

Comparative Study on Stability of Coconut Oil, Sunflower Oil and Palm Oil During Deep Frying

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Repeated use of oils for frying can create products that are harmful for human health. This study was aimed to evaluate the stability of three oils widely used in Sri Lanka, namely, coconut oil (CO), sunflower oil (SO) and palm oil (PO) during continuous deep frying. Oil samples were purchased from local markets. Frying experiment was conducted by frying potato slices at 175 ± 5 °C. Frying was done for 15 minutes (one frying cycle). This process was conducted over a period of 12 hours using the same oil without replenishment. Samples were collected after every two hours during frying and evaluated for the chemical changes [acid value (AV), iodine value (IV) and total polar compounds (TPC)] and physical changes (viscosity and smoke point) occurred during frying. Oxidative stability of oil samples were determined by evaluation of peroxide value (PV), *p*-anisidine value (*p*-AV) and conjugated dienes (CD) and conjugated trienes (CT) values. Data were statistically analysed using ANOVA ($\alpha = 0.05$) using SAS. Less changes were observed in the parameters determined for the CO than SO and PO. Rates of increase in AV (0.02/hour), *p*-AV (8.03/hour), PO (0.13/hour) and viscosity (1.15/hour) were higher for SO than other oils. Smoke point of all oils decreased significantly, however, the reduction was higher for PO (from 208.5 to 172 °C) than others. TPC were increased significantly during frying in all three oils. However, TPC of CO did not reach the maximum acceptable limit (24-27%) throughout the frying, while, PO and SO reached the limit at 4 and 12 hours of frying, respectively. The rate of reduction in the IV of the PO and SO was 0.03/hour and 1.15/hour, respectively. Based on the results of this study, it can be concluded that the CO is more suitable for continuous deep frying up to the duration studied compared to other two oils.

Keywords: Coconut oil, Continuous deep frying, Frying cycle, Oxidative stability, Total polar compounds