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Investigating the Impact of Sourdough on Acrylamide and Phytate Levels in Whole Wheat Bread

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Background and Aims: Whole wheat bread, while nutritionally beneficial, has higher levels of phytic acid and acrylamide than white flour bread. Sourdough may effectively address this issue. This study reviews existing literature to evaluate sourdough's impact on acrylamide and phytate levels in whole wheat bread.

Materials and Methods: Articles were searched in the SID and Google Scholar databases using the keywords sourdough pH and lactic acid strains' effects on acrylamide and phytate reduction in whole wheat bread were extracted.

Results: Breads high in phytic acid often contain increased acrylamide levels. At elevated pH, phytic acid catalyzes the Maillard reaction, leading to greater acrylamide production. Sourdough fermentation with bacteria and yeasts can reduce phytic acid and acrylamide in whole wheat bread. Research shows that lower pH in sourdough correlates with reduced acrylamide formation by promoting the protonation of asparagine's amine group. Lactic acid bacteria also help decrease acrylamide through enzymatic activity and phytic acid breakdown. Lactobacillus acidophilus effectively lowers phytic acid, while Lactobacillus plantarum generates high acidity. Bread fermented with Lactobacillus paracasei exhibits the lowest acrylamide content and softest texture, due to its low pH of 3.5.

Conclusion: Sourdough is an effective method for preparing whole wheat bread. By using suitable microbial strains, it can replace chemical and industrial processes, producing high-quality bread that boosts nutritional value.

References: 1. Nasiri Esfahani B, Kadivar M, Shahidi M, Soleimanianzad S. Evaluation of the effect of fermentation of sourdoughs containing four strains of lactic acid bacteria on the amount of phytic acid and acrylamide of bulk whole wheat bread. Journal of Nutritional Sciences and Food Industries of Iran. 2017: 13(1), 53-62.
2. Farhosh R, Shahidi M, Sharif A. Investigating the effects of acetic acid and dough fermentation on the amount of acrylamide in Sangak bread. Iranian Journal of Food Science and Industry Research. 2014:11(1), 100-106.