RESEARCH ARTICLE

EFFECT OF VARIOUS OIL CAKES AQUEOUS EXTRACTS (EACH @ 5 % AND 10% @ CONC.) ON GROWTH OF *PLEROTUS* SPP.

Tarun Kumar Jatwa, K.T. Apet and Rudrappa K. Bannihatti*

Department of Plant Pathology, V.N.M.K.V., Dist. Parbhani, India
Email: tarunjatwa@gmail.com +919461553414

Received-10.04.2017, Revised-27.04.2017

Abstract: Effect of various oil cakes aqueous extracts each @ 5 % and 10% @ conc. (cotton seed cake, neem seed cake, soyabean seed cake, castor cake, karanj cake, safflower cake, sunflower cake and groundnut cake) on mycelial growth of *Pleurotus* spp**.** (*P. florida, P. eous, P. sajor-caju*) was studied *in vitro*. The culture media tested, maximum colony diameter of *P. florida* (90.00 mm) was recorded on Potato dextrose agar (control-without any aqueous extract of oil cakes), this was followed by Cotton cake extract @ 5 % (49.66 mm), Karanj cake extract @ 5 % (42.66 mm) minimum colony diameter was recorded on safflower cake extract @ 10 % (21.00 mm) and this was followed by sunflower cake extract @ 10 % (23.00 mm). The average colony diameter of *P. eous* the maximum colony diameter (90.00 mm) was recorded on Potato dextrose agar (control-without any aqueous extract of oil cakes), this was followed by Cotton cake extract @ 5 % (59.66 mm), Karanj cake extract @ 5 % (55.66 mm) and the minimum colony diameter was recorded on sunflower cake extract @ 10 % (20.33 mm) and this was followed by groundnut cake extract @ 10 % (24.66 mm). Colony diameter of *P. sajor-caju* the maximum colony diameter (90.00 mm) was recorded on Potato dextrose agar (control-without any aqueous extract of oil cakes), this was followed by Cotton cake extract @ 5 % (53.00 mm) and the minimum colony diameter was recorded on castor cake extract @ 10 % (20.33 mm) and this was followed by sunflower cake extract @ 10 % (22.00 mm).

Keyword: *In vitro, Plerotus florida, Plerotus. eous, Plerotus sajor-caju,* Culture media

INTRODUCTION

Edible mushrooms are nutritionally endowed fungi (mostly Basidiomycetes) that grow naturally on the trunks, leaves and roots of trees as well as decaying woody materials (Chang and Miles, 1992; Stamets, 2000; Lindequist *et al*., 2005). These edible mushrooms include *Agaricus* spp. (button mushrooms), *Volvariella volvacea* (oil palm mushrooms), *Auricularia auricula* (wood ear mushroom), as well as *Pleurotus ostreatus* (oyster mushrooms) (narh *et. al.2011).*This Mushroom is fleshy, spore-bearing reproductive structures of fungi grown on organic substrates and for a long time, have played an important role as a human food due to its nutritional and medicinal properties (Etich, O. K., *et. al.* 2013)). Mushrooms are a good source of protein, vitamins and minerals and are known to have a broad range of uses both as food and medicine. A high nutritional values of oyster mushrooms has been reported with protein (25-50%), fat (2-5%), sugars (17-47%), mycocellulose (7-38%) and minerals (potassium, phosphorus, calcium, sodium) of about 8-12% (Stanely *et. al.* 2011). Edible mushrooms are also rich in vitamins such as niacin, riboflavin, vitamin D, C, B1, B5 and B6 (Syed, A. A. *et. al*. 2009).

This mushroom is gaining popularity day by day considering the nutritional and medicinal importance of this mushroom, an attempt was made to evaluate different strains for their physiological requirements and the substrate suited for their production (Rakesh Kumar and kushwaha, 2014)

MATERIAL AND METHOD

Prepartion of pure culture of *P. florida, P. sajor-caju* and *P. eous.*

Matured pileus/cap of *P. florida, P. sajor-caju* and *P. eous* was placed in the sterile glass petriplats (90 mm) lined with dark black coloured drawing sheet paper, facing gills underside covered with lid and kept as such for a over night. Next day morning abundant white coloured circular spore print on paper sheet was obtained. From this spore prints, spores were gently lifted with the wire loop and transfered on autoclaved and cooled PDA medium in glass Petriplates under Laminar air flow cabinet. These plates were then incubated at 20^0C in an incubator. After a week of incubation, profused whitish, cottony growth was developed. From these plates, pure culture of *P. florida, P. sajor-caju* and *P. eous* were preapred on PDA slants in glass test tubes and preserved in refrigrator for further studies.

