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Ensuring Purity: Analysis and Control of Contaminants and Residues in Herbal Medicines

Invited Talk

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Abstract

Herbal medicines (HMs) and traditional herbal products are widely used worldwide, offering therapeutic benefits often associated with their complex phytochemical compositions. However, there has been limited attention to the quality and safety of medicinal plant raw materials. The growing popularity of medicinal plants, along with their notable environmental characteristics, has raised significant concerns among global organisations regarding their safety and quality assurance. Recently, several pharmacopoeias have been established worldwide for medicinal plants and herbal products, including those in India, the United States, Singapore, China, Canada, Malaysia, Thailand, and Italy. Various countries have developed legal frameworks for these pharmacopoeias at national and regional levels. Key contaminants of concern include heavy metals from soil and environmental pollution, mycotoxins resulting from improper post-harvest storage and fungal growth, and synthetic pesticide residues used during cultivation. Reports indicate that the presence of these contaminants in medicinal herbs often exceeds acceptable limits. This study highlights the current issues related to these risks, including inconsistent regulatory enforcement and the inherent complexity of analysing these products. Effective control methods require the development and implementation of advanced, validated analytical techniques for the accurate identification and quantification of trace substances. To protect patient health and maintain consumer trust in traditional therapies, there is a need for harmonised global standards, stringent Good Agricultural and Collection Practices, and robust Good Manufacturing Practices (GMP).

Keywords: Herbal medicines, Contaminants, Residues, Heavy metals, Mycotoxins, Pesticide residues, Quality control, Pharmacopoeia, GMP

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