

Response Surface Methodology for the Optimization of Sugar Extraction from *Phoenix dactylifera* L.

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Abstract : In Algeria, important quantities of secondary date variety (*Phoenix dactylifera* L.) are generated in each campaign; their chemical composition is similar to that of commercial dates. The present work aims to valorize this common date variety (Degla-Beida) which is often poorly exploited. In this context, we tried to prepare syrup from the secondary date variety and to evaluate the effect of conventional extraction (CE) or water bath extraction (WBE) and alternative extraction (microwaves assisted extraction (MAE), and ultrasounds assisted extraction (UAE)) on its total sugar content (TSC), using response surface methodology (RSM). Then, the analysis of individual sugars was performed by high-performance liquid chromatography (HPLC). Maximum predicted TSC recoveries under the optimized conditions for MAE, UAE and CE were 233.248 ± 3.594 g/l, 202.889 ± 5.797 g/l, and 233.535 ± 5.412 g/l, respectively, which were close to the experimental values: 233.796 ± 1.898 g/l; 202.037 ± 3.401 g/l and 234.380 ± 2.425 g/l. HPLC analysis revealed high similarity in the sugar composition of date juices obtained by MAE (60.11% sucrose, 16.64% glucose and 23.25% fructose) and CE (50.78% sucrose, 20.67% glucose and 28.55% fructose), although a large difference was detected for that obtained by UAE (0.00% sucrose, 46.94% glucose and 53.06% fructose). Microwave-assisted extraction was the best method for the preparation of date syrup with an optimal recovery of total sugar content. However, ultrasound-assisted extraction was the best one for the preparation of date syrup with high content of reducing sugars.

Keywords : dates, extraction, RSM, sugars, syrup

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