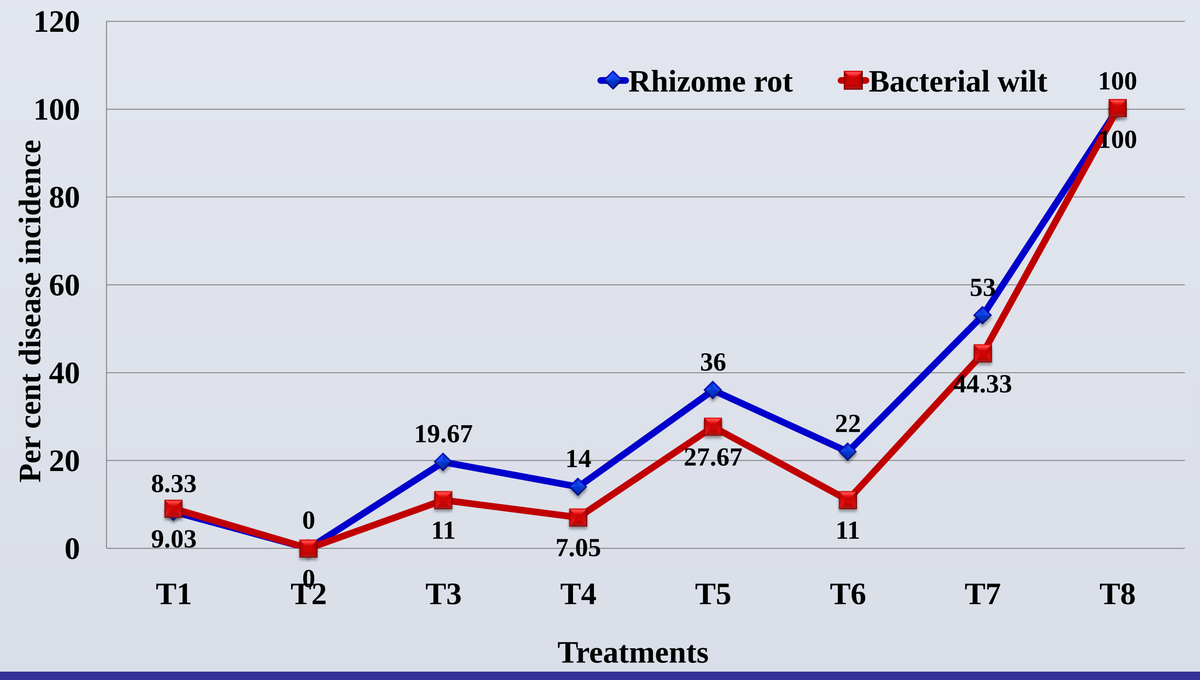


Fig.2 SMS as mulch treatments

Table 1: Effect of treatments on growth parameters and yield of ginger

Tr. No	Treatments	No. of tillers	No. of leaves/ tiller	Height of tiller (cm)	Yield (g/pot)
T_1	Paddy straw SMS of *P. florida*	5.44^{cd}	17.20^{bc}	33.70^{ab}	205.07^{c}
T_2	Paddy straw SMS of *P. sajor-caju*	10.56^{a}	21.23^{a}	45.77^{a}	316.03^{a}
T_3	Saw dust SMS of *P. florida*	6.33^{bc}	14.90^{d}	30.77^{b}	207.93^{c}
T_4	Saw dust SMS of *P. sajor-caju*	7.22^{b}	18.10^{b}	38.03^{ab}	252.14^{b}
T_5	Neopeat SMS of *P. florida*	4.67^{d}	16.77^{bc}	36.10^{ab}	225.25^{c}
T_6	Neopeat SMS of *P. sajor-caju*	4.89^{d}	15.10^{cd}	38.87^{ab}	214.52^{c}
T_7	Copper hydroxide 0.2%	8.00^{f}	14.87^{d}	29.77^{b}	176.23^{d}
T_8	Control	0.33^{g}	1.89^{e}	8.89^{c}	83.61^{e}
	CD (0.05)	1.15	1.65	8.65	19.95

Fig. 3: Effect of treatments on per cent disease incidence



Conclusion

- The spent mushroom substrate obtained from *P. florida* and *P. sajor-caju* can be used as mulch for ginger crops. It is rich in antagonistic microorganisms like fungi and bacteria
- Paddy straw SMS of *P. sajor-caju* was found to be the best giving maximum enhancement of growth parameters and also reduces the incidence of rhizome rot complex disease of ginger
- High cellulolytic capacity of *P. sajor-caju* favour the maximum degradation of the substrate, thereby provides a niche for the multiplication of favourable microorganisms with antagonistic and plant growth promoting activity

Reference

Ahlawat, O. P., Dev Raj, Sagar, M. P., Pardeep Gupta and Vijay, B. 2006. Effect of recomposted button mushroom spent substrate on yield, quality and disease-pest management of cauliflower. *Mush. Res*. 15 (2): 49-152.