



Innovative date syrup processing with ohmic heating technology: Physiochemical characteristics, yield optimization, and sensory attributes

Asaad R. Al-Hilphy^a, Thamer-K.M. Al-Behadli^b, Atheer A. Al-Mtury^c,
Arzaq A. Abd Al-Razzaq^a, Ayoub S. Shaish^a, Lan Liao^{d,e}, Xin-An Zeng^{d,e,*},
Muhammad Faisal Manzoor^{d,e,*}

^a Department of Food Sciences, College of Agriculture, University of Basrah, Iraq

^b Ministry of Industry and Minerals, Iraq

^c Basrah Agriculture Directorate, Iraq

^d Guangdong Provincial Key Laboratory of Intelligent Food Manufacturing, Foshan University, Foshan 528225, China

^e School of Food Science and Engineering, South China University of Technology, Guangzhou 510641, China

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ABSTRACT

The present study aimed to investigate the application of the ohmic heating (OH) technique in the production of date syrup from the date fruit of the Sukkary variety at different electric field strengths (EFS) (9, 10, and 11 V/cm). The results were compared to the conventional heating method (CH). The response surface methodology was used to optimize yield. The results showed that the time to reach the boiling point of dates and water mixture using OH was less than the CH by 80% for extracting and 900% for evaporation. In addition, the productivity of date syrup using OH at EFS of 11 V/cm was higher than the CH by 86.11%. There is no significant effect between OH at EFS of 11 V/cm and CH in moisture content, refractive index, density, TSS, and viscosity. The optimum level of EFS was 11.5 V/cm, which gave a higher yield (64.93%). OH, save consumed power and cost. The OH gave the highest scores of sensory characteristics compared to CH. Total sugars, monosaccharides, and ketone monosaccharides were detected in the date syrup, and the result was positive, while the quintuple sugars and multiple sugars were negative for all treatments. The OH reduced the cost by 85.78% compared with CH.

1. Introduction

Dates are one of the essential agricultural products in Iraq, as there are suitable varieties of high quality that may not be available in other global markets. Dates occupy an important economic position at the Iraqi level and in Basrah Governorate, contributing to increasing economic benefits and achieving national food security [1]. Dates are considered a food of high nutritional value because they contain carbohydrates, proteins, and mineral elements. It also contains essential nutrients in supplying humans with the thermal energy that the body needs, as it contains high sugars that reach about 80% of the weight of dates [2–4]. Dates are characterized by easy absorption and quick digestion and can be introduced into manufacturing industries to produce date syrup, date paste, and

* Corresponding authors. Guangdong Provincial Key Laboratory of Intelligent Food Manufacturing, Foshan University, Foshan 528225, China.
E-mail addresses: xazeng@scut.edu.cn (X.-A. Zeng), faisaluos26@gmail.com (M.F. Manzoor).