

Ultrasound-Assisted Extraction of β -Asarone from Sweet Flag (*Acorus calamus*) Rhizome

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Abstract: In this study, the extraction efficiency of β -asarone from Malaysian *Acorus calamus* from Acoraceae family using conventional solvent extraction and ultrasound-assisted extraction techniques was compared. The results showed that the ultrasound-assisted extraction technique significantly improves the extraction yields and process feasibility without changing the structure of the active compound, i.e., β -asarone. The extraction yield increment was found to be ~2.5-fold and ~1.6-fold at 1:100 and 1:50 solid-to-solvent ratio, at 30% applied sonication power. The positive impact of sonication can also be observed for both mechanistic stages of extraction, i.e., the washing and diffusion stages, due to the favorable physical effect of acoustic cavitations. The observation was supported by the SEM images of the plant residue. The characterization of the extract was carried out using HPLC, NMR, UV and IR techniques. In conclusion, ultrasound assistance increases the extraction efficiency by ~2.5-fold even at only 30% applied ultrasonic power at a 1:100 solid-to-solvent ratio. The present study also provides an efficient and simple method for accurate direct dosing of *Acorus calamus* extracts to an application.

Keywords: ultrasound assistance; asarone; HPLC; NMR; UV; IR; *Acorus calamus*

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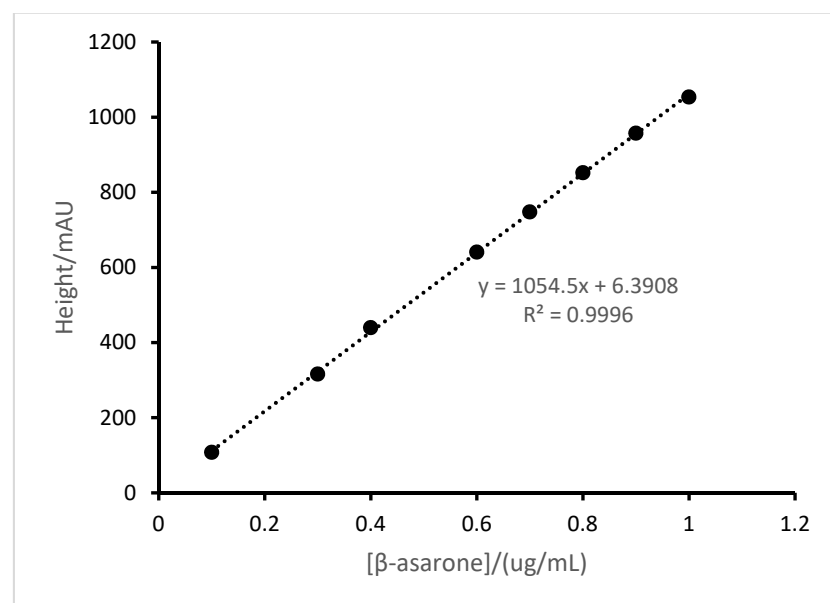


Figure S1 The calibration curve of the pure β -asarone constructed by HPLC quantification.

