Bio Control Potential of Rice Endophyte

Fusarium oxysporum Against Rice Sheath Blight Pathogen Rhizoctonia solani

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Introduction

An endophyte is a fungal or bacterial microorganism that spends the whole or part of its life cycle colonizing healthy tissues of the host plant, typically causing no apparent symptoms of disease [1]. The relationship between the host and the endophyte may range from symbiotic to near pathogenic [2]. Endophytic microorganisms are a significant reservoir of genetic diversity, and an important source for the discovery of novel bioactive secondary metabolites. Endophytes are a rich source of natural products displaying a broad spectrum of biological activities and the phytochemistry of endophytic microbes continues to increase in significance. As a general rule, a single endophytic strain will produce multiple bioactive substances. The reported natural products from endophytes include antibiotics, antipathogens, immunosuppressants, anticancer compounds, antioxidant agents and other biologically active substances. Many medicinal plants are reported to be harboring endophytic fungi.

The ecological roles played by endophytic fungi are diverse and varied [3]. Besides protection against insects, many of these fungi produce biologically active secondary metabolites [4]. Certain, other metabolites produce host growth responses, accelerate or delay senescence [3]. Future investigations might include studies aimed at detecting production of antibiotics and pest deterrents in plants as a first step towards evaluating ecological significance of secondary metabolite production by endophytes in biological control.

Rice (Oryza sativa), one of the primary graminaceous crops, constitutes the main nutrient resource for 40% of world’s population including most developing countries. Rice has been severely affected by several diseases and insect pests, of which Sheath blight (ShB) disease caused by Rhizoctonia solani is becoming a serious concern for the successful cultivation of rice. It is one of the most destructive diseases of rice that occurs globally [5]. Abuse of chemical pesticides, which are the most common approach for control, can destroy the balance of ecological systems and the contamination by their toxic residues may cause harm to humans and domestic animals. In addition, chemicals can decrease the soil micro flora sharply and induce tolerance of the pathogens. Search for environmentally and toxicologically safe, more selective and efficacious fungicides for the control of plant diseases is gaining momentum at present. As an environmentally benign agent, endophytes are the ideal candidates. The aim of the present study is to isolate potential endophytic fungi from paddy (Oryza sativa) which will be effective against Rhizoctonia solani, an important rice pathogen causing Sheath blight disease in paddy.

Materials and Methods

Rice Plant Samples

Rice plants were collected from Kottayam, Alapuzha and Trivandrum districts, Kerala. Ten rice plants without signs of any disease were collected from four plots of one experimental field.
Acknowledgement

References

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reported that exploitation of the endophytes as biocontrol agents may be a breakthrough in the biological control adding strength to additional benefits of host/fungus endophytic association [8].

References