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 180ؚC) of potato chips were studied. The frying duration was 100ؚmin 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 BHTؚBHAؚsage extractؚoleoresin rosemaryؚTBHQ. 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