Environment Conservation Journal 13(3) 65-68, 2012
ISSN 0972-3099 (Print) 2278-5124 (Online)
Abstracted and Indexed

Impact of media composition on the growth of flower decomposing fungi

Shobha Shouche [1], Praveesh bhati [2], Anil Pandey[1], Ulka Yadav ✉[3] and Sudhir Kumar Jain [3]

Received: 22.05.2012 **Revised: 17.07.2012** **Accepted: 23.09.2012**

Abstract

A growth experiment was conducted at Madhav Science College , Ujjain , India to find out the optimum growth requirements of flower decomposing fungi. In this experiment, Selected test fungi i.e. *Penecillium sp., Aspergillus sp., Mucor sp.,Rhizopus sp. , Alterneria sp.*etc, were taken and allow to grow in various kinds of media viz. semi defined media with floral extract , chemical defined media, semi defined media with yeast extract and semi defined media with floral extract & yeast extract. After incubation, observations indicate that semi defined media with yeast extract and floral extract is more suitable for fungal growth and absence of yeast extract slightly affect the fungal growth.

Keywords*: Basal medium, floral extract, fungi, decomposition, yeast extract*

Introduction

Composting is a biological process by which organic materials are degraded through the enzymatic activities of consecutive groups of microorganisms. It is a natural way to reduce organic wastes and produce organic fertilizer or soil conditioner (Gajdos, 1992). Composting process occur in a warm moist environment by action of bacteria, fungi and other organisms (Anastasi *et. al*., 2010; Annibale, *et al*., 2006 Salvator and Sabee, 1995). It requires conditions that are favorable for microbial growth including both physical and chemical factors. The organic waste materials used in the composting process can either be anaerobic or aerobic, but the process is much faster and less odoriferous if done aerobically. Although composting is a microbiological process, but little is known about microorganisms involved and their activities during specific phases of the composting process.Different microbial communities predominate during the various composting phases (mesophilic and thermophilic), each of which being adapted to a particular environment.The composition of the microbial communities during composting is determined by many factors (temperature, pH, water content, C/N, etc). In order to enhance the rate of composting microbial, inoculums added in composting bin. Inoculums prepared in the lab by using different nutrients ingradients. These ingredients are both organic and inorganic in nature. (Tiquia and Michel, 2002). Under aerobic conditions, temperature is the major selective factor for populations and determines the rate of metabolic activities.The objective of our study is to reveal the importance of different ingredients of nutrient for the growth of selected strain of fungi. In our study we selected floral degrading fungi and allowed to grow in different composition media. Experimental results show that C and N contents play an important role .Excluding above sources, vitamins also play compassionate role although not provided sole source of energy and allowed to grow alone.

Author's Address

[1] Government Madhav Science College,\Department of Zoology, Dewas road, ,Ujjain , M.P.
E-mail: shobha.shouche@gmail
[2] Government Madhav Science College, Research Scholar, Department of Microbiology, Dewas road, Ujjain, M. P.
[3] Vikram University, SOS in Microbiology, Dewas road, Ujjain , M. P.

Material and Methods

Fungal strains:

Several species of fungi were isolated from floral wastes. Out of these, one *Alterneria Sp* four *Aspergillus* spp., two *Chrysosporium* ,one *Cladosporium* ,one *Mucour* sp., two *Penicillium*

spp., one *Rhizopus* sp. and one *Trichoderma sp.* were selected by screening method. The screened fungi were maintained on Czapek- Dox Agar medium.

Media

For isolation, culturing, maintenance of stock cultures, and experimental studies the following range of media were used: Czapek- Dox Agar (Sucrose, 30 g; $NaNO_3$, 2 g; K_2HPO_4, 1 g; KCl, 0.5 g; $MgSO_4$, 0.5 g; $FeSO_4$, 0.002 g; Agar, 20 g; Distilled water,1 L), basal medium (Li Gao Xingzhong liu , 2010) K_2HPO_4 ,1.0 gm; KCl , 0.5 gm; $MgSO_4$, 0.5 gm; $FeSO_4$, 0.01 gm ; Distilled water,1 L (Sati & Bisht , 2006) K_2HPO_4 ,1.0 gm; $FeCl_3$, 0.5 gm; $MgSO_4$, 0.2 gm; yeast extract , 1.0 gm ; Distilled water,1 L. in basal medium 10% floral extract were added as a carbon & nitrogen source. During preparation of media four different types of media were prepared which contained different composition table 1.

