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Evaluation Of The Incorporation Of Modified Starch In Puff Pastry Dough By Mixolab Rheological Analysis

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Abstract : The connection between health and nutrition has driven the food industry to explore healthier and more sustainable alternatives. Key strategies to enhance nutritional quality and extend shelf life include reducing saturated fats and incorporating natural ingredients. One area of focus is the use of modified starch in baked goods, which has attracted significant interest in food science and industry due to its functional benefits. Modified starches are commonly used for their gelling, thickening, and water-retention properties. Derived from sources like waxy corn, potatoes, tapioca, or rice, these polysaccharides improve thermal stability and resistance to dough. The use of modified starch enhances the texture and structure of baked goods, which is crucial for consumer acceptance. In this study, it was evaluated the effects of modified starch inclusion on dough used for puff pastry elaboration, measured with Mixolab analysis. This technique assesses flour quality by examining its behavior under varying conditions, providing a comprehensive profile of its baking properties. The analysis included measurements of water absorption capacity, dough development time, dough stability, softening, final consistency, and starch gelatinization. Each of these parameters offers insights into how the flour will perform during baking and the quality of the final product. The performance of wheat flour with varying levels of modified starch inclusion (10%, 20%, 30%, and 40%) was evaluated through Mixolab analysis, with a control sample consisting of 100% wheat flour. Water absorption, gluten content, and retrogradation indices were analyzed to understand how modified starch affects dough properties. The results showed that the inclusion of modified starch increased the absorption index, especially at levels above 30%, indicating a dough with better handling qualities and potentially improved texture in the final baked product. However, the reduction in wheat flour resulted in a lower kneading index, affecting dough strength. Conversely, incorporating more than 20% modified starch reduced the retrogradation index, indicating improved stability and resistance to crystallization after cooling. Additionally, the modified starch improved the gluten index, contributing to better dough elasticity and stability, providing good structural support and resistance to deformation during mixing and baking. As expected, the control sample exhibited a higher amylase index, due to the presence of enzymes in wheat flour. However, this is of low concern in puff pastry dough, as amylase activity is more relevant in fermented doughs, which is not the case here. Overall, the use of modified starch in puff pastry enhanced product quality by improving texture, structure, and shelf life, particularly when used at levels between 30% and 40%. This research underscores the potential of modified starches to address health concerns associated with traditional starches and to contribute to the development of higher-quality, consumer-friendly baked products. Furthermore, the findings suggest that modified starches could play a pivotal role in future innovations within the baking industry, particularly in products aiming to balance healthfulness with sensory appeal. By incorporating modified starch into their formulations, bakeries can meet the growing demand for healthier, more sustainable products while maintaining the indulgent qualities that consumers expect from baked goods.

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