

Influence of carbohydrate- and protein-based foods on the formation of polar lipid fraction during deep-frying

ABSTRACT

The extents of the oxidation and polymerization processes were examined in refined, bleached, and deodorized palm olein (RBDPO) to determine the impact of frying different foods on frying oil stability, particularly the formation of polar lipid fraction and short chain fatty acid upon frying, and at the same time to evaluate its discarding point. Sliced potatoes (SP) and chicken breast meat (CBM) were fried for 200 min/day for seven consecutive days using RBDPO at 180 °C without any oil replenishment. The amounts of total polar compound (TPC), polymerized triacylglycerols (PTG), and short-chain fatty acid (caprylic acid) that formed were significantly ($p < 0.05$) higher in the RBDPO used to fry SP compared to CBM. The TPC in the RBDPO used to fry SP exceeded the limit of rejection for human consumption (>25% polar compounds) on the seventh day of frying. In addition, the amounts of epoxy, keto, and hydroxy acids that formed were significantly ($p < 0.05$) higher in the RBDPO used to fry CBM compared to SP. RBDPO also exceeded the safety limit when the concentration of epoxy acids respectively reached 7.4 g/kg and 8.8 g/kg after frying SP and CBM for seven days.

Keyword: Polymerized triacylglycerol; Oxidized fatty acid; Epoxy acids; Frying; Potato; Chicken breast meat