

F.7. OPTIMIZATION OF TECHNOLOGICAL PARAMETERS OF A FUNCTIONAL SEA BUCKTHORN SAUCE

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Abstract. This study investigates the valorization of sea buckthorn (*Hippophae rhamnoides* L.) fruits for the development of a sweet sauce with enhanced biological value, with a particular focus on optimizing technological processing parameters. Sea buckthorn is characterized by a high content of bioactive compounds, including vitamin C (30–2740 mg/100 g), polyphenols (29.8–38.8 mg GAE/g), and carotenoids, which confer strong antioxidant properties.

The research aimed to develop a technologically optimized process and to evaluate the influence of thermal regimes on physico-chemical, rheological, and sensory properties of the sauce. Experimental trials were conducted under controlled temperature conditions of approximately 60–65 °C (mild thermal treatment) and 80–90 °C (intensified thermal treatment), with processing durations ranging from 10 to 30 minutes, in order to assess their impact on product quality.

The results demonstrated that increasing temperature and treatment time led to a progressive increase in dry matter content and viscosity, due to water evaporation and structural modifications of the polysaccharide matrix. At 80–90 °C, viscosity increased significantly, indicating improved textural consistency, especially in samples with added gelling agents. However, these conditions also resulted in a pronounced degradation of thermolabile compounds, particularly vitamin C, confirming its sensitivity to heat and oxidation. In contrast, total polyphenol content remained relatively stable (approximately 30–40 mg GAE/g), ensuring sustained antioxidant activity, as confirmed by DPPH analysis.

Rheological behavior indicated a non-Newtonian, shear-thinning system, with viscosity strongly dependent on both temperature and formulation. Sensory analysis revealed that samples

processed at moderate temperatures (60–70 °C) exhibited the best balance between nutritional preservation and desirable texture, achieving higher acceptability scores.

The novelty of the study lies in the development of a clean-label, functional sauce based on locally available raw materials, with reduced reliance on additives and improved nutritional profile.

Keywords: sea buckthorn, functional sauce, thermal processing, physicochemical properties, antioxidant activity, rheology.

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