

## Effect of Repeated Heating on The Oxidative Degradation of White Coconut Oil and Soy Bean Oil.

C.M. Senanayake<sup>1\*</sup>, N. Jayathilaka, Kapila<sup>1</sup>, N. Seneviratne<sup>1</sup>

Repeated heating of cooking oils is a common practice used mainly to save the cost in food preparations. The aim of the present study was to investigate the effect of repeated heating on the oxidative degradation of frying oils (white coconut oil and soy bean oil). Initially, fresh potatoes were peeled off and sliced into uniform thickness ( $4 \times 0.3 \times 0.3$  cm<sup>3</sup>). Sliced potatoes (batches of 25 g) were fried in 100 mL portions of white coconut oil (WCO) and soy bean oil (SO) separately at  $180 \pm 5$  °C for 10 minutes. The oils were reused for 2 more frying cycles over a span of 3 days (1 frying cycle per day). In each day, an amount of fresh oil was added to make the volume of frying oil in to 100 mL. After each frying cycle, oil samples were collected from the frying pan and by extraction of fat with n-hexane from potato chips. Level of oxidation of frying oils and lipid extracted from potato chips were assessed by measuring the peroxide value (PV) and thiobarbituric acid reactive substances (TBARS).

Table 01 states the results of PV and TBARS. Both PV and TBARS of frying oils and lipid extracted from potato chips increased as the number of frying cycles were increased (Table 01). Fried SO (FSO) and lipid extracted from potato chips fried in SO (PSO) showed higher PV and TBARS values than that of fried WCO (FWCO) and lipid extracted from potato chips fried in WCO (PWCO) in every frying cycle (Table 01).

**Table 01.** PV and TBARS of frying oils and lipid extracted from potato chips

Sample	1 <sup>st</sup> Frying cycle		2 <sup>nd</sup> Frying cycle		3 <sup>rd</sup> Frying cycle	
	PV (meqO <sub>2</sub> / kg of oil)	TBARS (MDA mmol/kg of oil)	PV (meqO <sub>2</sub> / kg of oil)	TBARS (MDA mmol/kg of oil)	PV (meqO <sub>2</sub> / kg of oil)	TBARS (MDA mmol/kg of oil)
FWCO	2.54±0.46	0.77±0.08	4.69±0.11	1.41±0.21	16.91±0.29	2.71±0.19
FSO	18.48±0.35	4.23±0.16	20.24±0.76	6.60±0.08	21.67±0.49	7.59±0.08
PWCO	2.36±0.14	2.57±0.12	2.87±0.17	2.54±0.85	11.33±0.27	2.69±0.24
PSO	14.06±0.63	5.12±0.33	13.05±0.32	5.78±0.50	15.49±0.65	7.92±0.30

According to Codex standards for fats and oils, PV up to 15 meq O<sub>2</sub>/ kg of oil is considered as safe level for consumption. AOCS and Food Sanitation Law of Japan guidelines state that PV up to 10 meq O<sub>2</sub>/ kg of oil and PV ≤30 meq O<sub>2</sub>/ kg of oil as safe levels of consumption respectively. Considering these values, we can conclude that, the levels of PV of WCO can be safely maintained for three frying cycles with a frying time of 10 minutes. Financial assistance provided by NRC 12-012 is highly appreciated.

**Keywords:** *Frying oil, Oxidative degradation, Peroxide value, Repeated heating, Thiobarbituric acid reactive substances*

<sup>1</sup> University of Kelaniya, Sri Lanka \*chathurissnk@gmail.com