INFLUENCE OF RHIZOPLANE AND RHIZOSPHERE BACTERIA ISOLATED FROM INFECTED PLANTS OF WITHANIA SOMNIFERA (DUNAL) IN BIOTRANSFORMATION OF WITHANOLIDES AND STEROLS

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ABSTRACT : Endophytes are a group of endosymbiotic microorganisms, which colonizes the plants and they can be readily isolated in the laboratory on a specific microbial medium. These endophytes are known to be the reservoirs of many novels, secondary metabolites. Endophytic microorganisms, especially bacteria are known to colonize many plants, including medicinal plants. Apart from synthesizing the secondary metabolites in the associated plants, the endophytic microorganisms are known to increase the ability of synthesizing the bioactive components. In the current study, we investigated on analyzing these endophytic microorganisms especially bacteria associated with the medicinal plant that can synthesize the secondary metabolite compounds under abiotic stress in Withania somnifera. Entophytic bacteria from rizzoplane and risosphere was isolated from the leaves and roads of W. somnifera. Pure bacterial isolates were identified using 16S rRNA sequencing. 16S rRNA sequences showed that the bacterial isolates were found to be in close resemblance with Bacillus velezensis, Bacillus amyloliquefaciens and Pseudomonas floridensis. Further, the pure culture cell free extracts with Withanolides and sterols substrates were extracted and analyzed using HPLC and TLC. Out of the total bacterial cultures isolated, B9 and B6 isolates showed significant bands when compared with control. Similarly, B1 isolates showed unique bands when compared with control. The rise in the production of the secondary metabolite components such as withaferin A, withanolide D was significant as seen when treated with bacterial endophytes than the control. The findings of the current research can be used in tracing the application of potent bacterial endophytes in modifying the natural chemical structure of the secondary metabolite compounds.

Key words : Bacterial isolates, Withania somnifera, Withaferin A, Withanolide D, HPLC, TLC, 16S rRNA.

INTRODUCTION

Soil nutrients are mainly responsible for the quality and quantity of the herbal drugs (Ganie et al, 2015) and the geographical patterns of their native (Liu et al, 2015; Quan and Liang, 2017). Researchers are giving importance to understand the native plants and their genetic diversity (Panda et al, 2015). Studies conducted on the influence of bacterial endophytes on the herbal drug is an important need for pharmaceuticals. Studying the interactions between plants and microbes and the processes involved in the production of herbal compounds in medicinal plants will be easy by using endophytic microorganisms. Microorganisms interact with plants by a symbiotic relationship, which provides a microbial niche in controlling plant diseases (Andreote et al, 2014). Hence, host-endophytic interaction can be enhanced by using endophytes in production of important urban drugs.

Several detoxifying enzymes such as cellulose protease are produced by bacterial endophytes after colonization and form a symbiotic relationship with the host plant. Sharing of genetic information is necessary through coexistence to ensure that advantage of metabolic, genetic and physiological development will occur (Schmidt et al, 2014). Nutrients minerals and favorable environmental conditions are provided by the plant host to the bacterial endophytes. to enable their growth and development, while disease resistance, growth and bioactive compounds are provided by the bacterial
Influence of rhizoplane and rhizosphere bacteria isolated from infected plants of *W. somnifera*


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