

Effect of fresh water cyanobacterial extracts on alkaloid production of the *in vitro* *Solanum elaeagnifolium* tissue culture

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ABSTRACT

Solanum elaeagnifolium Cav. (Family Elaeagnaceae) is a wild, herbaceous, perennial Egyptian plant. Its callus culture was successfully produced from the germination of sterilized seeds on autoclaved basal MS medium. Explants from seedlings stems, roots, hypocotyls and leaves were transferred on solid MS medium supplemented with 0.5 mg/l 2,4-D and 1.0 mg/ml Kin to support maximum growth of the undifferentiated callus. *Solanum elaeagnifolium* synthesizes toxic steroidal alkaloids and sapogenin (mostly as solasodine and diosgenin, respectively), which are of importance as a starting material in steroidal hormone synthesis. Production of glycoalkaloids is affected by different physical and chemical factors, which may lead to a great increase of these alkaloids and of their poisoning effects on humans and animals ingesting the plants. Biotic elicitation was investigated by the application of 20 % cyanobacterial crude extracts to the basal MS medium cultured with shoot explants. Five out of ten cyanobacterial species used (nitrogen fixers or not) showed a stimulatory effect of glycoalkaloid production as well as fresh, dry weight and growth rate of calli cultures.

Oscillatoria acuminata extract induced the maximum production of solasodine and diosgenin as well as other growth parameters. Chemical analysis using GC/MS demonstrated the presence of substance(s) responsible for the dramatic increase in growth and secondary products.

Key words: Alkaloids, cyanobacteria, gas chromatography/mass spectrometry, *Solanum elaeagnifolium*, tissue culture.

INTRODUCTION

Natural pharmaceutical compounds can be derived from microorganisms, animals or plants. Most of these compounds are classified as secondary metabolites or secondary products and they originate from primary precursors. Secondary compounds have low molecular weights and unique or complex structures. They are synthesized in certain types of cells of specific

plant species at a particular developmental stage and are usually stored either in vacuoles or in other differentiated tissues. Secondary compounds are not believed to have any essential role in the basic life process of the plant. However, they are ecologically important in the reaction of the organism to the environment (Oksman-caldentey, 1998)

Solanum elaeagnifolium Cav. (Family Elaeagnaceae) is one of the wild herbaceous, perennial Egyptian flora (Saleh, 1967),