



**REVIEW ON QUALITY CONTROL OF HERBAL MEDICINES BY
SOPHISTICATED ANALYTICAL TECHNIQUE: RECENT
ADVANCEMENT**

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ABSTRACT

Herbal medicines have been explored exhaustively recently and it has been observed that utilization of analytical methods has become essential to ensure quality of herbal products. The standardization of herbal product is an important issue as per global acceptance concern. The herbal industries has expensed use amount for this purpose. There are various methods available for the standardization of herbal

products including modern analytical techniques and recently many researchers put their efforts to ensure quality of herbal products using these methods; this article summarizes some of them.

KEYWORDS: Herbal Medicine, Standardization, Quality Control, Analytical Techniques.

INTRODUCTION

Various chromatographic and spectroscopic techniques are available for inspection of herbal medicines. Chromatographic and spectroscopic fingerprints are recommended to ensure quality of herbal medicines, since they represent chemical integrities of the herbal medicines. Chromatographic fingerprinting of herbal medicines can be best achieved by HPTLC since this approach is more precise and accurate. The traditional herbal medicines have been used for thousands of years in many countries. The herbal medicine generally contains complex mixtures of various chemical constituents and these component are very difficult to separate

out from each other even available extraction process are not able to do so; due to this reason the quality control of herbal medicine has become tedious job and standardization of herbal medicine has now become a common problem for many small scale herbal industries. The standardization of herbal medicine also resists their global acceptance and herbal medicines are yet to be recognized in many countries. Consequently, education, training and research in this area have not been accorded due attention and support. Many researchers investigated herbal medicines extensively and established some data regarding their safety and efficacy but the available data is not sufficient to meet the criteria needed to support its use world-wide. The reasons for the lack of research data are due to not only to health care policies, but also to a lack of adequate or accepted research methodology for evaluating traditional medicine. The available methods of standardization are unable to provide complete approximation regarding products due to the presence of complex chemical mixtures. Thus it is very essential to estimate most of the phytochemical constituents present in herbal products in order to ensure the reliability and safety of herbal products. This article summarized recent research investigations which have been conducted using modern analytical techniques for standardization and fingerprinting of herbal medicine.^[1,2]

Standardization and Evaluation of Herbal Shampoo

Generally shampoo used as cleaning agents for the hair and considered as a beauty products. Herbal shampoo recently gained use consumer attention due to their safety profile, but standardization of herbal shampoo is also very essential to assure its quality, purity and safety. Bahuguna *et. al*; standardized and evaluated marketed Satreetha Shampoo of *navjeevan*. The study dealt with the standardization and evaluation of Satreetha Shampoo which was formulated from Navjeevan *gramodyog*. The standardization parameters involved organoleptic characters, physical properties, IR examination of non-volatile matter and determination of water by toluene distillation, *Liebermann Burchard* reactions etc. Heavy metal content was also determined. Study concluded few characteristics peaks in spectroscopy study and finally research established certain standards to check the purity and quality of Satreetha Shampoo.^[3]

Analysis of Cinnamon Barks Growing in South-West of Ethiopia.

Bizuneh analyzed the essential oil of cinnamon bark growing in *Tepi* (south-west, *Ethiopia*) by gas chromatography-mass spectrometry. Various components were identified and 2-propenal, 3-phenyl was the found to be major constituent while other constituents were found

to be; Eugenol Naphthalene and Tricyclo [3.3.1.0 (2, 8)] nona-3, 6-dien-9-on. The study concluded that the quantity of phytochemical present in cinnamon bark that is grown *Tepi* (south west of *Ethiopia*) is different from other area may be due to the geographical variation. Study also suggested that cultivation, variety of cinnamon; harvesting time and extraction method also affect the composition of the essential oil. The study suggested GC-MS as an important tool for the analysis of essential oil of cinnamon bark.^[4]

Analysis of Long Pepper Growing in Tepi, South-west Ethiopia

Bizuneh identified essential oils present in *Long pepper* growing in *Tepi*, South-west *Ethiopia* using Gas Chromatography-Mass Spectrometry (GC-MS). Various components were identified and eugenol was found to be as chief constituent (98.979%). Study also proved presence of other constituents like; trans-caryophyllene, phenol and 1, 3, 6-Octatriene, 3, 7-dimethyl. Eugenol was confirmed as major compound responsible for the characteristics aroma of plant.^[5]

Analysis of Embelia Churna (Vidanga)

Gajbhar *et al*; developed RP-HPLC-PDA and HPTLC methods for the chemical fingerprint analysis of *churna* of *Embelia ribes* (*Vidanga*). In HPLC method the regression and recovery values were found to be 0.998 and 99.61- 101.2% respectively. Similarly, HPTLC method showed good regression (0.9994) and the recovery (99.09- 100.21%) values of the *embelin*. Study also involved validation of both methods as per ICH guidelines. Both developed methods were found to be simple, sensitive and reliable for quantitative and chemical fingerprint analysis of *Vidanga*, this fingerprint method enables manufacturers to test the presence of *Vidanga* species; the possible adulteration of *Vidanga* which may contain less amount of *embelin* can be avoided by this method. Study also confirmed that HPTLC may used for routine fingerprint analysis due to its less time and solvent consumption as compared to HPLC and especially in situations where high sample throughput and fast analytical speed are needed although study proved HPLC more sensitive, specific and precise than HPTLC for quantitation purpose.^[6]

Analysis of Warburgia ugandensis

Plant *Warburgia ugandensis* possess antiplasmodial properties and plant also contains chiefly sesquiterpenes which contributed towards the antimicrobial profile of plant. Were *et al*; conducted study through Fourier Transform Infra-red Spectrometry to confirm presence of other compounds including alkaloids, terpenoids and terpenes in *W. ugandensis*. Study

revealed the presence of N-H, C-H, C=C and C=O etc. which proved presence of groups like; carboxylic acids, amines and alkenes, these functional groups established presence of compounds such as; alkaloids, terpenes and flavonoids etc. study also concluded these constituents responsible for the antiplasmodial activity.^[7]

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