

## OXIDATIVE STABILITY OF SELECTED EDIBLE OILS AND THE EFFECT OF NATURAL PLANT EXTRACTS IN MINIMIZING THEIR OXIDATION

Umami Walallawita<sup>1</sup>, T. Madhujith<sup>2</sup>, N.W.I.A. Jayawardana<sup>1</sup> and C.S. Ranadheera<sup>1</sup>

<sup>1</sup> Department of Agricultural Systems, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama.

<sup>2</sup> Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya, Peradeniya.

Lipid oxidation is one of the major causes of food spoilage. Oxidation leads to generate wide array of undesirable compounds some of which are detrimental to health. Chemical mechanisms such as auto-oxidation and photosensitized oxidation are responsible for the oxidation of edible oils during processing and storage. A study was conducted to evaluate the oxidative stability of ten edible oils (Palm, sesame, soy bean, mahua (*Madhuca longifolia*), sunflower, pairing, white coconut, virgin coconut, RBD and coconut oil grade-1) for photo-oxidation and auto-oxidation. Peroxide value (PV), conjugated diene (CD), conjugated triene (CT) and thiobarbutaric acid reactive substance assay (TBARS) were measured at the beginning and at one day intervals for 28 days to assess the oxidative stability of oils. The values obtained initially were considered as controls. Another series of experiments was carried out to determine the efficacy of three natural antioxidative extracts (mangoose peel, cinnamon, chilli) in preventing oxidation of sesame oil. Same experimental procedure mentioned above was followed. Palm oil [(photo-oxidation PV 4.78%, TBARS 0.95%, CD 2%, CT 0.2%) (auto-oxidation PV 1.91%, TBARS 10.04%, CD 4.07% , CT 24.11%)] and soy bean oil [(photo-oxidation PV 5.44%, TBARS 1.26%, CD 2.02%, CT 0.06%) (auto-oxidation PV 2.2%, TBARS 4.23%, CD 0.87%, CT 10.55%)] showed highest oxidation rates while virgin coconut oil [(photo-oxidation PV 0.075%, TBARS 1.94%, CD 0.16%, CT 0.43%) (auto-oxidation PV 2.83%, TBARS 10.41%, CD 3.02%, CT 2.13%)] showed lowest rate of oxidation in both auto- and photo-oxidation. Virgin coconut oil showed the highest oxidative stability, compared with the control in both oxidation processes. Chilli extract [(auto-oxidation PV 3.33%, TBARS 2.7%, CD 1.89%, CT 1.42%) (photo-oxidation PV 6.6%, TBARS 0.96%, CD 1.3%, CT 0.75% )] showed the highest efficacy in preventing auto-oxidation and photo-oxidation. The production of primary oxidative products was decreased by chili extract in auto-oxidation.

**Key words:** Auto-oxidation, Edible oils, Natural extracts, Oxidative stability, Photo-oxidation