PREVENTIVE ACTIONS OF ACRYLAMIDE FORMATION AS A CHEMICAL HAZARD DURING DEEP FAT FRYING OF POTATO STRIPS

By

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ABSTRACT

Acrylamide is a chemical contaminant that is driven from heat induced reaction between asparagine and reducing sugars during process. This study is aimed to investigate the most effective pre-frying treatment as a preventive action on acrylamide formation during frying of potato strips. Acrylamide was determined in potato strips samples using High Performance Liquid Chromatography with UV detector (HPLC-UV) technique. Immersing samples in boiled water (BW) treatment was carried out for 30, 60 and 90 sec. Also, exposing samples to water vapor (WV) treatment was carried out for 30, 60 and 90 Sec. Exposing samples to microwave treatment was occurred by exposing potato strips to different microwave powers P_1 (385 W), P_2 (540 W) and P_3 (700 W) for 30, 60 and 90 sec. of each power level. Soaking was carried out using four different solutions *i.e.,* sodium chloride, sodium acid pyrophosphate, citric acid, and ascorbic acid for three different concentrations of each solution *i.e.,* 5, 10 and 15 gm/L for 30, 60 and 90 min. to study the effect of soaking on reducing sugars content before deep fat frying as well as acrylamide formation after deep fat frying of potato strips. Antioxidants treatment was carried out by adding four different antioxidants *i.e.,* BHA, TBHQ, mixed tocopherols, and rosemary extract to palm stearin before frying to study their effect on acrylamide formation in fried potato strips. Results showed that the pre-treatments with P_1 (385 W) contain higher acrylamide content than other treatment used showing significant difference ($p<0.05$). Meanwhile, P_3 (700 W) contained lowest acrylamide content with significant differences ($p<0.05$) followed by water vapor at any exposure time used except at 30 sec. Also, results showed no significant differences ($p<0.05$) between each following pair of treatments: WV/30 sec. and P2/30 sec., P2/30 sec. and BW/60 sec., P1/90 sec. and WV/60 sec. and P2/90 sec. and BW/90 sec. Soaking prior to frying of potato strips in 10 gm/L citric acid solution for 60 and 90 min., soaking in 10 gm/L ascorbic acid solution for 90 min, soaking in 15 gm/L sodium chloride solution for 90 min. or 15 gm/L sodium acid pyrophosphate, citric acid, and ascorbic acid for 60 and 90 min. led to lowering acrylamide content to the accepted level (500 µg/kg) as identified by EU. Arylamide content of fried potato strips was tended to decrease gradually by using different antioxidants *i.e.,* BHA, TBHQ, mixed tocopherols and rosemary extract showing that the most effective antioxidant to reduce acrylamide content is rosemary followed by mixed tocopherols. It could be concluded that treatment prior to frying is very important to decrease acrylamide formation in fried potato strips.

Keywords: Potato strips, acrylamide, reducing sugars, boiling water, water vapor, microwave, soaking, and antioxidants.

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