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Walnut Paste: A Healthy Alternative for Nutella Consumers

Eugenia COVALIOV

Technical University of Moldova

Rodica SIMINIUC

Technical University of Moldova

Violina POPOVICI

Technical University of Moldova

Abstract: Nutella is the best-selling chocolate and hazelnut spread in the world. It is known that the main ingredients of Nutella are sugar (55%) palm oil (23%), hazelnuts (14%), cocoa solids and skimmed milk (8%). Currently, worldwide, there is a tendency to make healthier food choices, and the sugar and palm oil from Nutella's formulation are ingredients blamed for causing certain health disorders (obesity, cardiovascular diseases and diabetes). In this order, the purpose of the research was to develop the technology for obtaining walnut paste, since walnuts have proven prophylactic properties, with a low sugar content and without palm oil. The quality of the elaborated walnut paste was determined and monitored during the shelf life in terms of oxidative stability (Acidity index (FFA) and Peroxide value (PV)), total phenols content, antioxidant activity and rheology. The obtained results demonstrated that during 4 months of storage the acidity index of the walnut paste did not register significant changes, reaching maximum values of $0.17 \pm 0,01$ (Oleic g/100 g), while the peroxide values evolved up to $2.22 \pm 0,03$ meq/kg oil. The slow evolution of the oxidative parameters can be due to the phenolic compounds in walnut paste that recorded a value of $47.2 \pm 0,36$ mg GAE/g with an antioxidant activity (DPPH free radical scavenging) of $70 \pm 1,02$ %. Concerning sensory characteristics, the walnut paste samples were positively appreciated in comparison with Nutella and no significant quality difference was observed after storage for 4 months.

Keywords: Walnut paste, Oxidative stability, Phenolic compounds, Antioxidants

Introduction

The walnut (*Juglans Regia* L.) fruit is considered one of the most consistent foods, and walnut culture is specified as a strategic direction for human nutrition and included by FAO and WHO in the list of priority plants (Gandev, 2007). Because of the high fat content, walnut kernels were not considered a healthy food until recently. This perception has changed a lot lately, because it has been found that they have a healthy polyunsaturated fatty acid profile, are rich in proteins, vitamins and minerals. Many authors report that walnut kernel contains a large amount of lipids (> 50% of the weight), 11% proteins, 5% carbohydrates and is very caloric (approx. 525 kcal/100 g). Walnut lipids have a high content of unsaturated fatty acids (up to 90%), including polyunsaturated fatty acids (PUFA) (up to 78% of the total fatty acid content), which play an essential role for the proper functioning of the human body. They also contain appreciable amounts of dietary fiber, vitamins (E, B3, B5, B6) and mineral elements (K, P, Mg) (Chatrabnous et al., 2018; B. Liu et al., 2020; Martínez et al., 2010).

The importance of walnut culture is determined by its multi-functional utility that includes food, medicine, dyes, adhesives, cosmetics, oils, furniture and sculpture (Guasch-Ferré et al., 2018; L. Liu & Dai, 2021; Rusu et al., 2020). The interest in walnuts is also determined by the nutritional value, which derives from their unique

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composition, with certain nutrients and phytochemicals responsible for multiple beneficial effects of consuming walnuts and derived products (Ni et al., 2022; Ros et al., 2018). The objective of combining walnut kernel with other raw materials is to diversify and improve the nutritional and organoleptic qualities of traditional food products, but also to obtain so-called functional foods. Thus, by using certain strategies in the reformulation of food product matrix, food with a specific composition (eg: reduction of animal fat and sodium content, fortification with various bioactive substances, etc.) and acceptable physico-chemical and organoleptic properties is obtained (Otunola & Martirosyan, 2021). Due to the beneficial effects of walnut consumption on human health demonstrated by numerous researches, there has been increased interest in the development of new food products based on walnuts, such as walnut milk, various fillings for pastry products, walnut flour. Some researchers have tried to produce meat products containing walnut kernel (Ayo et al., 2005; Cofrades et al., 2004). Some studies related to the production of drinks and emulsions using walnut kernels have also been carried out (Gharibzahedi et al., 2012; Ouyang et al., 2022).

The walnut sector is a traditional branch for Republic of Moldova, being favored by the moderate climate, the fertile soils, the possibilities of cultivating the most valuable varieties from the world selection (Zimny, 2012). As in other regions of the world, the market leader of the nut spread industry in Republic of Moldova is the well-known *Nutella* spread. Today, Ferrero's product is a global success. There are studies that mention that on one hand a jar of Nutella is sold worldwide every 2.5 seconds and on the other hand there are health and environmental damage concerns due to the use of palm oil in Nutella spread manufacturing (Cova & D'Antone, 2016; Silva, 2016). Taking into account the fact that walnuts are a local product for the Republic of Moldova and that there are no Moldovan products similar to the "Nutella" spread on the market, the prime objective of this research was to develop a walnut paste with cocoa and chocolate addition that is similar to Nutella using locally grown walnuts.

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Author Information

Eugenia Covaliov

Technical University of Moldova
168 Stefan ce Mare blvd., Chisinau, Republic of Moldova
Contact e-mail: eugenia.boaghi@toap.utm.md

Rodica Siminiuc

Technical University of Moldova
168 Stefan ce Mare blvd., Chisinau, Republic of Moldova

Violina Popovici

Technical University of Moldova
168 Stefan ce Mare blvd., Chisinau, Republic of Moldova

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