

Title: Enzyme applications in baking: From dough development to shelf-life extension

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Abstract: Enzymes play a vital role in baking, providing significant benefits from dough development to extending shelf life, which enhances product quality and consistency. Acting as biological catalysts, enzymes such as proteases and amylases break down proteins and starches, modifying dough rheology and improving fermentation. Lipases and oxidases further refine dough texture through emulsification and oxidation, while lipases also produce fatty acid derivatives during fermentation, contributing to the flavor and aroma of baked goods. Xylanases and cellulases optimize dough handling by altering fiber structure, and amylases help maintain moisture and texture, extending the shelf life of baked products. Ensuring regulatory compliance is essential when incorporating enzymes into baking processes, as bakers must address enzyme stability and determine appropriate dosages for reliable outcomes. Ongoing research is exploring innovative enzyme applications, including customized enzyme blends that target specific product qualities, offering new possibilities for product differentiation and innovation. In summary, enzyme-driven advancements present bakers with opportunities to improve product quality, shelf life, and consistency, while meeting industry regulations. This review emphasizes the critical impact enzymes have on dough properties and finished product characteristics, highlighting their role in driving future innovations within the baking industry.

Keywords: Enzymes, Baking, Dough development, Shelf life, Product quality, Proteases, Amylases, Lipases, Oxidases

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