

Effects of natural and synthetic antioxidants on changes in 3-MCPD esters and glycidyl ester in palm olein during deep-fat frying

ABSTRACT

The effects of selected antioxidants on the changes of the quality properties and 3-monochloropropane-1,2-diol (3-MCPD) esters and glycidyl ester (GE) contents in refined, bleached, and deodorized (RBD) palm olein during the deep-fat frying (at 180 °C) of potato chips were studied. The frying duration was 100 min in five antioxidant systems for three consecutive days. The antioxidants used were butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), tert-butylhydroquinone (TBHQ), oleoresin rosemary and sage extract. Both the frying oil and the oil extracted from the fried potato chips were analyzed for the 3-MCPD esters and GE content, acylglycerol composition, free fatty acid (FFA) content, p-anisidine value (p-AV), and specific extinction coefficient K232 and K268. Generally, TBHQ and oleoresin rosemary showed significantly lower levels of 3-MCPD esters and GE. The order of effectiveness of the selected antioxidants in the frying oil and fried potato chips was BHT < BHA < sage extract < oleoresin rosemary < TBHQ. Antioxidants reduce the 3-MCPD esters and GE levels by inhibiting the formation of radical intermediates.

Keyword: 3-monochloropropane-1,2-diol esters; Glycidyl ester; Antioxidant; Palm olein; Frying