Table 1: Different medium composition

Name of Medium	Composition of Medium
M1	Only basal medium
M2	Basal medium with 10% floral extract
M3	Basal medium with yeast extract
M4	Basal medium with yeast extract and floral extract

The above mentioned composition media prepared and distributed as 45 ml in 100 ml conical flask. Flasks were sterilized at 121°C for 15 min.

Inoculation and incubation:

Spores of selected fungi transferred in media (M1, M2, M3 & M4) by cork borer method. Each fungal species was inoculated in each medium and made double set. All media were incubated at 28°C for 7 days. After 07 days of incubation the net hyphal growth (Dry weight) in the media were determined. Adhered agar medium from the mycelia mat was removed by straining through a filter paper (Whatman No. 1). The mycelia mat rinsed with distilled water 3–4 times to remove traces of basal medium and placed in a Hot air oven at 105° C for 24 hrs. The fungal biomass weighed with a digital electronic balance.

Results and Discussion:

In this study we have taken the four different composition medium i.e. (M1-basal medium, M2-basal medium +yeast extract, M3-basal medium+ floral extract, M4-basal medium +yeast extract +floral extract). They all were screened for the growth of selected floral waste decomposing fungi (viz. *Alterneria Sp.*; *Aspergillus Spp*., *Mucour sp.*, *Cladosporium sp.Penicillium sp., Rhizopus sp*, *Trichoderma sp.*) The growth results of these fungal isolates are shown in figure no. 1 and table-2.

Basal medium (M1) without carbon and nitrogen source (the control) supported little growth. Basal medium + floral extract (M2) supported significant growth but not the best.

Basal Medium + Yeast extract (M3) supported little growth.Basal medium +yeast extract +floral extract (M4) supported best growth.

The results show that M4 is the most suitable medium for fungal growth as compare to M1, M2 and M3.Only basal medium was observed to be a poor source of fungal growth for all studied fungi. Basal medium + floral extract supported moderate growth of all selected fungi.

The variety and galaxy of fungi and their natural beauty occupy prime place in the biological world and India has been the cradle for such fungi. Only a fraction of total fungal wealth has been subjected to scientific scrutiny and mycologists have to unravel the unexplored and hidden wealth. (Manoharachary *et. al*., 2005) .composting is a process in which organic solid turn in to valuable product with the help of microorganisms. The active component involved in the biodegradation and conversion processes during composting is the resident microbial community, among which fungi play a very important role. (Brown, 1995; Tiunov and Scheu 2000).

In the present study, out of four different composition media, M4 medium support the maximum growth of all selected fungi. The growth of fungi mainly depend upon the suitable carbon & Nitrogen sources but the presence of trace amount of vitamins influenced the growth (Alexopoulos *et al*., 1996). Northolt and Bullerman (1982) reported that the growth of fungi depends on the composition of the growth media, water activity (aw), pH, temperature, light, and the surrounding atmospheric gas mixture.

Figure no.1: Growth of fungi with different composition of medium

Basal medium (M1)

Basal medium with floral extract (M2)

Basal medium with yeast extract (M3)

Basal medium +yeast extract+ floral extract(M4)

Table 2 Average dry weight (mg) yields of fungi after 7 d using different composition of medium

