

## Investigation of the Effect of Lactic Acid Bacteria and *Nigella Sativa* Oil on Acrylamide Formation in Cereal Products

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Acrylamide, a probable human carcinogen, is formed by a reaction between asparagine and reducing sugars *via* Maillard reaction and it was detected in a wide range of cereal products. The aim of the present study was to investigate the effects of lactic acid bacteria (LAB) and *Nigella sativa* oil on the formation of acrylamide in bread. For the lactic acid fermentation, *Lactobacillus plantarum* was used as a starter at different levels (2%, 4%). As for *Nigella sativa* oil, it was applied on the surface of dough before baking at the level of 4%. Acrylamide determination was performed by high performance liquid chromatography coupled with UV detection. The results showed that both LAB and *Nigella sativa* oil could effectively reduce the formation of acrylamide. Lactic acid fermentation, as individual factor, had significant effect on acrylamide inhibition depending on the starter concentration in the bread models. A decrease in acrylamide content was found to range from 16.6% to 27.4% for breads containing 2% and 4% of *L. plantarum*, respectively. Significant effect was also observed when *Nigella sativa* oil was applied. The results indicate that acrylamide concentration decreased by 28% for bread models added by *Nigella sativa* oil. The maximum reduction rate (53.01%) was achieved when the addition level of LAB was 4% and the *Nigella sativa* oil was applied. In the conclusion, both LAB and *Nigella sativa* oil showed their inhibitory effect on acrylamide formation in bread.

**Keywords:** acrylamide, bread, liquid chromatography, *Nigella sativa* oil, *Lactobacillus plantarum*