Prepartion of aqueous extracts of oilcakes.

Aqueous extracts of eight oilcakes *viz*., cotton seed cake, neem seed cake, soyabean seed cake, castor cake, karanj cake, safflower cake, sunflower cake and groundnut cake were used to study the culture growth of *P. florida, P. sajor-caju, P. eous.* Oil cakes were ground to coarse powder using mixer cum grinder. The 100 g each oil cake powder was dispensed in 100 ml distelled water and heated to boiling. Cooled at room temperature and filtered through double layered muslim cloth. The extracts

*Corresponding Author

were obtained were further filtered through Whatman No.1 filter paper using funnel and volumatric flasks. The final clear extracts obtained from the standard oil cakes extracts of 100 percent concentration, which were evaluated (each @ 5 % and 10%) using PDA as a basal medium.

An appropriate quantity of each oil cake extract (100%) was separately mixed throughly with PDA medium in conical flask (250 ml cap.) to obtain desired concentartion (5 and 10%) and autoclaved at 15 lbs/cm² pressure for 15 to 20 minutes. Sterilized and cooled PDA amended with oil cakes extract was then poured (15 to 20 ml/plate) into sterile glass petriplates (90 mm dia.) and allowed to solidify at room temperature. Each oil cake extrarct and its respective concentration were replicated thrice. The plates containing PDA without any extract were maitained as untreated control . Upon solidification of PDA , all the plates were aseptically inoculated by placing in the centre of a 5 mm mycelial disc obtained from a week old culture of *P. florida*, *P. eous*, and *P. sajor- caju* grown on agar plate. Plates containing plain PDA and with test fungus served as untreated control. All these plates were then incubate at 20 °C temperature for a week or till the untreated control plates were fully covered with mycelial growth of the test fungus. Observation on radial mycelia growth/colony diameters of the test fungal were recorded treatment wise as 24 hours intervals and continued till mycelial growth of the test fungus was fully covered in untreated control plates.

RESULT AND DISCUSSION

The average colony diameter of *P. florida* on various aqueous extracts of oil cakes in present investigation ranged between 21.00 – 90.00 mm. the maximum colony diameter (90.00 mm) was recorded on Potato dextrose agar (control-without any aqueous extract of oil cakes), this was followed by Cotton cake extract @ 5 % (49.66 mm), Karanj cake extract @ 5 % (42.66 mm), Cotton cake extract @ 10 % (41.00 mm) and Castor cake extract @ 5 % (39.66 mm) and the minimum colony diameter was recorded on safflower cake extract @ 10 % (21.00 mm) and this was followed by sunflower cake extract @ 10 % (23.00 mm).

The average colony diameter of *P. eous* on various aqueous extracts of oil cakes in present investigation ranged between 20.33 – 90.00 mm. the maximum colony diameter (90.00 mm) was recorded on Potato dextrose agar (control-without any aqueous extract of oil cakes), this was followed by Cotton cake extract @ 5 % (59.66 mm), Karanj cake extract @ 5 % (55.66 mm), Castor cake extract @ 5 % (52.00 mm) and the minimum colony diameter was recorded on sunflower cake extract @ 10 % (20.33 mm) and this was followed by groundnut cake extract @ 10 % (24.66 mm).

The average colony diameter of *P. sajor-caju* on various aqueous extracts of oil cakes in present investigation ranged between 19.00 – 90.00 mm. the maximum colony diameter (90.00 mm) was recorded on Potato dextrose agar (control-without any aqueous extract of oil cakes), this was followed by Cotton cake extract @ 5 % (53.00 mm), Karanj cake extract @ 5 % (50.33 mm), groundnut cake extract @ 5 % (50.00 mm) and Castor cake extract @ 5 % (48.00 mm) and the minimum colony diameter was recorded on castor cake extract @ 10 % (20.33 mm) and this was followed by sunflower cake extract @ 10 % (22.00 mm).