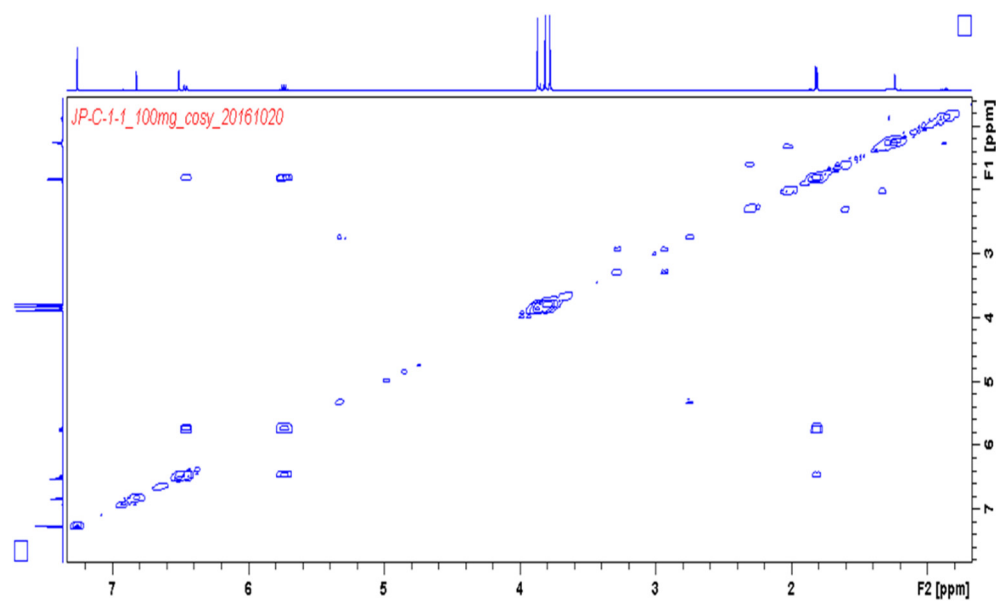


Figure S2. The COSY Spectrum of β -asarone.

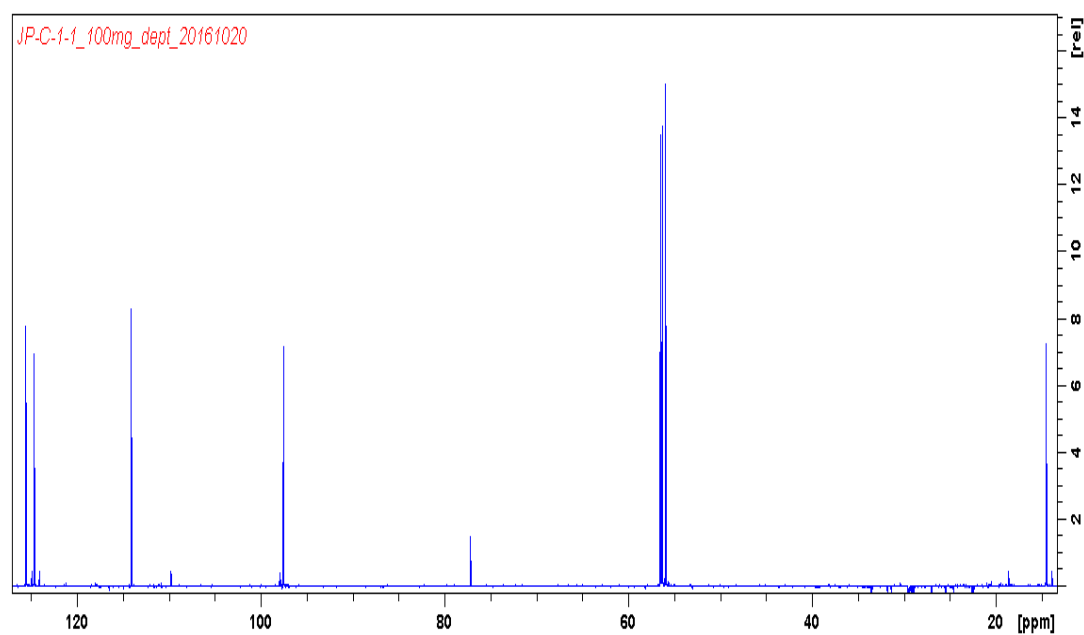


Figure S3 The DEPT-135 Spectrum of β -asarone.

