
Comparative study of four extraction methods of *Lawsonia inermis* harvested from two different regions in Morocco and their LC-ESI-Q-TOF-MS analysis

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Abstract

Lawsonia inermis L. commonly pronounced Henna belongs to the family Lythraceae. It is known for its traditional significance both as cosmetic and medicinal properties especially in the indigenous areas of Morocco, India and Middle East countries. In this study, *Lawsonia inermis* was extracted by different methods including greener techniques like Supercritical Fluid Extraction. Maceration, Soxhlet, Ultrasound assisted Extraction and Pressurized liquid extraction were carried out using ethanol as solvent and following the conditions based on the principle of each extraction method. Two Henna's regions in Morocco were used namely Tazzarine (T) and Fom Zguid (FZ).

Naphtoquinones present in *Lawsonia inermis* were the target of this study for their significant therapeutic properties like anti-microbial, anti-tumor, anti-inflammatory effects etc. Lawsone, Plumbagin and lapachol were identified and quantified using LC-ESI-Q-TOF-MS. A comparative study was performed between the extraction methods and the region of the harvest.

Results showed that, despite conventional technique, maceration resulted in higher global yields of various samples under research. Ultrasound and PLE exhibited similar profiles of output for the samples. Supercritical Fluid Extraction resulted focusing results with lesser yields than Soxhlet extraction using hexane drawing attention towards analysis of different compounds. Central Composite Design projected clear impact of the significant factor on the desired output. Geographical divergence has impact on the global extract% with T region deriving significant results for leaves and FZ region for seeds.

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