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Studying physical and chemical changes in liquid frying margarine after consecutive times of heating

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Objective: To observe chemical and physical changes in liquid frying margarine during heating at different times.

Methodology: In 12 kinds of formulated margarines with 4 different types of oil phase (palm super olein, partially hydrogenated Canola oil, 50:50 mixture of palm super olein and partially hydrogenated canola oil , liquid canola) and 3 different moisture levels (16, 8, 4%) frying test was carried out in 3 time intervals with potato in pan and after every step a few heated emulsion samples were separated to observe changes in polar compound percent , acidity and overall color.

Result and conclusion: Margarines with more unsaturated fatty acids and higher percent of moisture exhibited higher acidity and polar compounds after heating. However by increasing heating time, samples exhibited higher amount of total polar compound and acidite. (In margarine canola as base oil and 16% moisture acidity increased from 0.181 to 0.253 and polar compound percent increased from4.5 to 8.01 after 3 times heating , but in margarines as palm super olein base oil and 4% moisture, acidity increased from 0.099 to 0.102 and total polar compound increased from 3.1 to 4.6%. The highest color value was for margarines with palm super olein base for many pigments that is in structure. In second step of frying exhibited least color because many pigments lost in heating and didn't   develop much secondary colored oxidation product in heated emulsion. In margarines with the same type of oil phase, highest color value was related to margarines with highest moisture. The results exhibited that all produced margarines could be used for frying for more than 3 times.