Formulation of minimal cost media for fungi

Discussion

There are a number of studies evaluated to find alternative and cheap culture media to replace expensive fungus medium. Fungus media such as PDA and SDA are commonly used for the growth of fungi in laboratories, whose compositions are well define but these readymade media are expensive to be used in research work and the cost of 1 kg of PDA is approximately $ 100 (Rs12, 750), making it very expensive[10]. Previous research studies used starch source such as sago, palmyrah tuber flour, tubers of sweet potato and cassava as alternative growth media for fungi[12]. Further vegetables are also reported to be used as alternative ingredient for preparing culture media for the growth of fungi and bacteria[28]. Thus the use of different alternative formulations as culture media in laboratories with basic facilities is very much feasible and cheaper when compared to commercially prepared media. The present study is aimed at replacing the nutrient source by various locally available cheap materials such as cereals and sugar sources that contain considerable amount of protein and starch.

In this study an attempt was made to formulate a cheap substitute of fungal growth media.

Fungi have important role in soils and plant nutrition. They plays important role by degrading / decomposing cellulose, hemi cellulose, starch, pectin, lignin in the organic matter present in the soil. Lignin which is resistant to degradation by bacteria is mainly decomposed by fungi. They are also sources of food for bacteria. Certain fungi that belong to sub-division

Zygomycotina and Deuteromycotina are naturally predaceous and attack on protozoa & nematodes in soil and thus maintain biological equilibrium in soil. They also have significant role in formation of humus and in aggregation. Number of soil fungi forms symbiotic relationship with the roots of higher plants and helps in mobilization of soil nitrogen and phosphorus[29]. Two types of media were selected with barley, sugar, dry milk and custard as their main ingredients. The reason for the use of barley is its richness in carbohydrates and proteins. The highest constituents in barley is starch (59. 1-61. 5%) followed by crude fiber (20%) and proteins of its dry weight (12-13%) [30]. Sugar which provides glucose (a carbon source), dry milk powder for protein, vitamins and fats. Salt maintain sodium and other trace elements in the media, agar as a solidifying agent, where in SDA, Peptone (Enzymatic Digest of Casein and Enzymatic Digest of Animal Tissue) provide the nitrogen and vitamin source required for organism growth in SDA, Dextrose is added as the energy and carbon source and Agar is the solidifying agent. Thus the newly formulated minimal media is good replaceable for costly media SDA, where its availability is less.

Media 1 prepared, checked the pH (7. 4 and SDA 5. 6) and poured into petri dishes and exposed to various environments such as B1 Hostel mess, KUST open environment and Microbiology Department laboratory (KUST) by open plate method or settle plate method. This is semi quantitative method used to assess the likely number of microorganisms depositing onto the product or surface in a given time. The method involves opening and exposing petri dishes containing agar medium suitable for growth of microorganisms of interest. The agar plates are left open at selected points for 15 to 20

minutes. This allows mold spores and fragments to settle onto agar media by gravity. Both Agar plates (Newly formulated media and SDA) showed black and brown colonies in B1 Hostel mess (Fig. 1), black and whitish colonies in KUST open environment (Fig. 2), black and brownish colonies in microbiology laboratory (Fig. 3) resembling Aspergillus spp.

The same media (M1) is used for soil samples collected at different zones (Rhizosphere, surface soil and deep soil) and inoculated after serial dilutions. The fungus growth appeared on media 1 is compared with standard medium SDA, the growth was similar. No growth appeared on water sample.

Newly formulated medium fulfill all the requirements that is required for the growth of fungi, because it contain all the ingredients that are present in SDA. The results obtained from the SDA and newly formulated media developed almost equal number of colonies with same morphology (Fig. 5, 6 & 7).

Media 2 (M2) inoculated with serially diluted soil samples of different zones along with control media SDA, white and brown colonies were appeared on the both media (Fig. 9, 10, & 11). The pH of M2 was 7. 85 and SDA was 5. 6. Basing on the morphology of colonies the soil samples contain Aspergillus (White or Black colonies) Cladosporium (Brown or Black colonies), Penicillium (Whitish Green colonies) etc. The growth of fungi was not appeared on water sample in M2.

CONCLUSION

The present preliminary study for the screening of alternative local and cheaper sources for the fungal culture media shows that among the four tested sources Barley, Dry milk, Sugar and Custard can be used instead of PDA or SDA with very low expenses. Therefore, we recommend this media for the fungal growth in order to carryout microbiological works. Further studies regarding the chemical composition of this media and cultivation of other types of fungi are needed to enrich the value of this finding.