

THE IMPACT OF AGRO-INDUSTRIAL BY-PRODUCTS IN CONFECTIONERY

Olga BOESTEAN, ORCID ID: 0000-0002-0390-3550

Technical University of Moldova, Department of Food Technology, Chisinau, Republic of Moldova

Natalia NETREBA, ORCID ID: 0000-0003-4200-1303

Technical University of Moldova, Department of Food Technology, Chisinau, Republic of Moldova

Oksana SHESTOPAL, ORCID ID: 0000-0001-7283-1055

Rybnitsa branch of Pridnestrovian Shevchenko State University, Rybnitsa, Republic of Moldova

*Corresponding author: Olga Boestean, e-mail: olga.boestean@tpa.utm.md

The use of agro-industrial by-products in the creation of new food products is an important direction for the utilisation of natural resources and the reduction of environmental impact. This study investigated the possibility of partially replacing cocoa powder with grape seed meal in truffles. Grape seed meal, rich in dietary fibre, proteins and phenolic compounds with antioxidant activity, was analysed in terms of its effect on the sensory and nutritional properties of the finished product.

The physicochemical parameters of plant by-products were determined in accordance with regulatory and legislative documents in this area [1]. The sensory and physicochemical quality of grape seed meal flour was analysed. The physicochemical characteristics were described by the following values: moisture content – $5.76 \pm 0.04\%$, ash content – $4.49 \pm 0.30\%$, lipid content – $8.42 \pm 0.61\%$ and protein content – $15.75 \pm 0.11\%$. When preparing experimental samples of truffles, the cocoa mass was partially replaced with grape seed meal flour in proportions of 5%, 10% and 25%.

Changes in the quality indicators of candies based on grape seed flour were noticeable. Grape seed flour is rich in fibre, which has the ability to absorb moisture. This led to a reduction in moisture content from 1.69 to 1.17%, i.e. by 1.4 times, and a decrease in sugar content from 36.4 to 28.3%, i.e. by 1.3 times. Adding it to sweets can reduce the energy value of the final product while providing nutritional benefits such as improved digestion and protection against oxidative stress [2].

Adding grape seed flour to a candy recipe affects its organoleptic characteristics, namely taste and colour. In terms of taste, grape seed flour has a slightly astringent taste with fruity notes that complement the main flavour of the candy, giving it an original, piquant taste [3]. As for the colour of truffles, grape seed flour does not have a decisive effect on their colour, as the change in colour is not noticeable against the background of cocoa powder; it can only change the colour, making it more saturated and intense [4]. Grape seed meal acts as a functional ingredient with antimicrobial activity, improving the microbiological stability of truffles, and provides nutritional benefits (antioxidants, fibre), making it a sustainable and safe alternative to cocoa powder.

The findings highlight the potential of grape seed meal as a sustainable and nutritious ingredient that can improve the functional profile of confectionery products while offering an innovative alternative to the traditional use of cocoa powder. The results showed that the addition of pomace leads to a significant increase in antioxidant and fibre content, contributing to a functional dessert with added value. Sensory evaluation showed that partial replacement of cocoa powder is favourable.

Keywords: *antioxidants, confectionery products, grape seed meal, sensory evaluation, sustainable ingredients*

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