

## Antioxidant properties of fresh and frozen peels of citrus species

### ABSTRACT

Citrus peel is a functional food. It is rich in antioxidants. This study aims to investigate the antioxidant properties of selected fresh and frozen peels of Citrus species. Frozen and fresh peels of lemon (*Citrus limon*), key lime (*C. aurantifolia*) and musk lime (*C. microcarpa*) were screened for their antioxidant properties such as total phenolic content and total flavonoid content. DPPH radical scavenging activity and ferric ion reducing antioxidant power (FRAP) assays were also determined. Among the three citrus peels, musk lime peel had the significantly highest total phenolic content and total flavonoid content. Frozen citrus peels showed significantly higher antioxidant content than the fresh peels. The frozen peels also showed promising antioxidant activity as indicated by their significantly higher FRAP value compared with fresh citrus peels. Moreover, frozen citrus peel possessed higher antioxidant activity as indicated by its lower EC<sub>50</sub> values which ranged between  $0.823 \pm 0.1$  and  $3.16 \pm 0.92$  mg mL<sup>-1</sup>. A moderately high correlation was determined between FRAP value and total phenolic content ( $r=0.783$ ), and between FRAP value and total flavonoid content. This study shows that frozen peels of citrus are functional foods and sources of potent antioxidants.

**Keyword:** Antioxidant activity; Bioactive compound; By-product; FRAP value; Free radical; Frozen peel