

Anil Kumar Sharma
Ajay Sharma *Editors*

Plant Secondary Metabolites

Physico-Chemical Properties and
Therapeutic Applications

 Springer

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Plant Secondary Metabolite Determination Through Analytical Chromatographic Techniques: Recent Trends and Advancement

Rohit Sharma , Ashun Chaudhary, Yash Pal Sharma & Sunil Kumar

Chapter | [First Online: 02 March 2022](#)

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Abstract

The present chapter presents a summary of analytical instruments like high-pressure thin-layer chromatography, high-pressure liquid chromatography, and gas chromatography-mass spectroscopy for their potential benefits to drug discovery through chemical fingerprints for pharmaceutical, food, and biotechnology industries. The methods outlined in the current chapter are quite robust, rapid, economical, consistent, and effective tools for qualitative and quantitative analysis of natural compounds, and identification of markers could be exploited at the industrial scale and thus have beneficial aspects for human welfare and drug discovery.

Keywords

Analytical instruments

High-pressure thin-layer chromatography

High-pressure liquid chromatography

Gas chromatography-mass spectroscopy

Drug discovery

About this chapter



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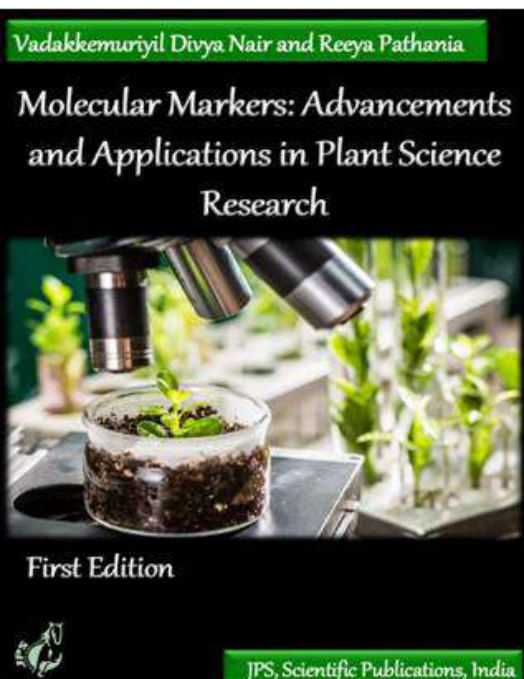
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MOLECULAR MARKERS: ADVANCEMENTS AND APPLICATIONS IN PLANT SCIENCE RESEARCH

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Chapter- 4

A REVIEW ON PHYTOREMEDIATION - AN ECOFRIENDLY TECHNOLOGY

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CHAPTER - 4

A review on Phytoremediation - an eco-friendly technology

Neha Thakur, Munish Sharma and *Munish Sharma

Abstract

Phytoremediation a technology is used from last decade or two to solve the problem of eradication of harmful metal ions in sustainable, environment friendly way. Rapid increase of industrialization, modernization and various other factors such as agricultural activities and due to man's greed, the excessive use of fertilizers, untreated waste, untreated laboratory effluents lead to degradation of soil as well as environment. Therefore, it become our foremost duty towards sustainable development goals to eradicate the toxic harmful metal ions. Certain physical and chemical technologies are used to eradicate such toxins but due to certain limitations natural method is preferred which is use of plants for eradication of toxins from soil. Phytoremediation is a technique which help in eradication of heavy metal ions through plants metabolic pathway. The plants which are used as phytoremediator are generally hyperaccumulators, that can accumulate metal ions in concentration of more than 1000ppm. Plant that act as phytoremediator must have certain properties such as branched root system, less biomass, easy harvestable, and many more. Besides the benefits there are certain limitations of this technique. This review will focus on heavy metal stress, its sources and various technologies to eradicates heavy metal or metal toxin from soil through various processes and public and regulatory acceptance.

Keywords

Phytoremediation, toxic effects, heavy metals, hyperaccumulators, metallophytes



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A Brief Review of Plant Cell Transfection, Gene Transcript Expression, and Genotypic Integration for Enhancing Compound Production

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Abstract

Plants possess a plethora of important secondary metabolites, which are unique sources of natural pigments, pharmaceutical compounds, food additives, natural pesticides, and other industrial components. The commercial significance of such metabolites/compounds has directed the research toward their production and exploration of methods for enhancement of production. Biotechnological tools are critical in selecting, integrating, multiplying, improving, and analyzing medicinal plants for secondary metabolite production. Out of many techniques that are being explored to enhance secondary metabolite production, "plant cell transfection" is the latest tool to achieve maximum output from the plant source. It is based upon the introduction of foreign DNA into the plant cell relying on physical treatment such as electroporation, cell squeezing, sonoporation, optical transfection nanoparticles, magnetofection, and chemical treatment or biological treatment that depends upon carrier. One of the promising tools that have been exploited is CRISPR-Cas9. Overall, the abovementioned tools focus on the stable transfection of desired gene transcripts. Since the integration and continuous expression of transfected gene of particular trait represents stable transfection of host cell genome, resulting from transfer of required trait to daughter cells ultimately leading to enhanced production of secondary metabolites of interest. This chapter will review a set of biotechnological tools that are candidates for achieving the enhanced bioactive compound production indicated here to be used for drug discovery.

Keywords: CRISPR-Cas9; Drug discovery; Gene transcripts; Plants; Secondary metabolites.



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