STABILITY OF SELECTED EDIBLE OILS AGAINST PHOTOSENSITIZED OXIDATION AND AUTOXIDATION

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Lipid oxidation is one of the major causes leading to spoilage of fatty foods which involves a series of chemical reactions that degrades the quality of edible oils. Oxidation leads to generation of a plethora of undesirable chemical constituents some of which are detrimental to health. Different chemical mechanisms such as autoxidation and photosensitized oxidation are responsible for the oxidation of edible oils during processing and storage. This study was carried out to evaluate the oxidative stability of selected edible oils namely, sesame, *mahua (mee)* (*Madhuca longifolia*), virgin coconut, refined bleached and de-odorized (RBD) and grade-1coconut oils for photosensitized oxidation and autoxidation. Fresh oil samples were collected from local oil producers and stored at 4 °C until analysis. The effect of light on oxidation of edible oils was evaluated by exposing oils (5ml) to a florescent bulb (10 W) fixed in a specially prepared plastic box over 28 day and assessing the level of oxidation by measuring Peroxide Value (PV), 2-*tert* Thiobarbituric Acid Reactive Substances (TBARS), Conjugated Dienes (CD) and Conjugated Trienes (CT). The oil samples were placed in glass vials and left open such that they were directly exposed to light emitted by the fluorescent bulb. The stability of oils against autoxidation was evaluated by storing the oils (5ml each) at an elevated temperature (60 °C) for 28 days in a Schaal oven and assessing the level of oxidation by measuring PV, TBARS, CD and CT. The percent rate of increment of each of the above parameters was calculated by dividing the increase of each parameter by 28 and expressing as a percentage. Virgin and RBD coconut oils and *mahua (mee)* oil showed the highest rate of increment of PV and CD indicating high production of primary oxidative products, however, the increase in TBARS and CT was very minimal. The secondary oxidative products are better indicators of oxidation, therefore, it can be concluded that these oils maintain a long shelf life under the light than sesame and coconut oils. The experiments carried out to study the effect on autoxidation revealed that RBD coconut and *mahua (mee)* oil showed the lowest rate of increment of TBARS and CT indicating high oxidative stability. Coconut oil (grade 1) showed the highest rate of increment of TBARS during the 28 day period indicating its poor stability against photo-sensitized oxidation. Based on the results of both photosensitized oxidation and autoxidation, it can be concluded that RBD coconut and *mahua* oils exhibit the highest oxidative stability. Furthermore, it can be concluded that virgin coconut oil shows better oxidative stability against photo-sensitized oxidation while it is not stable against autoxidation.

Keywords: Autoxidation, *Mahua* oil, *Mee* oil, Oxidative stability, Photo sensitized oxidation