ORIGINAL ARTICLE

Isolation and characterization of quinine from *Polygonatum verticillatum*: A new marker approach to identify substitution and adulteration

Jaswinder Kaur Virk, Sanjiv Kumar[1], Ranjit Singh[2], Avinash C. Tripathi[3], Shailendra K. Saraf[3], Vikas Gupta, Parveen Bansal

Department of Herbal Drug Technology, University Centre of Excellence in Research, Baba Farid University of Health Sciences, Faridkot, [1]Department of AYUSH, National Institute of Ayurvedic Pharmaceutical Research, Patiala, Punjab, [2]School of Pharmaceutical Sciences, Shobhit University, Meerut, [3]Department of Pharmacy, Babu Banarasi Das Northern India Institute of Technology, Lucknow, Uttar Pradesh, India

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ABSTRACT

Polygonatum verticillatum (Mahameda) is an important ingredient of Ashtawarga and Ayurvedic formulations. Nowadays, it comes under the category of endangered plants due to large scale and indiscriminate collection of wild material. To overcome the scarcity, substitutes of Mahameda are also commonly used in market. These additives are different from the authentic plant by Ayurvedic and pharmacological theory of drug action, thereby resulting in substitution/adulteration. Substitution is a critical issue in isolation and quantification of the therapeutically active ingredients that can be used as markers in the identification of substitution/adulteration. Methanolic extract of the rhizomes of *P. verticillatum* was subjected to preliminary phytochemical screening for the detection of phytoconstituents, followed by column chromatography for isolation of the marker. The column was first eluted with pure hexane, and polarity of the solvent was gradually increased. A total of 1180 fractions were collected and pooled on the basis of thin-layer chromatography profile. The single compound was isolated and confirmed by chemical test, melting point, spectral analysis, and comparison with literature. Phytochemical screening of the extract shows the presence of alkaloids, flavonoids, carbohydrates, terpenoids, and phenolics. A pure white crystalline powder was isolated by column chromatography which was characterized as (6-methoxyquinolin-4-yl-8-vinylquinuclidin-2-yl) methanol, i.e. Quinine. The isolated compound, Quinine, was identified as a novel compound in Mahameda as it has not been reported in the genus *Polygonatum,* till now. It can be used as a marker for the identification of substitution/adulteration and standardization of *P. verticillatum.*

Key words: Adulterants, column chromatography, marker compound, *Polygonatum verticillatum,* substituents

INTRODUCTION

Around 5000 years ago, *Polygonatum* species has been practiced in Chinese and European health-care system. *Polygonatum verticillatum* is a flowering perennial plant of the family *Liliaceae* and is commonly known as Mahameda in Hindi and Whorled Solomon's Seal in English. Mahameda is a deciduous, erect plant of *Polygonatum* genus having bell-shaped greenish-white flowers, mid-green leaves, and red fruits. In India, Mahameda is found in temperate Himalayas from Kashmir (at an altitude of 2000–3600 m asl) to Sikkim (at an altitude of 2600-4000 m asl), Himachal Pradesh and Uttarakhand (1600–3500 m asl). Mahameda

Address for correspondence:
Dr. Parveen Bansal,
University Centre of Excellence in Research, Baba Farid University of Health Sciences, Faridkot, Punjab, India.
E-mail: ucer_bfuhs@rediffmail.com

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