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Effect of temperature and relative humidity on spawn production

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Abstract
Oyster mushroom (*Pleurotus spp*.) is fungal fruiting body. There are several oyster mushroom varieties available. Some of the varieties were commercially cultivating in Tamil Nadu. The seeding material for mushroom is spawn. The spawn will give good yield based on the climatic condition especially temperature and relative humidity (Bugarski, D 2000). A study was undertaken for identifying effect of temperature and relative humidity on oyster spawn production exclusive for Trichtrappalli district. The isolation is made from mushroom. The mushroom isolation was done for pure culturing of mushroom. These isolates were cultured in PDA medium. Sorghum and paddy seeds were used for spawn production. The spawn production mainly depends upon temperature and relative humidity, however the temperature and relative humidity of December and January months are more favorable for spawn growth compared to March and April. The high yield was recorded in December and January compared to February while during the project period. The results showed that temperature and relative humidity are the main climatic factors that alter the spawn growth.

Keywords: Temperature, relative humidity, spawn production

Introduction
The mycelium of *Pleurotus* is pure white in colour. It may also grow on decaying organic matter. The fruiting bodies of this mushroom are distinctly shell or spatula shaped with different shades of white, cream, grey, yellow, pink or light brown depending upon the species. The oyster mushrooms have three distinct parts-a fleshy shell or spatula shaped cap (pileus), a short or long lateral or central stalk called stipe and long ridges and furrows underneath the pileus called gills or lamellae. The gills stretch from the edge of the cap down to the stalk and bear the spores. Oyster spawn can grow at moderate temperature ranging from 20 to 30 ^{0}C and humidity 70-90%. It can also be cultivated in summer months by providing the extra humidity required for its growth. In hilly areas above 900m (M.S.L.), the best growing season in the lower regions from October to January. Like Temperature, Relative humidity is important to the growth and development. Keeping these objectives in view present investigation was taken up.

The major states in India producing this mushroom are Orissa, Karnataka, Maharashtra, Andhra Pradesh, Madhya Pradesh, West Bengal and most of the North Eastern hill states. Among all the cultivated mushrooms *Pleurotus* has maximum number of commercially cultivated species suitable for round the year cultivation. All the varieties or species of oyster mushroom are edible except *P. olearius* and *P. nidiformis* which are poisonous. Species commercially cultivated all over the world during summer months includes *P. flabelltus, P. sajorcajo, P. sapidus, P. membranaceous, P. citrinopileatus, P.eous* etc. and those produced during winter are *P. ostreatus, P. florida, P. cornucopiae, P.fossulatus, P.eryngiietc.* Cultivation of different varieties of oyster mushroom was initiated in India in the early sixties. Commercial cultivation began in mid-seventies. Oyster mushrooms are the third largest cultivated mushroom. China, the world leader in Oyster production, contributes nearly 85% of the total world production of about a million tonnes. The other countries producing oyster mushrooms include Korea, Japan, Italy, Taiwan, Thailand and Phillipines. The present production of this crop in India is only around 1500 tonnes due to low domestic demand. Another inhibiting factor is that export demand orders are large and can be met only if a linkage is developed between producer, cooperatives and exporters. The economic importance of the mushroom lies primarily in its use as food for human consumption. It is rich in Vitamin C and B complex and the protein content varies between 1.6 to 2.5 percent (Caglarırmak N. 2007) [11].

International Species of *Pleurotus* are cheapest and easiest to grow among all the cultivated edible mushrooms. The mushroom yield is highly dependable on the quality of spawn and other abiotic factors (K. Chitra, 2018) [10]. Spawn production mainly depends temperature and relative humidity. Higher relative humidity and lower temperature are favourable for the mycelial growth. It is one of the most suitable fungal organisms for producing protein rich food from various agro-wastes or forest wastes without composting (Rajarathnam 1987) [3].

