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ABRUS SUCROSE AGAR A NEW MEDIUM FOR THE GROWTH OF FUNGI

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Abstract

Mycelial growth and early spore formation of some fungal strains in Czapek's Dox Agar, Potato Dextrose agar and a complex medium containing sucrose, agar and Abrus seed powder were evaluated. Abrus contains nitrogenous compounds like Abrin, Paraglobulin and ∝- Phytalbumose.

Abrus medium showed high affinity for growth of mycelium and early spore formation in *Penicillium lilacinum, Paecilomyces variotti, Aspergillus ochraceous, Penicillium funiculosum* and *Spadiocoides stoveri* while comparatively low affinity with Czapek's Dox Agar and Potato Dextrose Agar.

Introduction

Microorganisms need nutrients as a source of energy and certain environmental conditions in order to grow and reproduce. In the environment, microbes have adapted to the habitats most suitable for their needs. In laboratory, however these requirements must be met by a culture medium. To culture fungi in the laboratory, it is necessary to furnish in the medium all essential nutrients for the synthesis of protoplasm (David 1978; Griffin 1966). First attempt to obtain laboratory cultures of fungi was made by the great Italian botanist Micheli (1729). He could succeed in growing three different molds viz., *Mucor, Aspergillus* and *Botrytis* on freshly cut surface of melon and pear.

Surveying the nutritional capabilities of a fungi is an endless task since every chemical found in living organism and a wide variety of manufactured and inorganic materials are potentially useful for satisfying the need of a fungus (Griffin, 1966).

Several naturally occurring agricultural byproducts such as wheat bran, coconut oil cake, groundnut oil cake, rice bran, wheat and paddy straw, sugar beet pulp, fruit pulps and peels, corn cobs, saw dust, maize bran, rice husk, soy hull, sago hampas, grape marc, coconut coir pith, banana waste, tea waste, cassava waste, aspen pulp, sweet sorghum pulp, apple pomade, peanut meal, cassava flour, wheat flour, corn flour, steamed rice, steam pre-treated willow, starch etc. could be used for the production of different species of Fungi. (Pandey *et al*., 2001).

Depending on the type and combination of nutrients, different categories of media can be made. Considerable work has already been carried out on nutrition of fungi (Fothergill & Jone 1958) and a large number of different kinds of media have been devised for fungal nutrition like Czapek's Dox agar, Potato dextrose agar etc.

The present report describes the comparative growth of fungi in Czapek's Dox agar (Thomas & Raper, 1945), Potato dextrose agar and *Abrus* sucrose agar medium. The aim of this study was to formulate an effective and cheaper medium for rapid fungal growth.

Material and Method

Preparation of seed powder: The seed of *Abrus precatorius* were collected from the local market of Hyderabad and Sanghar, Pakistan. These seeds were washed in sterile water, then ground in a pestle and mortar with the help of electrical grinder (ANEX AG-694).

Preparation of media: Abrus sucrose agar medium was prepared using 20 g of Abrus powder, 8.0 g of sucrose and 12.0 g agar or 30 g China grass in 1000 ml distilled water in a flask shaken vigorously in an automatic shaker for 20 to 30 minutes. The media was autoclaved at 121°C for 15 min., then poured in Petri dishes. The chemical composition of these media are given below.

Table 1. Comparison of media.

Czapek's Dox agar		Potato dextrose agar		Abrus sucrose agar	
Sucrose	30.0 g	Potato infusion	200.0 g	Abrus powder	20.0 g
$NaNO_3$	3.0 g	Dextrose	20.0 g	Sucrose	8.0 g
$MgSO_4$	0.5 g	Agar	15.0 g	Agar	8.0 g
KCl	0.1 g	Water	1000.0 ml	Water	1000.0 ml
$FeSO_4$	0.01 g	pH	5.6	pH	6.0 ±0.5
K_2HPO	1.0 g				
Agar Agar	13.0 g				
Distilled water	1.0 liter				
pH	7.3 ± 0.1				

The plates were incubated at room temperature. Growth was assessed every day for seven days and the result expressed in mm of colony diameter.

Result and Discussion

Fungal growth started on the first day of incubation in all substrates. Some degree of differentiation become visible after the 4^{th} day of incubation, The comparative study showed that *Paecilomyces variotii, Penicillium lilacinum, Phoma herbarum, Spadiocoides stoveri* showed significant difference which had vigorous mycelial growth and pigmentation than other media. Nutrient components in Abrus sucrose agar medium played an important role in triggering mycelial growth. Possibly due to the high nutritional value of embryo albumins, globulins.

Paecilomyces variotti showed 1.4 mm more growth in Abrus sucrose agar medium than Czapek Dox agar medium and 1.7 mm more growth in Abrus medium than P.D.A medium. *Penicillium lilacinus* showed 1.16 mm more growth in Abrus medium than Czapek and 1.84 mm more growth than PDA medium.

Conclusion

Abrus precatorius seeds contain nitrogenous compounds like Abrin, glycoproteins, paraglobulin & α-phytoalbumose (Budavari, 1989) along with sucrose and agar enhanced the growth of fungi and proved to be a good medium for rapid growth of fungi, early pigmentation and spore formation.

Table 2. *In vitro* evaluation of average fungal growth per days after 7 days.

Fungal culture	Czapek-Dox agar medium (mm)	Potato dextrose agar medium (mm)	Abrus sucrose agar medium (mm)
Paecilomyces variotii	5.5	5.2	6.9
Spadicoides stoveri	4.5	4.28	5.5
Penicillium sclerotorium	3.14	3.85	3.28
Aspergillus versicolor	5.3	4.92	5.07
Phoma herbarium	3.14	3.85	5.5
Penicillium funiculosum	4.21	5.07	5.21
Aspergillus ochraceous	4.0	4.21	4.35
Penicillium lilacinum	3.85	3.17	5.01

References

Ainsworth and Bisby. 1995. *Dictionary of the Fungi eight edition*. Commonwealth, Mycological Institute Kew, Surrey pp. 445.

Budavari. S. 1989. The Merck Index an encyclopedia of chemicals, drugs and biologicals, 10th ed. Rahway, New Jersey, Merck and Co., Inc.

Davis, J.H. 1978. *Abrus precatorius* (rosary pea). The most common lethal plant poison. *J. Fla. Med. Assoc*., 65: 189-191.

Fothergill, P.G and M.J. Jone 1958. *Gen Microbiology*, pp. 298.

Griffin, D.H. 1966. Fungal Physiology. John Wiley and Sons New York.

Gunn, C.R. 1969. *Abrus precatorius*: a deadly gift. *Gard. J*., 19:2-5.

Lilly, V.G. and H.I. Barnett. 1951. Physiology of Fungi. McGRaw Hill Book Company Inc. (New York) U.S.A.

Micheli, P.A. 1729. *Nova plantrum* genera. 234 pp. illus. Florance, Pl. 91.

Pandey, A., Soccol, C.R., Rodriguez-Leon and J.A., Nigam. P.2001. Solid-state Fermentation in Biotechnology. Fundamentals and Applications. History and Development of Solid-state Fermentation. P-3.

Raper, K.B. and C. Thom. 1945. Manual of Penicillia". The Wiiliams & Wilkins co., Baltimore U.S.A.

Vogel. H.J. 1956. A convenient growth medium for *Neurospora crassa*. *Genet Bull*., 13: 42-43.

Zamir, K. and S.S. Husain. 1970. Studies on the nutrition of fungi IV. Effect of different nitrogen and carbon sources on the growth of six imperfect fungi. *Pak.J. Sci. Ind. Res.,* 7: 171.

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