

Antioxidant Efficacy of Lovi (*Flacourtia inermis*) Peel Extract in Edible Oils during Storage

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Abstract : Lovi (*Flacourtia inermis*) is an underutilized fruit crop grown in Sri Lanka with promising antioxidant properties; thus, exhibits the great potential to use as a natural antioxidant. With the concern of synthetic antioxidants, there is a growing trend towards the addition of a natural antioxidant to retard the rancidity of edible oils. Hence, in this backdrop, extract obtained from the peel of *F. inermis* fruit was used to retard the rancidity of selected edible oils. Free fatty acid (FFA) content and peroxide value (PV) of sunflower oil (SO) and virgin coconut oil (VCO) were measured at 3-day intervals for 21 days at $65 \pm 5^\circ\text{C}$ after addition of extract at 500, 1000, 2000 ppm levels and α -tocopherol at 500 ppm level was used as positive control. SO and VCO without added extract was used as the control. The extract was prepared with 70% ethanol using ultrasound-assisted extraction, and antioxidant efficacy and total phenolic content (TPC) of the extract were measured using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging capacity and Folin-Ciocalteu method respectively. Antioxidant activity (IC_{50}) and TPC of the extract were $227.14 \pm 4.12 \mu\text{g mL}^{-1}$ and $4.87 \pm 0.01 \text{ mg GAE per gram}$, respectively. During the storage period, FFA content and PV of both oils were increased with time. However, SO showed comparatively high PV than that of VCO and thereby indicate the progression of lipid oxidation as PV is a good indicator of the extent of primary oxidative products formed in oils. The most effective extract concentration was 2000 ppm. After 21 days of storage, VCO (control) sample exhibited significantly ($p < 0.05$) high FFA (0.36%) and PV (1.93 meq kg^{-1}) than that of VCO with 1000 ppm (FFA: 0.35%; PV: 1.72 meq kg^{-1}) and 2000 ppm (FFA: 0.28%; PV: 1.19 meq kg^{-1}) levels of extract. Thus, demonstrates the efficacy of lovi peel extract in retardation of lipid oxidation of edible oils during storage at higher concentrations of the extract addition. Moreover, FFA and PV of SO (FFA: 0.10%; PV: $12.38 \text{ meq kg}^{-1}$) and VCO (FFA: 0.28%; PV: 1.19 meq kg^{-1}) at 2000 ppm level of extract were significantly ($p < 0.05$) lower than that of positive control: SO with α -tocopherol (FFA: 0.22%, PV: $17.94 \text{ meq kg}^{-1}$) and VCO with α -tocopherol (FFA: 0.29%, PV: 1.39 meq kg^{-1}) after 21 days. Accordingly, lovi peel extract at 2000 ppm level was more effective than α -tocopherol in retardation of lipid oxidation of edible oils. In conclusion, lovi peel extract has strong antioxidant properties and can be used as a natural antioxidant to inhibit deteriorative oxidation of edible oils.

Keywords : antioxidant, *Flacourtia inermis*, peroxide value, virgin coconut oil

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