e-ISSN 2320 –7876 www.ijfans.org
Vol.12, Iss.1, 2023
 UGC CARE Listed (Group -I) Journal

Study Of Mycology In Relation With Biocontrol Agents

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Abstarct :

As necrotrophs (which acquire nutrition from dead cells or tissues) and biotrophs (which obtain nutrients from living cells or tissues), fungi directly interact with trees. These interactions can take the form of parasites or mutualistic mycorrhizas. The great majority of plants in nature depend on mycorrhizas for their health because they provide them with water, mineral nutrients, and protection against root diseases. By digesting dead organic materials and releasing the nutrients that were contained therein, fungi have an indirect impact on trees because they are saprotrophs. The interactions between fungi, other microorganisms, and soil invertebrates that alter mycelial growth and function make the relationships between fungi, soil, and trees complex. The outcome of these interactions will probably change with a changing environment, and consequently, so will the relationship between fungi and trees.

Keywords:Saprotrophs, Fungi, Biocontrol Agents and Agriculture

INTRODUCTION :

The ability of xerotolerant and xerophilic fungal biological control agents to withstand abiotic stresses (such as water stress); ecophysiological manipulation of endogenous reserves (sugars and polyols) in inocula for improved growth, germination, and viability under water stress conditions; advancements in biological control in the field; and potential improvements to the commercialization of ecologically sound inocula.(Magan,2001).Two basidiomycete fungi from the genus Crinipellis (Agaricales), both of which are currently on an invasive front, are the primary limitation and ongoing threat to the production of cocoa in Latin America. As a management tactic, classical biological control—in which coevolved natural enemies are seen to have the greatest potential for long-term control of invading alien organisms—is being researched. In the beginning,

we searched the mesic forests of north-west Ecuador for the suspected coevolved host (Theobromagileri) of one of these pathogens, Crinipellisroreri, the cause of frosty pod rot; we isolated the endophytes and mycoparasites associated with both host and pathogen; we screened a few fungi in the greenhouse and laboratory to assess their biocontrol potential.(Evans et al,.2003)

A new approach to finding fungal biocontrol agents with greater thermotolerance and environmental persistence is suggested by the link between conidial thermotolerance and FAE protein levels.The viability of conidia after 3-150 min of temperature stress at 48°C was measured independently for each of the 11 isolates, and the survival indices fit well to a survival model (r2 097). The fitted model produced an LT50, or the period at which 50% of viability will be lost under stress, for a given isolation. Six isolates of B. bassiana (10–61–19 min) and five isolates of P. fumosoroseus (2–8–6 min) had LT50s that were associated (r2 = 0–81) with FAE protein levels (6–9–23–4 g mg1). After 45 minutes of heat stress at 48°C, the survival indices of a fixed B. bassiana isolate were also associated.(Ying et al,.2004)Entomopathogenic fungi (EPF) help control bug, tick, and mite populations naturally. The number of species known so far exceeds 750. Notable culture collections, like the USDA-ARS culture collection of insect-pathogenic fungi, provide proof that these cosmopolitan organisms have been isolated from soils and affected insects from various parts of the world. Numerous researchers from around the world have also documented the existence of these fungi in nature. The process of identifying which techniques and instruments are necessary for risk assessment of microbiological BCAs will be sped up by improved communication, coordination, and cooperation between the key players. Additionally, a thorough examination of the available data is necessary for the development of risk assessment tools as well as the change of data requirements, particularly where (Scheepmaker, et al,.2010)