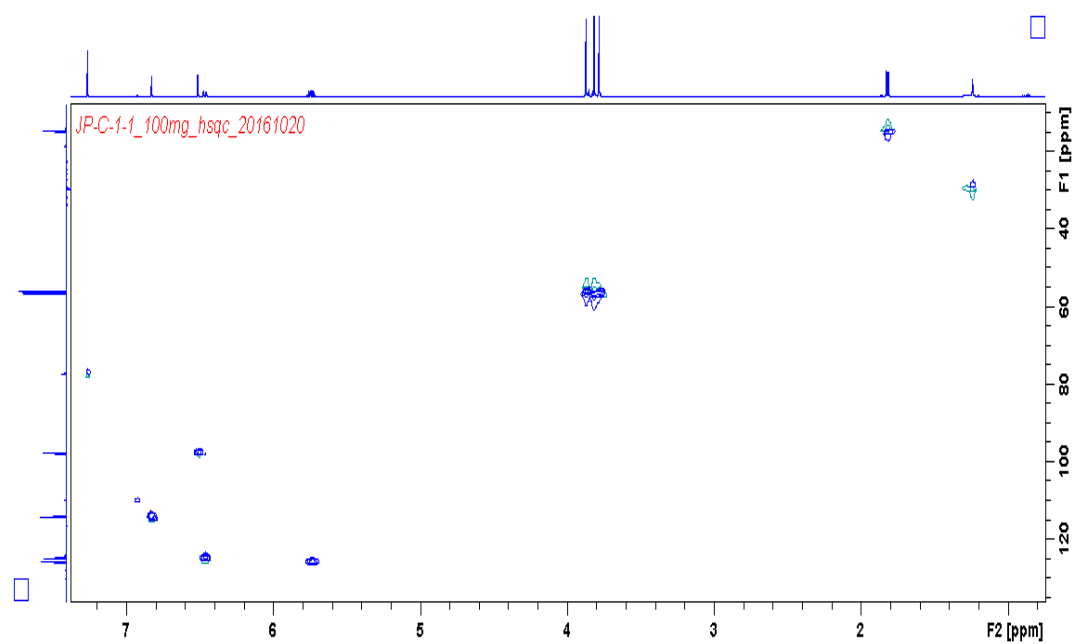


Figure S4 The HSQC Spectrum of β -asarone.

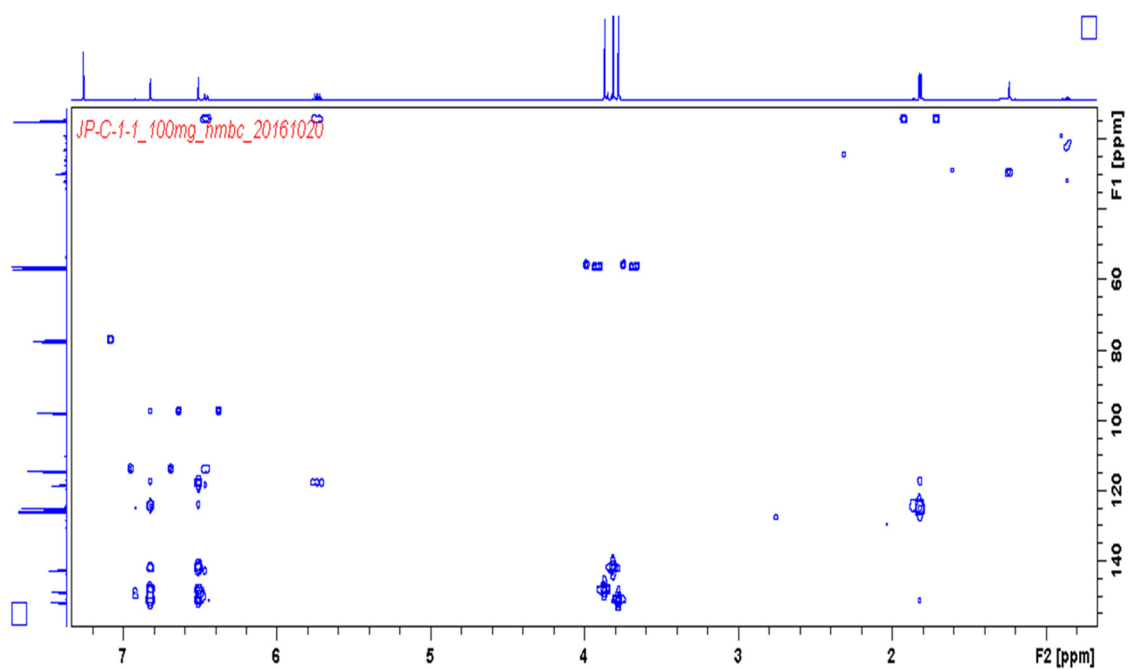


Figure S5 The HMBC Spectrum of β -asarone.