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Incorporation of natural antioxidants from plant extracts in to virgin coconut oil for extension of shelf life

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Lipid oxidation renders a tremendous impact on the quality deterioration of edible oils. In oils the oxidation leads to loss of flavour, aroma, and overall nutritional value, along with texture degradation. High levels of oxidation products act as *cyto*-toxic substances that lead to health problems. Synthetic antioxidants are often used to preserve edible oils. Fruits, vegetables and seasoning spices contain high amount of phytochemicals which can be used as natural antioxidants. Objective of this study is to develop natural antioxidants over synthetic antioxidants due to reported health issues. In this study, soxhlet extractions of ten plant varieties were evaluated for their antioxidant properties using *DPPH* assay and noted *Fragaria ananassa* (Strawberry) whole fruit, *Beta vulgaris* (Beet Root) whole fruit with peel, *Cinnamom verum* (Cinnamon) barks, and *Zingiber officinale* (Ginger) rhizome with peel contains highest antioxidant activity. The dry crude ethanolic extracts of these four varieties were further evaluated for total phenolics content, total flavonoids content, total antioxidant activities and for their oxidative stability. The oxidative stability was evaluated in comparison with synthetic antioxidant *BHT* and natural antioxidant vitamin E under accelerated oxidation conditions of 65 °C for 72 hours, using virgin coconut oil (*VCO*) as the oxidation substrate. Each and every *VCO* sample fortified with individual antioxidants and their every possible combination were monitored at each 24 hour intervals. The total phenolics contents evaluated using *Folin-Ciocalteu* reagent were 0.612, 0.437, 0.429, and 0.068 mg gallic acid /g dry weight in *Fragaria ananassa*, *Zingiber officinale*, *Cinnamom verum* and *Beta vulgaris* respectively, while total antioxidant activities evaluated using ammonium molybdate assay were 0.828, 0.892, 0.302, and 0.058 mg Trolox /g equivalent (*DW*) respectively. Highest flavonoids value was reported in *Zingiber officinale* against 2% $AlCl_3$ solution used. The oil samples fortified with antioxidants subjected to accelerated oxidation was observed with inverse relationships between peroxide value and oxidative stabilities and secondary oxidation products and stability at termination of stage. On the basis of the obtained results, the combination of strawberry, beet root and cinnamon barks and ginger rhizome extracts of 1:1:1:1 ratio and ginger and beet root extract of 1:1 ratio at 1500 ppm could be used as natural antioxidants and might be explored to prevent oxidation of vegetable oils. Therefore, they could be used as preservative ingredients in the oil based food industries.

Keywords: Strawberry, Cinnamon, Ginger, Beet Root, Antioxidants

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