



“Gheorghe Asachi” Technical University of Iasi, Romania



DEVELOPMENT AND CHARACTERIZATION OF CAROB (*Ceratonia siliqua* L.) BASED ICE CREAM: DIETETIC AND VALUE-ADDED FORMULA

Ichrak Charfi^{1,2}, Sarra Sammoud², Asma Tekiki¹, Safa Baraketi², Haitham Osman³,
Salwa Bornaz¹, Wissem Mnif^{4*}, Zaina Algarni⁵, Hanene Ghazghazi⁶

¹Laboratory of Innovation and Valorization for Sustainable Food Industry, Higher school of food industries of Tunis, University of Carthage, 58 Avenue Alain Savary, 1003, Tunis, Tunisia

²Private University of Tunis (ULT), 30 Avenue Kheireddine Pacha, 1002, Tunis, Tunisia

³Department of Chemical Engineering, College of Engineering, King Khalid University, Abha 61411, Saudi Arabia

⁴Department of Chemistry, Faculty of Sciences at Bisha, University of Bisha, P.O. BOX 199, Bisha 61922, Saudi Arabia

⁵Department of Physics, Faculty of Sciences at Bisha, University of Bisha, P.O. BOX 199, Bisha 61922, Saudi Arabia

⁶Laboratory of Management and Valorization of Forest Resources LR161INRGREF01, National Institute for Research in Rural Engineering Water and Forest (INRGREF), University of Carthage, B.P 10, 2080 Ariana, Tunisia

Abstract

Despite their several nutritional and functional properties, local products, such as carob, have been underexploited in Tunisia. In the context of valorization of these resources, the current study investigates the use of carob as a functional ingredient on physicochemical, microbiological, and sensory characteristics of new dietary carob-based ice cream. Following preliminary tests, eight different samples were initially produced which differ by the amount of added carob. The mixture plan of the optimized formula was then determined according to 5 responses: flavour, odour, overall acceptability, antioxidant activity and viscosity of the ice cream. The addition of carob gave the ice cream nutritional and energy boosting values without being too caloric (153.12 kcal/ 100g) and with no added sugar. The optimized formula with 3.6 % of fat content makes it fall to the dietetic products category. Moreover, the addition of carob gave the ice cream antioxidant properties which is manifested by an antiradical activity of the order of 91.01% and a total antioxidant activity equal to 44.72mg EAA/ g DM. Viscosity and microbiological properties were not affected by the use of carob which meets the prescribed standards of ice creams. This successful preparation of high-quality nutritional and functional carob-based ice cream had a positive response on sensory level, and it had natural dark tint and fragrance without any added chemicals. Therefore, the incorporation of carob significantly improved the functional, nutritional, physicochemical, rheological, and organoleptic quality of the obtained product, stabilizing its microbial quality and viscosity.

Key words: acceptability, antioxidant activity, nutritional quality, quality characteristics, value addition

Received: October, 2023; *Revised final:* February, 2024; *Accepted:* March, 2024; *Published in final edited form:* July, 2024

* Author to whom all correspondence should be addressed: e-mail: w_mnif@yahoo.fr; Phone: +966533983356