Study of Aero Myco Diversity, Growth and Count on Five Different Media

J. Thaware and S. Jawade.
Department of Botany, S. K. Porwal College, Kamptee.
jsthaware@gmail.com

Abstract

Hundreds of culture media were prepared for the study of fungi, which are specific according to fungal nutrient requirement and their capability of degradation. Some nutrient media have simple or complex carbohydrates, some are with peptones and few are complete chemical mixture of many elements. These diverse media can be differentially used for specific study of fungal biochemistry, genetics, molecular biology, cell biology or taxonomic studies. With aim of finding a better nutrient media specific for aeromycoflora study for isolation, identification and conservation, with respect to Diversity, growth and count the present study was carried out. The studies shows that, the PDA and PDRBA were good for the Isolation and Identification studies were CDA were efficient for Conservation of Aeromycoflora. Zygomycetes members can be studied on MEA. SDA were poor for growth of Aero-fungi, this is the only peptone containing media which were good to study opportunistic pathogens such as Aspergillus fumigatus, Candida, Yeast etc.

Keywords- Aeromycoflora, Nutrient media, Mold spores, Petriplate method .

Introduction-

Fungi are omnipresent organisms, they are most important in biogeochemical cycles. A fungus recycles tones of biodegradable waste per year due to their capability of growth on minimal substrate concentration by reproducing spores abunduntanly. Fungal spores are the major components of bio aerosols; they usually transport ample viable spores by means of air. Many aero biologists used to study aero-mycoflora by Petri-plate Method with mostly Potato Dextrose Agar (Debnath et. al., 2008). As fungi grows on minimal media having salts and sugars, some special structures produced by individual diverse fungi can be seen on typical media having special microelements, for instance some Ascomycetes, fungi which produce spores in closed receptacles known as perithecia, will produce on Czapek's Dox Agar what appear to be normal fruit bodies, but these are totally devoid of spores (Smith, 1949). On these basis scientist (Smith, 1959) inference that for fungal taxonomic study, a mycologist should identify and use different media for Isolation, Identification and conservation purposes. With aim of finding a better nutrient media specific for aeromycoflora study with respect to Diversity, growth and count the present study was carried out.

Material and Methods-

Sterile Petri-plates with five different types of media (Hi-media Pvt. Ltd.) were exposed for the period of one year (December 2013- November 2014) fortnightly at the height of 5 feet for 10 minutes at premises (outdoor) of Seth Kesarimal Porwal College, Kamptee. After exposure Petri-plates were sealed with parafilm tape and incubated at 25^{0}C- 28^{0}C for 3-4 days. Total numbers of colonies were recorded. Sub cultures were maintained and fungal species were identified with the help of standard literature (Tsuneo Watanbe, 1930; Gilman, 1945; Barnett, 1960 and Nagmani et.al., 2006).

Result and Discussion:

Total 560 colonies were calculated in 12 months study, with 42 species. Out of 42, 2 species represent class Ascomycetes, 5 were from Zygomycetes and remaining 35 from Dueteromycetes class (Table-I). Figure – I shows that, out of 560 colonies maximum 135 colonies were observed on Potato Dextrose Agar (PDA) nutrient media, followed by 115 on Potato Dextrose Rose Bengal Agar (PDRBA), 125 were in Malt Extract Agar (MEA), 111 was on Czapek's Dox Agar (CDA), and least 74 colonies were observed on Sabouraud Dextrose Agar (SDA).

Figure- II shows the class wise contribution . Ascomycetes with maximum nuber of 14 colonies were observed on PDRBA followed by 10 colonies on PDA and only one colony was observed on SDA. Zygomycetes members were best grown on MEA (35 colonies), followed by potato Dextrose agar with 21 colonies and least were observed on SDA 10 colonies. Dueteromycetes with all 35 species were observed on PDA with highest 104 colonies, followed by 34 species on CDA with 88 colonies, and least 23 species with 63 colonies were observed on SDA.

