

Role of Endogenous and Exogenous Hormones in Bioactive Compounds Production in Medicinal Plants via In Vitro Culture Technique

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Abstract

The natural compounds produced in plants are classified into two major groups (Primary and secondary metabolic compounds). These compounds are the precursor materials for the compounds of the second group, which are represented by secondary metabolites, most of which produce from three main compounds: shikimic acid, acetate, and fatty acids. Primary metabolites are the basic units in the metabolism of secondary compounds. Tissue cultures of plants are used to produce large quantities of secondary metabolic products, although cultures of callus and cell suspensions often do not produce higher levels of the whole plant. Therefore, some technologies were used to increase the production of secondary metabolites by plant tissue culture techniques through the selection of high-production cells. The growth of plant cells in tissue cultures occurs when the requirements for division and growth are available for them from nutrients, growth regulators, and any other additives that all affect the metabolic activities within the cells. To achieve optimal productivity of secondary metabolites, it is preferable to produce cells in a medium that is optimal for increasing biomass. Plant growth regulators such as auxins and cytokinins affect cell division, various metabolic processes, and plant growth in tissue cultures.

Keywords: auxin, cytokinin, *in vitro* culture, plant hormones, secondary metabolites

1. Introduction

The plants can produce certain bioactive compounds that are mostly affected by the chemical and physical environments in which they develop. Some searches announced that plant growth regulators and light are important factors stimulating the growth, development (organogenesis), and production of plant compounds, including both primary and secondary products. In addition, plant growth regulators were applied for callus induction, and adjusting the metabolite content, carbon sources, suspension culture, temperature, pH, medium type and ammonium nitrate (NH_4NO_3) concentrations plays an important role in the formation of plant primary and secondary products [1–3]. This chapter elicits the role of endogenous and