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Advances in Elicitor-Mediated Secondary Metabolite Production in Plant Cell Suspensions: Factors and Mechanisms

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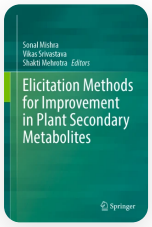

Elicitation Methods for Improvement in Plant Secondary Metabolites

Gazala Parween, Sabika Akram, Tanya Singh, Syed Saema, Kahkashan Khatoon & Laiq Ur Rahman

Abstract

Secondary metabolites are diverse bioactive compounds produced by plants, playing crucial roles in defense against pathogens, pests, and environmental stress. Due to their pharmacological properties, these metabolites are highly valued in pharmaceuticals, cosmetics, and food industries. The cell suspension culture technique has emerged as a powerful tool to enhance the production of these secondary metabolites. The growth and productivity of cell suspensions are influenced by multiple factors, including cell size, temperature, pH, nutrient media composition, growth kinetics, light exposure, and

inoculum density. Optimizing these parameters is essential to enhance cell viability and maximize metabolite yield. By improving growth conditions and employing elicitors, such as biotic and abiotic stimuli, this method stimulates metabolite biosynthesis, offering a scalable and efficient approach for producing high-value compounds. This knowledge paves the way for the development of advanced, large-scale cell suspension culture systems tailored to specific medicinal plants, enabling sustainable and high-yield production of secondary metabolites.