JPC - Journal of Planar Chromatography - Modern TLC

Volume/Issue: Volume 32: Issue 3

Gas chromatographic–mass spectrometric profile of non-polar fraction and high-performance thin-layer chromatographic analysis of methanolic fraction with simultaneous quantifications of protocatechuic acid and quercetin in *Carissa carandas* L. fruits

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Pages: 237–241
Online Publication Date: Jun 2019
Publication Date: 01 Jun 2019
Article Category: Research Article

DOI: https://doi.org/10.1556/1006.2019.32.3.9
Keywords: Carissa carandas L.; Gas chromatography–mass spectrometry; High-performance thin-layer chromatography; Protocatechuic acid; Quercetin

Summary

Extraction of crude drugs by using different solvents provides polarity-based fractions containing specific type of secondary metabolites. *Carissa carandas* L. fruits were extracted and fractionated, petroleum ether extract was processed by a fatty acid methyl ester (FAME) technique for characterization by gas chromatographymass spectrometry (GC-MS) analysis, and the remaining part was extracted with methanol for high-performance thin-layer chromatography (HPTLC) analysis, followed by simultaneous quantitative determination of protocatechuic acid and quercetin in methanolic fractions. A validated method for the simultaneous quantification of protocatechuic acid and quercetin was developed and is being reported for the first time in *C. carandas* L. fruits to the best of our knowledge. Petroleum ether and methanol fractions were found to be the best for the highest possible recovery of targeted analytes. Chromatographic elution of FAME compounds generated from petroleum ether extract was evaluated by GC-MS profiling. Nineteen fatty acid compounds were separated with the highest quantity of octacosanal (13.31%). On the other hand, a polar fraction was processed by HPTLC profiling. For achieving good separation, a mobile phase of toluene-ethyl acetate-formic acid (6:3:1; *V/V*) was used. Densitometric determination was carried out at 310 nm in the reflection/absorption mode. The calibration curves were linear in the range of 100-600 ng per spot for protocatechuic acid and quercetin. During the analysis, the dried raw material from *C. carandas* L. fruits showed the presence of protocatechuic acid (0.04%%) and quercetin (0.05%). The proposed method is simple, precise, specific, and accurate. The statistical analysis of the data obtained proves that the method is reproducible and selective, which can be used for the routine analysis of the reported phenolic compounds in crude drug and extracts. The simultaneous quantification of these phenolic compounds has not yet been reported in *C. carandas* L. fruits which may be utilized for the proper standardization of the drug.