BIOCONTROL STUDY

Using naturally infected soy beans and sterilised soy beans that had been intentionally inoculated with Aspergillusflavus, the ability of Pichia guilliermondii to prevent the growth of grain microflora was examined. When A. flavus (102 spores ml1) and P. guilliermondii (107 or 109 cells ml1) were administered to sterilised soy beans at the same time, fungal proliferation as shown by colony-forming-unit counts was significantly reduced during 16 days of storage. When yeast cells were applied three days before a fungal inoculation, the inhibitory action was reduced. By employing naturally infested soya beans at two different moisture content levels (11 and 16%), the inhibitory effect of the yeast and that of propionic acid were compared. The yeast curbed the growth of fungi on the grain at both levels (Paster et al,.1993). Mineral salts, nitrate nitrogen, glucose, and thiamine were the minimum nutrients needed for Idriella (= Microdochium) bolleyi to thrive in a shaken liquid culture. When sodium alginate was employed to induce growth by distributed mycelia, typical batch culture kinetics were seen in this medium and evaluated by culture turbidity. Conidia were created throughout the exponential development phase, reaching their peak production (about 6 107 ml1) during the deceleration or early stationary phase. The minimum doubling time in glucose-nitrate-thiamine medium at 25 °C was estimated to be between 5 and 6 h using the Monod equation, and Ks (limiting substrate concentration at half maximum specific growth rate) was estimated to be between 0 and 077% glucose In addition to eating colonised organic matter, soil invertebrates frequently feed on mycelia of fungi. Fungal mycelia is extremely nutritive since it has much higher amounts of nitrogen and phosphate than wood or even leaf litter. Mycelial morphology and growth rate are significantly altered by collembola grazing, sometimes resulting in increases and sometimes in declines (Boddy& Jones 2008). Nutrients are likely released during insect feeding and can therefore alter the pace of wood degradation and nutrient cycle. Additionally, grazing can alter the results of interspecific mycelial interactions (TD Rotheray, TH Jones, and L. Boddyunpub.). Further effects on microbial community composition, decomposition processes, and nutrient cycling may result from this..(Lascaris et al,.1994)

Actinoplanescampanulatus, Micromonosporachalcea, and Streptomyces spiralis' ability to reduce seedling damping-off and Pythiumaphanidermatum-caused root and crown rots of mature cucumbers (Cucumissativus) in pots under greenhouse conditions was further assessed to determine their potential as biological control agents and as plant growth promoters in the field under commercial conditions. The three isolates dramatically increased plant development and yield and decreased seedling damping-off, root and crown rots, when used alone or in combination on cucumber seedlings. Individually, S. spiralis performed at a relatively high level, followed by A. campanulatus and M. chalcea. field use of endophyticactinomycetes as promising plant growth promoters and biological control agents against Pythium diseases of cucumber. (El-Tarabily et al,.2010) The potential of Esteyavermicola (Ophiostomataceae), an endoparasitic fungus of pinewood nematode Bursaphelenchusxylophilus (Nematoda: Aphelenchoidoidea), as a biocontrol agent of pine wilt disease has been proved. Recently, increasing attention has been paid to this fungus with the deterioration and scatter of pine wilt disease around the world. Many novel researches in this field have been reported in recent years. This review systematically summarizes the latest studies of E. vermicola in respect to its ecology and distribution, characteristics, infectivity against nematodes, nutrition and sporulation, environmental stress resistance, as well as control effect against pine wilt disease, etc. Moreover, its application potential to the biocontrol of pine wilt disease and possible research directions in the future are briefly discussed. This is the first review on this little-known hyphomycete, hoping to lead to its efficient use for the biocontrol of disastrous pine wilt disease (Chu et al,.2015) Candida sake was cultured on nutrient yeast dextrose broth, which was diluted and/or modified by the addition of either glycerol, glucose to 0·96 or trehalose to 0·97 water activity (aw) to modify endogenous sugar alcohol and sugar content. Sugar alcohols (glycerol, erythritol, arabitol and mannitol) and sugars (trehalose and glucose) were extracted from the yeast cells and quantified using HPLC. Total polyol and sugar content varied significantly between treatments. The total intracellular concentrations in NYDB medium were significantly increased in NYDB+glucose media. The major intracellular polyols/sugars in cells grown on unmodified NYDB were arabitol, trehalose and glucose with small amounts of glycerol and erythritol. This was changed by reducing aw of the growth medium, particularly with glucose or glycerol. The major polyols in C. sake cells grown on glucose-modified media were arabitol and the low molwt polyol glycerol, with smaller amounts of glucose.(Texdol et al,.1998)

FUTURE PROSPECTS:

For trees to thrive, fungi are essential. However, as the climate changes, the interaction between fungi and trees is probably going to change. The rate of decomposition and, thus, the cycling of nutrients are greatly influenced by temperature and moisture regime. In temperate environments, temperatures between 25 and 35 °C are ideal for the growth and metabolism of the majority of fungus. It is obvious that most decomposer fungus spend the majority of their time in temperatures that are not ideal. Thus, if there is enough water available, an increase in temperature brought on by climate change may result in a faster rate of fungal growth and organic matter decomposition. However, the abiotic environment influences how fungal mycelia interact, therefore climate change is expected to alter the microbial communities that live in soil and decomposed organic matter.

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