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Optimizing Microwave Assisted Extraction of Anti-Diabetic Plant Tinospora cordifolia Used in Ayush System for Estimation of Berberine Using Taguchi L-9 Orthogonal Design

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Abstract : Present work reports an efficient extraction method using microwaves based solvent–sample duo-heating mechanism, for the extraction of an important anti-diabetic plant Tinospora cordifolia from AYUSH system for estimation of berberine content. The process is based on simultaneous heating of sample matrix and extracting solvent under microwave energy. Methanol was used as the extracting solvent, which has excellent berberine solubilizing power and warms up under microwave attributable to its great dispersal factor. Extraction conditions like time of irradition, microwave power, solute-solvent ratio and temperature were optimized using Taguchi design and berberine was quantified using high performance thin layer chromatography. The ranked optimized parameters were microwave power (rank 1), irradiation time (rank 2) and temperature (rank 3). This kind of extraction mechanism under dual heating provided choice of extraction parameters for better precision and higher yield with significant reduction in extraction time under optimum extraction conditions. This developed extraction protocol will lead to extract higher amounts of berberine which is a major anti-diabetic moiety in Tinospora cordifolia which can lead to development of cheaper formulations of the plant Tinospora cordifolia and can help in rapid prevention of diabetes in the world.

Keywords : berberine, microwave, optimization, Taguchi
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