Table 1. Effect of various oil cakes aqueous extracts (each @ 5 % and 10 @ conc.) on growth of *P. florida.*

Tr. No.	Treatments	Avarage colony Diameter (mm)	
		5% conc.	10% conc.
T_1	Cotton seed cake	49.66	41.00
T_2	Castor cake	42.66	32.33
T_3	Ground nut cake	39.66	26.00
T_4	Karanj cake	30.00	23.00
T_5	Bajara	27.66	21.00
T_6	Sunflower cake	31.66	28.66
T_7	Neem seed cake	35.33	27.33
T_8	Soyabean cake	37.00	31.00
T_9	Control (untreated)	49.66	41.00

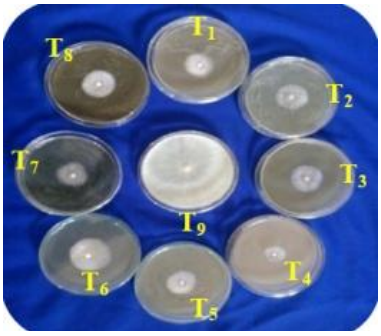
Table 2. Effect of various oil cakes aqueous extracts (each @ 5 % and 10 @ conc.) on growth of *P. eous.*

Tr. No.	Treatments	Avarage colony Diameter (mm)	
		5% conc.	10% conc.
T_1	Cotton seed cake	59.66	32.33
T_2	Castor cake	55.66	27.66

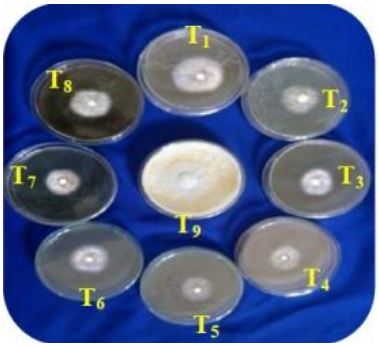
T_3	Ground nut cake	52.00	34.33
T_4	Karanj cake	43.33	20.33
T_5	Bajara	41.33	25.00
T_6	Sunflower cake	48.33	24.66
T_7	Neem seed cake	35.33	33.33
T_8	Soyabean cake	38.66	35.33
T_9	Control (untreated)	90.00	90.00

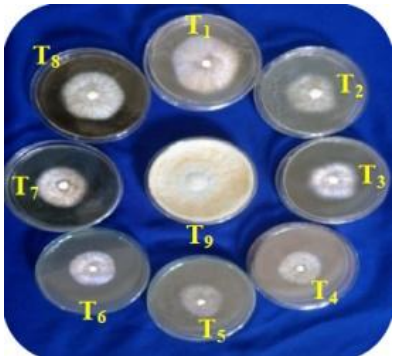
Table 3. Effect of various oil cakes aqueous extracts (each @ 5 % and 10 @ conc.) On growth of *P. sajor-caju.*

Tr. No.	Treatments	Avarage colony Diameter (mm)	
		5% conc.	10% conc.
T_1	Cotton seed cake	53.00	27.33
T_2	Castor cake	50.33	23.33
T_3	Ground nut cake	48.00	20.00
T_4	Karanj cake	42.66	22.00
T_5	Bajara	47.33	24.33
T_6	Sunflower cake	50.00	17.66
T_7	Neem seed cake	39.00	18.00
T_8	Soyabean cake	33.33	19.00
T_9	Control (untreated)	90.00	90.00

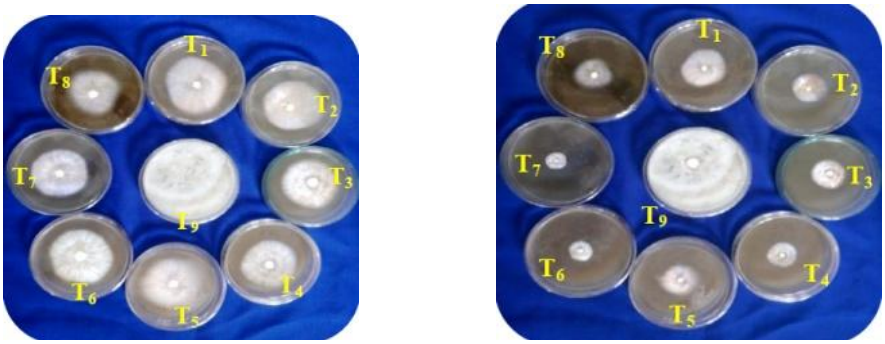


(A) 5 % conc. (*P. eous)* 10% conc.