Fungal species	Basal Medium		Basal medium + yeast extract		Basal medium + floral extract		Basal medium +yeast extract + floral extract	
	Set-A	Set-B	Set-A	Set-B	Set-A	Set-B	Set-A	Set-B
Alterneria sp.	10	10	30	30	90	80	130	130
Apergillus sp.1	00	00	20	30	70	80	90	100
Aspergillus sp.2	10	00	40	30	80	80	130	120
Aspergillus sp.3	00	00	30	20	80	90	130	130
Aspergillus sp.4	10	10	30	20	80	80	120	120
Chrysosporium sp.	10	00	20	20	60	70	110	110
Cladosporium sp.	00	10	30	40	70	70	100	100
Mucour Sp.	10	10	30	20	70	80	100	110
Penicillium sp.1	10	00	20	20	60	70	100	110
Penicillium sp2	00	10	20	30	60	70	100	100
Rhizopus sp.	00	00	30	20	70	60	100	100
Trichoderma sp.	00	10	20	20	70	70	110	100

The effect of environmental factors on the growth of fungi is generally less specific and restricted than the nutrient factors. In basal medium very less growth is seen it may be because of the absence of carbon and nitrogen while supplies of floral extract enhance little but not significant growth M2 where as in the M3 media which supplies yeast extract supports only little growth but the addition of floral

extract together with yeast extract in M4 condition supports the best growth it may be because of fulfillment of C and N requirement as well as vitamins.These finding demonstrates that selection of appropriate composition of medium is an essential first step for the best growth of fungi and for commercial preparation of inoculums for the degradation of floral waste.

Acknowledgement

The authors are thankful to our principal Dr. Usha Shrivastava to give help and support.We are also very thankful to Shri Mahakal Prabandhan Samati ,Ujjain (M.P.) to provide initial grant for composting of flower.

References

Alexopolous, C.J., Mims , C.W. and Blackwelli, M. 1996 . *Introductory Mycology*. John Wiley, New York.

Anastasi, A., Varese , G.C., Marchisio , V.F., 2005. Isolation and identification of fungal communities in compost and vermicompost , ***Mycologia*** , 97 : 33–44.

Annibale, A. D., Rosetto, F., Leonardi , V., Federici, . F. and Petruccioli, M., 2006. Role of Autochthonous Filamentous Fungi in Bioremediation of a Soil Historically Contaminated with Aromatic Hydrocarbons. ***Journal of Applied and environmental Microbiology,*** 72: 28–36.

Barth, J. and Kroeger, B., 1998. Composting progress in Europe. – ***BioCycle Effluents Biotechnol. Prog.*** 19:.1156–1161.

.

Brown , G.G., 1995. How do earthworms affect microfloral and faunal community diversity? ***Plant and Soil*** .170: 209–231.

Christopher, J.G., Andrew, S. W., Michelle, S., Christopher , J. K., **and Tompson ,** I.P., 2003. Bioaugmentation strategies for remediating mixed chemical. ***Effluents . Biotechnology Progress.*** **19**:1156–1161.

Gajdos, R., 1992. The use of organic waste materials as organic fertilisers-recycling of plant nutrients. – ***Acta Hortic***. 302: 325-331.

Griffin , D.M., 1966. Fungi attacking seeds in dry seed-beds. ***Proc. Linnean Soc. N.S.W.*** 91:. 84-89.

Manoharachary , C., Sridhar , K., Singh ,R., Adholeya , A., Suryanarayanan , T. S., Rawat ,S. and Johri , B. N., 2005. Fungal biodiversity: Distribution, conservation and prospecting of fungi from India. ***Current Science.*** 89 : 58-71.

Northolt , M.D. and Bulleman , L.B ., 1982. Prevention of mold growth and toxin production through control of environmental condition. ***J. Food Prot.*** 6:.519-526.

Sjasjek , V., Glaser , J. A. and Baveye , P.,(1st edition) 2003. *The utilization of bioremediation to reduce soil contamination: problems and solution*, Kluwer Academic Publishers, Amsterdam, The Netherlands.

Salvator , K. and Sabee, W.E.,1995. Evaluation of Fertilizer Value and Nutrient Release From Corn and Soybean Residues Under Laboratory and Greenhouse. Conditions. ***Commu. Soil/ Sci., Plant Anal.*** 26: 469-484.

Sati , S.C. and Bisht , B., 2006. Utilization of various carbon sources for the growth of waterborne conidial fungi. ***Mycologia .*** 98: 678–681.