



ORIGINAL ARTICLE

Physicochemical characterization and antioxidant capacity of the extracted oil from date pits and its effect on storage stability of margarine

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ABSTRACT

Background and aims: The present work deals with the valorization of the date kernel oil of Mech-Degla variety by assessment of its physicochemical and antioxidant properties as well as its use in the formulation of margarine. **Methods:** Kernels' oil was extracted using Soxhlet method and its total phenolic (TP), flavonoid and carotenoid contents and DPPH* scavenging activity were estimated using colorimetric assays. After that, this oil was incorporated into margarine. The determined physicochemical parameters were the pH, the salt content, the solid content, the melting point, and the peroxide index. Finally, the elaborated margarine's oxidative stability was evaluated by the Rancimat test. **Results:** The yield of fat in the extracted oil was $9.84 \pm 1.45\%$ and the amount of TP, flavonoids and carotenoids were 112.92 ± 26.57 mg gallic acid equivalent /kg of oil, 15.7 ± 0.7 mg quercetin equivalent/kg of oil and 125.534 ± 0.109 mg β -carotene equivalent/kg of oil, respectively. As regards the anti-DPPH effect, the cold and hot date kernel oil extracts exhibited a moderate capacity by reducing 55.91% and 30% of the free radicals, respectively. After that, table enriched margarine has been industrially elaborated at the Cévital agri-food complex by adding 50 and 100 ppm of date kernel oil. Texture of this margarine was plastic and easy to spread, with an acceptable color and a brilliant and homogeneous appearance. At 37 °C, the solid fat content (SFC) index is lower than 6%, which attested that this margarine melts easily in the mouth. The physicochemical characteristics of the formulated product were also assessed and demonstrated that its pH value was 4.2, its peroxide value was 0.32 meq of O₂/Kg of margarine and its melting point was 36.0°C. It was also revealed using the rancimat test that the margarine enriched in date kernel oil proved to be more resistant to oxidation, than the control one. **Conclusions:** Date kernel oil can be used as a natural additive to enrich table margarine without affecting its properties while improving its oxidation stability.

Keywords: Date kernels oil, antioxidant activity, margarine formulation, physicochemical characteristics, oxidative stability.

ARTICLE INFORMATION

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1 Introduction

The valorization of organic by-products in the food industry has attracted the interest of several researchers for both environmental protection and economic exploitation. For example, some tropical fruits' by-products possess antioxidant

activities that retard lipid peroxidation as demonstrated in sunflower oil or food packaging applications^{1,2}.

The date palm (*Phoenix dactylifera* L.) is a vital plant for desert regions where it constitutes a basis of survival for their populations. The date palm tree produces globally an approximate of 4.8 million tons (dry weight) where 3.6