

Abstract

Acorn flour is an example of a raw material whose introduction into traditional food enriches its basic composition with bioactive compounds such as monounsaturated fatty acids, sterols, tocopherols, minerals, phenolic compounds and dietary fibre. Due to the fact that it is a high-starch raw material, the natural direction for the use of acorn flour in food production is its introduction into bakery and pastry products. However, due to its lack of gluten proteins and high fat and dietary fibre content, acorn flour can negatively affect the physical properties of products made with it.

The research carried out within the scope of this dissertation was based on current knowledge regarding the possibility of using acorn flour in bakery and pastry production as a bioactive enrichment ingredient, which was collected and described in a review publication, which is an integral part of the dissertation. In the experimental part, the chemical composition and properties of acorn flour were evaluated, which was then introduced into the recipes of wheat and rye baked goods carried out by different methods, wheat and gluten-free shortbread cookies and sponge cake (muffin). The baked products were evaluated for physical, sensory and antioxidant properties, as well as chemical composition, including special attention to the profile of phenolic compounds. The study analysed the effect of both the amount of additive (in the range of 5-70%) and the origin (Polish and Greek acorn flours), as well as the treatment of acorn flour before its introduction into the product (no treatment, spontaneous and directed fermentation).

The study confirmed that acorn flour differs in its baking properties from traditionally used flours, and thus affects the physical characteristics of bakery and confectionery products with its participation, including primarily colour, texture characteristics, texture and volume. Of significance is the effect of acorn flour on the composition and content of phenolic compounds, among which phenolic acids, mainly ellagic and gallic acids, are the most characteristic of the raw material. It was found that the way acorn flour affects the quality of bakery and pastry products depends on its origin and level of addition, as well as the pretreatment (fermentation) used and can be changed in the production process by selection of the dough method.

Keywords: acorn flour; bread; cookies; fermentation; physical properties; phenolic compounds; antioxidant capacity