

Latest Trend on Standardization of Herbal Medicines: A Brief Review

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Abstract

There is a need to improve method of standardization due to increase in growth of herbal medicine all around the world. Quality of herbal medicine can be enhanced through proper documentation and electronic monitoring of cultivation, harvesting and processing of medicinal plants using real time wireless technology and green house monitoring. Moreover, improve analytical technique such as chemical profiling of bioactive compounds of complex mixture such as polyherbal medicine using Liquid chromatography-mass spectrometry. Bioactive compounds tentatively identified can be further evaluated in-vivo through different pharmacological and pharmacokinetic models. Furthermore, enhanced assessment methods of herbal medicine using advanced technique such as biosensors

Keywords

Standardization; herbal medicine; quality control; biosensors; Processing technology

Introduction

Plants are the essential foundation of medicine [1]. There is tremendous increase in use of herbal medicine from the past few years. According to World health organization (WHO) 80% of the world's inhabitants still rely mainly on traditional medicines for their health care [2]. Herbal medicine used in different part of world in different names such as Ayurvedic, Unani and Chinese herbal medicine. Standardization of herbal formulations is necessary in order to examine the quality of drugs, depend upon physical and chemical properties [3]. There are some traditional methods of standardization such as physicochemical method, microscopic and macroscopic study, preliminary chemical test and identification of biomarkers using high performance liquid chromatography and thin layer chromatography. Standardization of herbal medicine can be improved with the help of up-to-date and advance analytical techniques.

Biosensors and advanced processing technology

Biosensors such as e-nose and e-tongue can play an important role in standardization of medicinal herbs instead of using traditional physical methods. Electronic nose helps to identify different kind of red ginseng [4]. It was also used to identify different quality of herbal tea [5]. Storage of herbal medicine is one of an important issue that needs to be addressed. It may affect the bioactive compounds. Recent studies on *Lonicera japonica* had found e-nose to be effective to assess the storage

condition [6]. With the development of advance image capturing platform such as machine vision system can helps to identify the difference between mature and immature fruits and other part of plants. The external quality on Harumanis Mango was evaluated using this technique [7]. The identification of medicinal herbs was previously performed manually with the help of taxonomist. With advance embedded portable device using image processing technique can helps to identify medicinal plants in any part of world [8].

Wireless Technology

Wireless technology can plays an important role in monitoring of cultivation of medicinal plants and can ensure good agricultural and collection practice. Cloud-based remote environmental monitoring can helps cultivator to observe the change in the environment and react accordingly that minimizing the loss of quality of product and better efficiency [9].

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Advance chemical profiling

Quality herbal medicine is of significant importance in the current era. Pharmacological activity of herbal medicine is due to targeted class of bioactive compounds. Therefore, it is necessary to standardize the bioactive compounds along with their pharmacological and pharmacokinetic profile. Tanshinones extract was standardized through chemical profiling, in-vivo pharmacological and pharmacokinetic using effective compound combination [10]. Metabolomics study helps to standardize herbal medicine through identification of phytochemical and bioactive markers.

Table 1: List of new technologies that help to improve standardization

Electronic sensors such as e-nose, e-tongue
Image processing technology
Electronic identification of plants/herbs
Cloud based monitoring in cultivation and harvesting
Advanced Chemical profiling such as metabolomics studies
Wireless sensor technology

Conclusion

Standardization of herbal materials based on their chemical and biological profile is an important prerequisite for development of herbal product [11]. Traditional method of standardization needs to modify according to latest challenges. Identification biomarker using thin layer chromatography has changes to high performance thin layer chromatography method. Similarly, other analytical technique such as high performance liquid chromatography has modified with the addition of mass spectroscopic technique. Mass spectroscopy helps to identify the compound using molecular weight. Availability of metabolites information and spectral database such as metlin and massbank has changed the way to standardize herbal medicine.

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