

Oxidative Stability of Whole Grain and its effect in Bakery Products

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The lipid fraction in baked products plays a fundamental role not only in determining the structural and sensorial characteristics, but also in influencing the oxidative stability and overall shelf life of the final product. Lipids are particularly subject to oxidation which leads to the formation of unpleasant flavors, loss of nutritional quality and the generation of potentially harmful compounds, reducing the shelf life of the product. The lipid fraction used in bakery formulation is therefore very important. Increased demand for clean-label, plant-based, and sustainable products drives the bakery industry to replace the traditional fats with alternative sourcing with also the aim to improve texture, stability, healthiness, and shelf life.

Besides, given the well-known health benefits of whole grain (WG) consumption, consumers are increasingly demanding WG versions of many cereal-based products. However, the presence of the germ and bran also introduces a higher proportion of unsaturated lipids and oxidative enzymes, making WG flours and products more susceptible to oxidative degradation, reducing shelf life.

For these reasons, this study explores the oxidative behavior of various baked goods during storage and processing, focusing on the main primary and secondary oxidative compounds, such as peroxide value, hexanal content, and oxidized fatty acids. The results highlight both how different fats used in formulations can affect the final quality of the baked product and how the lipid composition and oxidative status of the WG flour can influence the shelf life of the final product, highlighting a significant variability among WG products on the pasta and bakery market.