

Selection of vegetable oils and frying cycles influencing acrylamide formation in the intermittently fried beef nuggets

ABSTRACT

This study aims to investigate the effect of different vegetable oils and frying cycles on acrylamide formation during the intermittent frying of beef nuggets. Different vegetable oils, palm olein (PO), red palm olein (RPO), sunflower oil (SFO), and soybean oil (SBO), were used for a total of 80 frying cycles. Oil was collected at every 16th frying cycle and analyzed for peroxide value (PV), p-anisidine value (p-AV), free fatty acid (FFA), total polar compound (TPC), polar compound fractions, and fatty acid composition (FAC). Total oxidation (TOTOX) value was calculated, and acrylamide content was quantified in the nuggets. Regardless of the oil type, PV, p-AV, and TOTOX initially increased but gradually decreased. However, FFA and TPC continued to develop across the 80 frying cycles. The C18:2/C16:0 remained almost unchanged in PO and RPO but dropped progressively in SFO and SBO. The lowest acrylamide content in fried products was observed in the PO, while the highest content was observed in RPO. Bivariate correlation analysis showed no significant ($p \leq 0.05$) correlation between oil quality attributes and acrylamide concentration. The oil type but not the frying cycle significantly affected the acrylamide concentration in beef nuggets.

Keyword: Acrylamide; Intermittent frying; Beef nugget; Frying cycles; Vegetable oils