crucial in the design of accurate and sensitive electromagnetic converters for nondestructive quality assessment.

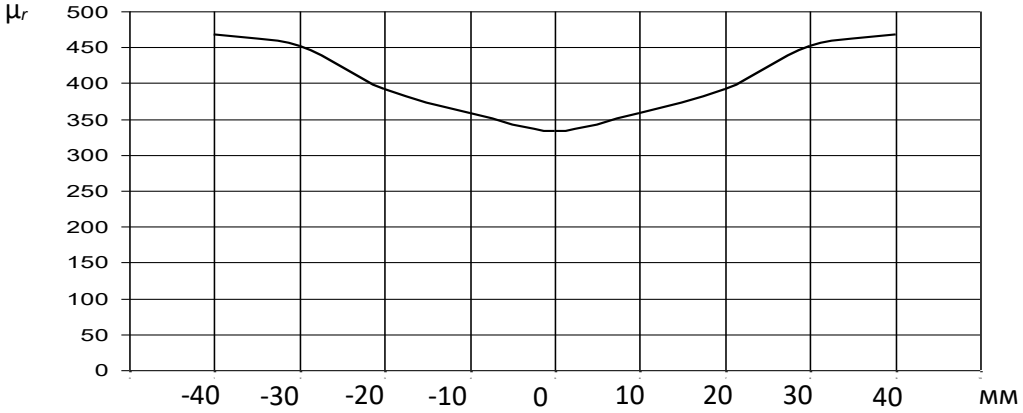

Fig. 3. Change in μr depending on the distance to the weld on both sides

Conclusions. It is concluded that the electromagnetic characteristics of welded joints differ significantly in the weld and heat-affected zones. The obtained results validate the potential of electromagnetic methods for accurate, nondestructive evaluation of weld quality.

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RATIONALE FOR THE STABILIZATION TECHNOLOGY OF GLUTEN-FREE BEER USING PLANT EXTRACTS

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Abstract. The increasing demand for gluten-free products is driven by the heightened prevalence of celiac disease and gluten sensitivity. Gluten-free beer represents a promising category that requires enhancements in storage stability.

Keywords: gluten-free beer, plant extracts, stabilization, antioxidants, oak bark, grape seed, rosemary, hop extract, foam stability, oxidative spoilage.

Introduction

Gluten-free beer faces several technological challenges, including:
- the absence of gluten proteins, which affects foam formation;
- susceptibility to oxidative processes;
- reduction in the stability of color and flavor;
- potential for sediment formation due to protein-phenolic interactions.

Text

The aim of this work is to conduct an analysis and study of issues related to the stabilization technology of gluten-free beer and to identify effective methods for solving this problem. One such method is the addition of plant extracts.

Plant extracts are natural antioxidants and stabilizers that can improve the physicochemical characteristics of gluten-free beer. Among the most promising are: rosemary extract – a powerful antioxidant that reduces oxidative spoilage; oak bark extract – a source of polyphenols that stabilize color and taste; hop extract – enhances foam formation and reduces the risk of microbial spoilage; grape seed extract – improves organoleptic properties and stabilizes foam [1, 2].

Recent studies have examined the impact of various plant extracts on foam duration, oxidative stability, organoleptic properties (aroma, taste, color), and physicochemical indicators (pH, phenol content, colloidal system stability).

Conclusions. The rational use of certain plant extracts significantly enhances the stability of gluten-free beer. The most effective stabilizer was found to be oak bark extract combined with grape seed extract. It is also noted that adding rosemary extract reduces oxidation levels and improves shelf life, while the use of hop extract promotes the formation of stable foam [3, 4].

Further development of this direction may include experimental studies to determine the optimal concentrations of extracts, their impact on the quality characteristics of the beverage, and the possibilities for integrating stabilizing components into industrial production technologies of gluten-free beer.

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COMBINED HEAT SUPPLY SYSTEM FOR BUILDINGS AND STRUCTURES

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Abstract. The abstract discusses the inefficiency of solar heat supply systems in cold seasons and proposes combined systems using additional energy sources for optimized performance. The paper analyzes various configurations and their energy-saving potential.
Keywords: combined heat supply, solar collectors, seasonal storage, energy efficiency, heating, hot water supply, renewable energy.

Introduction. The topicality of the study lies in the need to increase energy efficiency in building heat supply systems while transitioning away from fossil fuels. The object of research is combined solar and auxiliary heat supply systems. The subject is the structural and functional characteristics of such systems. The goal is to identify optimal configurations for year-round efficient energy use. The novelty lies in proposing integrated systems that balance solar and backup energy sources for both heating and hot water.

Text

The intensity of solar radiation during the winter period, and in some cases in the spring and autumn, is insufficient to provide the required power of solar collector heat supply systems. To cover loads during these periods, a high-capacity seasonal solar energy storage is required. However, the installation of such a storage system significantly increases the cost and payback period of solar systems. Therefore, such storage units have not become widely adopted [1].