Materials and Methods

Preparation of culture medium (PDA) and inoculation of mycelium into the medium. Spawn growth is regularly observed. Mother spawn preparation include soaking of sorghum seeds for 45 min. then boiling for 30 min. Then the seeds were mixed with 20g $CaCO_3$ for 1Kg seeds. Then seeds were packed by using polypropylene bags (30×15 cm size and 150 gauge thick) Arrange the bags in a autoclave and sterilize under 120 lbs pressure for 30 min. Take out the bags after cooling and place them inside the culture room and switch on the UV light. After 20 minutes put off the UV light and start working on the culture room. Cut the fungal culture into two equal halves using a foreceps and transfer one half portion to a bag. Another half portion is for another bag. The mycelial growth was observed under different temperature and relative humidity.

Results and Discussion

Optimum temperature of 24 to 27 ^{0}C and relative humidity of 70 to 85% were more suitable for spawn production (Bhatt, P 2010) [7]. Our experiment were directly correlated with temperature and relative humidity and the similar way December month was most suitable for spawn production because temperature around 26 ^{0}C and relative humidity 77% were favourable for the mycelial growth. In April month high temperature 33 ^{0}C and relative low humidity 51% and spawn growth were reduced because it was negatively correlated with temperature and relative humidity. December and January month climate were more suitable for better mycelia growth. The mycelial growth was completely filled within tem to 15 days on the sorghum seeds. Among this temperature Dec, Jan month were noticed minimum of 26-28 ^{0}C and high Relative Humidity 70-77% were showed better growth than other months of March, April and May. In December and January month temperature and relative humidity supported faster growth positively than the other months and April month temperature 34 ^{0}C and Relative Humidity 51% negatively correlated because growth was declined. (Table 1and Fig. 1)

Table 1: Monthly Average Temperature and Relative Humidity

	Average Temperature (^{0}C)	Average Relative Humidity (%)
Dec	25.89	76.97
Jan	26.96	70.51
Feb	28.28	65.34
Mar	30.85	57.60
Apr	34.00	51.26

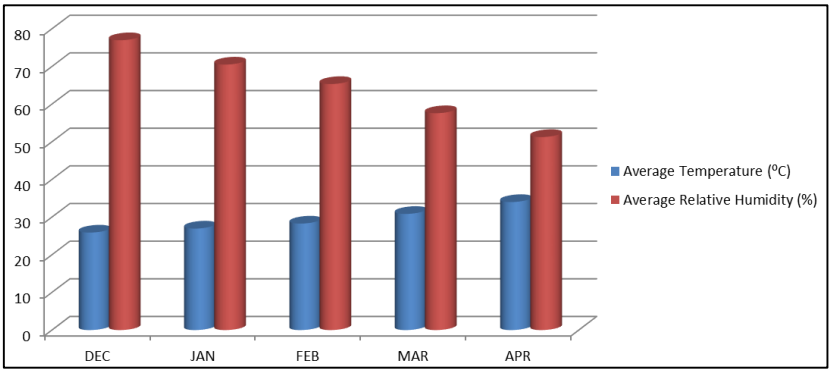

Fig 1: Monthly Average Temperature and Relative Humidity

Table 2: Weekly Average Temperature and Relative Humidity

DATE	Average temperature (^{0}C)	Average relative humidity (%)
Dec 16-22	26.20	78.20
Dec 23-29	26.10	80.70
Dec 30-jan 5	25.04	74.78
Jan 6-12	25.85	73.07
Jan 13-19	25.96	67.25
Jan 20-26	26.10	71.20
Jan 27-feb 2	26.50	67.5 0
Feb 3-9	27.60	68.28
Feb 10-16	27.75	67.71
Feb 17-23	29.00	62.50
Feb 24- mar 2	29.30	62.85
Mar 3-9	30.96	61.64
Mar 10-16	30.17	57.28
Mar 17-23	30.25	58.71
Mar 24-30	32.03	52.78
Mar 31-apr 6	32.25	51.73
Apr 7-13	33.50	50.27
Apr 14-20	33.75	50.13

Fig 2: Spawn growth during December month.

Fig 3: Spawn growth during April month.

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