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Extruded beetroot preparation as an enriching ingredient in gluten-free bread

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Bread is one of the fundamental components of the human diet. In its traditional form, it is based on gluten-containing cereals, mainly wheat and rye. In recent years, however, a rapid increase in demand for gluten-free products has been observed. On the one hand, this results from growing prevention efforts and awareness of gluten-related disorders (including celiac disease and wheat allergy), for which the implementation of a strict elimination diet is the only effective form of therapy. On the other hand, voluntary gluten avoidance is becoming increasingly popular, motivated by the perception of such a diet as more beneficial for overall health. However, gluten-free bread is characterized by a lower nutritional value. Another challenge is achieving an appropriate bread structure in the absence of gluten, which is responsible for structure formation. The aim of this study was to develop a formulation and evaluate the effect of adding a dietary fiber preparation from red beetroot on the physicochemical, textural, and sensory properties of gluten-free bread.

The research material consisted of gluten-free breads based on corn and potato starches. In the basic formulation, the starches were partially replaced with a fiber preparation at levels of 5%, 7.5%, and 10%. The effect of the addition on loaf volume, dry matter content, water activity, color, texture, and sensory characteristics was evaluated.

It was found that the addition of beetroot fiber at a level of 7.5% allowed for the production of gluten-free bread of high quality and consumer acceptance. Higher concentrations (10%), despite improving loaf volume, negatively affected crumb texture, making it excessively hard and gummy.