(B) 5 % conc. (*P. florida)* 10% conc.



(C) 5 % conc. (*P. sajor-caju)* 10% conc.

Fig. 1. Effect of various deoiled cakes (DOC) aqueous extract on growth of *P.eous* (A), *P.florida* (B), *P.sajor caju* (C).

T_1 : Cotton seed cake
T_2 : Castor cake
T_3 : Ground nut cake
T_4 : Karanj cake
T_5 : Sunflower cake
T_6 : Neem seed cake
T_7 : Soyabean cake
T_8 : Safflower cake
T_9 : Control (untreated)

CONCLUSION

The result of present investigation revealed that the maximum colony diameter was recorded on potato dextros agar media and followed by Czapek's dox agar in *P. florida* and *P. sajor-caju* and in *P. eous* patato dextros agar followed by yeast maintop agar media.

REFERENCES

Syed, A. A., Kadam,J. A., Mane, V. P., Patil, S. S., Baig, M. M. V. (2009). Biological efficiency and nutritional contents of *Pleurotus florida* (Mont.) Singer cultivated on different Agro-wastes, *Natural Science*, Vol.7, No.1, 44- 48. 2009.

Bhatt, P., Singh, R. P. and Sati, S. C. (2010). Evaluation of different *Pleurotus* hybrid for their growth requirment *in-vitro*. *Indian phytopath.* 63 (40) 424-426.

Bhatt, P., Singh, R. P. and Sati, S. C. (2010). Evaluation of different *Pleurotus* hybrid for their growth requirment *in-vitro*. *Indian phytopath*. 63 (40) 424-426.

Chang, S. T. and Miles, P. G. (1992). Mushrooms biology—a new discipline. Mycologist 6: 64–65.

Dey, R.C., Nasiruddin, K. M. and Mamsur, A. (2007). Effect of different harmone, media and varity on mycelial growth of mushroom. *J. Bangladesh Agril. Univ*. 5 (2): 181-187.

Gibriel, A.Y., Ahmed, M., Rasmy, N., Rizk, I. and Abdel-Rehem, N. S. (1996). Cultivation of oyster mushroom (*Pleurotus* spp.): Evaluation of different media and organic substrates. *Mush. Biol. Mush. Prod*. 1(3): 415-421.

Lindequist, U., Niedermeyer, T. H. J. and Julich, W. (2005). The pharmacological potentials of mushrooms. eCAM 2: 285–299

Narh, D. L., Obodai, M., Baka, D. and Dzomeku, M. (2011). The efficacy of sorghum and millet grains in spawn production and carpophore formation of *Pleurotus ostreatus* (Jacq. Ex. Fr) Kummer. *Int. Food Research J*. 18(3): 1143-1148

O. K. Etich, O. I. Nyamangyoku, O. I. Rono, J. J. Niyokuri, A. N. Izamuhaye (2013). Relative performance of Oyster Mushroom (*Pleurotus florida*) on agroindustrial and agricultural substrate, *International Journal of Agronomy and Plant Production*, Vol.4, No.1, 109-116.

R.P. Stanley (2011). Enumerative combinatorics, Cambridge university press, Vol. 49.

Rawte, H. and Diwan, R. (2011). Growth response of *Pleurotus* spp. on different basal media and different pH levels. *J. Ecobiotechno*. 3(4): 10-12.

Stamets, P. (2000). Growing Gourmet and Medicinal Mushrooms. 3rd edn. California, Berkley: Ten Speed Press.

Stanley, H. O. and Awi-Waadu, G. D. (2010). Effect of substrates of spawn production on mycelial growth of oyster mushroom spp. *Res. J. Applied Sci*. 5 (3): 161-164.

Thulasi, E. P., Thomas, P. D., Ravichandran, B. and Madhusudhan, K. (2010). *International J. of Biol. Techno*. 1(3): 39-42.