Dueteromycetes members are maximum saprophytes and their maximum contribution among aeromycoflora can be studied effectively with the help of Potato Dextrose Agar (PDA) medium. Molds which are represented by the species of *Mucor, Rhizophus, Cladosporium, Aspergilli, Penicillia etc* , were best grown on Malt extract Agar (MEA). Czapek's Dox Agar (CDA) a only

synthetic media used in study shows good results as concern with diversity , growth and count. Potato Dextrose Rose Bengal Agar (PDRBA) was having a antibiotic Rose Bengal inhibiting the growth of *Candida* and *Yeast sp.* but giving equal opportunity for surving maximum number of species on one Petri-plate. SDA were found very poor for Aeromycofloral studies.

From above results, we can conclude that the PDA and PDRBA were good for the Isolation and Identification studies were CDA were efficient for Conservation of Aeromycoflora. Zygomycetes members can be studied on MEA. SDA were poor for growth of Aero-fungi, this is the only peptone containing media which were good to study opportunistic pathogens such as *Aspergillus fumigatus, Candida, Yeast* etc.

Table. 1- Total no. of CFU produced on five different culture media

Fungal species Name	PDA	MEA	CDA	SDA	PDRBA
ASCOMYCETES					
Emericella nidulans	6	3	4	1	8
Eurotium amstelodami	4	1	3	0	6
ZYGOMYCETES					
Mucor sp.	5	7	3	2	3
Rhizophus nigricans	7	10	5	4	2
Rhizophus solani	4	8	2	1	3
Syncephalastrum racemosum	3	5	4	3	4
Cunninghamella sp.	2	5	2	0	3
DUETEROMYCETES					

Alternaria alternata	3	1	4	2	3
Alternaria brassicicola	3	0	3	2	2
Aspergillus flavipes	2	5	2	1	4
Aspergillus flavus	1	4	1	0	2
Aspergillus fumigatus	10	15	5	8	8
Aspergillus niger	7	12	6	5	5
Aspergillus tamarii	3	4	1	2	1
Aspergillus terreus	2	4	2	0	1
Candida sp.	3	0	5	4	3
Cladosporium cladosporioides	2	1	4	2	3
Cladosporium herbarum	4	3	6	1	4
Curvularia brachyspora	2	2	3	1	2
Curvularia lunata	3	2	2	2	3
Curvularia prasadii	2	0	3	0	3
Fusarium oxysporum	3	5	4	3	2
Fusarium moniliformae	2	0	3	4	0
Geotrichum sp.	4	8	4	1	3
Helminthosporium sp.	2	1	1	0	2
Humicola sp.	1	0	1	0	2
Microsporum sp.	3	0	2	4	3
Monodictys sp.	3	0	3	0	1
Nigrospora oryzae	3	1	2	0	2
Paecilomyces sp	2	3	1	2	1
Penicillium chrysogenum	3	3	2	2	2
Penicillium citrinum	2	2	1	3	3
Penicillium digitatum	3	2	0	2	2
Phoma sp	1	1	1	0	2
Rhodotorula sp	2	0	2	0	1
Scopulariopsis sp	3	2	1	0	2
Sporotrichum sp	4	3	2	2	3
Trichoderma sp	3	0	4	6	3
Trichothecium sp	4	0	1	0	2
Sterile mycelia (Black)	2	0	2	1	3
Sterile Mycelia (White)	3	2	1	0	1
Yeast sp.	4	0	3	3	2

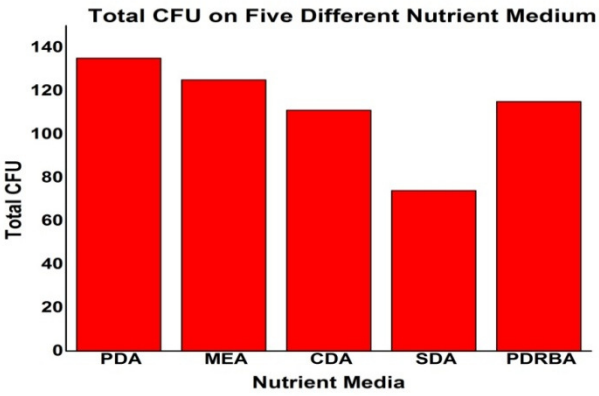

Figure-I: Total CFU count on five different nutrient media

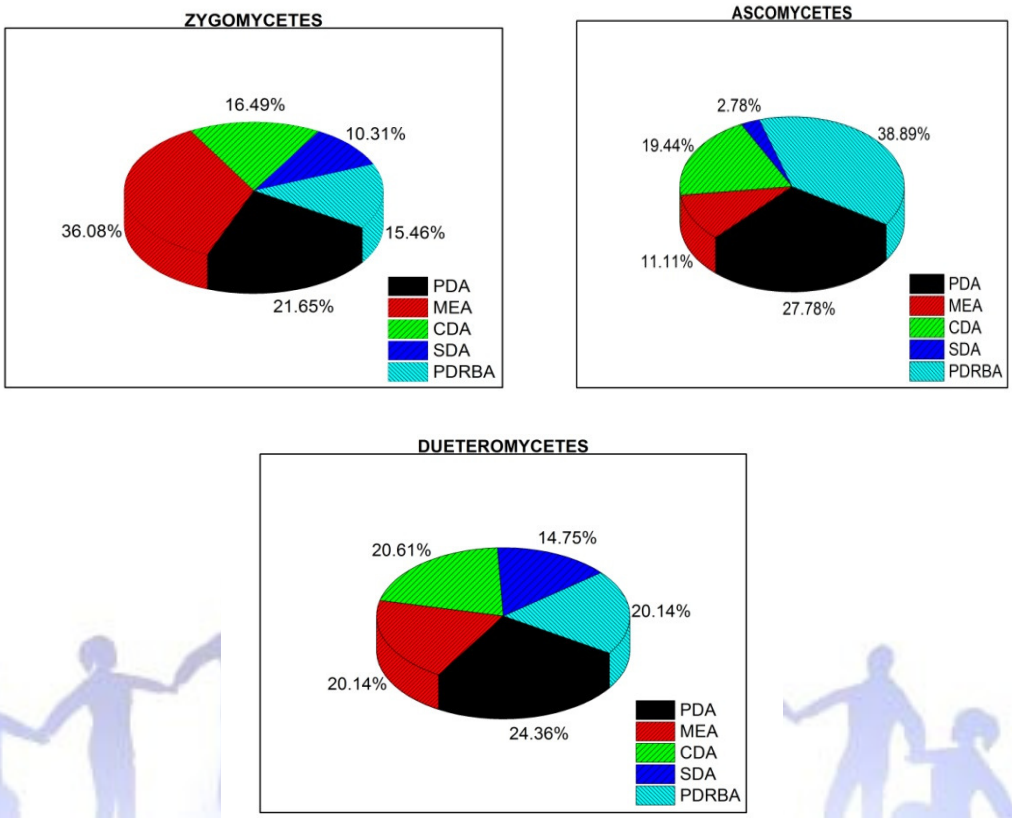

Figure. 2- Comparative account of colony formation of different classes of fungi On different nutrient media

Acknowledgement-

Authors are thankful to UGC for Financial support in the form of Major Research Project. Authors are also thankful to staff of Seth Kesarimal Porwal College for their cooperation and support.

References:

Barnett, H.L. (1960) *Illustrated genera of imperfecti fungi*, 2nd Ed.225 pp. Minneasota; Burgess Publishing Co.

Debnath S. and Baruah P.K.(2008) *Indian J. Aerobiol.*, Vol 21, No.2, pp 79-85.

Gilman J.C. (1945) *Manual of Soil Fungi.* The Iowa State College Press Ames, Iowa.

Nagmani A., Kumar I.K., Manoharachary, C. (2006) *Handbook of Soil Fungi.* I. K. International Pvt. Ltd., New Delhi and Bangalore.

Smith G. (1959) *J. Sci. Food Agric.*, 10.

Smith G.(1949), *Trans.Brit. mycol. Soc.* 32, 280.

Tsuneo Watanabe (1930), *Pictorial Atlas of soil and seed fungi: morphologies of cultured fungi and key to species.* 3rd Ed.