

Research Article:

Evaluation of the effect of passion fruit (*Passiflora edulis*) leaf extract on the oxidative stability of palm oil during heating

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Abstract

The growing need for natural alternatives to synthetic antioxidants in edible oils has driven extensive research into plant-derived extracts for enhancing oil stability during thermal processing. This study was carried out to evaluate the effect of continuous heating on the quality of palm oil and to assess its oxidative stability during heating by adding passion fruit leaf extract as an antioxidant. Acetone was used as the solvent to extract antioxidant components from fresh leaves with a sample to solvent ratio of 1:10 (w/v). Negative control (oil samples without any added antioxidants), positive control (oil samples added with 200 ppm of Butylated Hydroxytoluene (BHT) and test samples (oil samples added with 1000 ppm of leaf extract) were prepared. All oil samples were evaluated for stability under continuous heating at 170 ± 5 °C. Continuous heating was carried out for up to 24 h (30 min heating followed by 30 min cooling), that is, 24 heating cycles. Sampling was done at 2 h intervals (after every 2 heating cycles). The levels of oxidation of the samples were determined by evaluation of peroxide value, *p*-anisidine value, TOTOX value, free fatty acid content, total polar compounds, fatty acid composition and conjugated diene (CD) and conjugated triene (CT) values. All parameters measured were increased in all three samples; however, free fatty acid content, peroxide value, *p*-anisidine value and CD and CT values were significantly less in the test samples than in the positive control and negative control. The average rate of total polar compound formation, expressed as the percentage increase per heating cycle, was significantly lower in extract-treated (1.29% per cycle) and positive control (1.27% per cycle) samples than in the negative control (1.68% per cycle). These results indicate that the sample supplemented with passion fruit leaf extract exhibited higher thermal stability than both controls, and that fresh leaf extract (1000 ppm) more effectively controls the thermal oxidation of palm oil than BHT during continuous heating.

Keywords: Heating, Leaf extract, Palm oil, Passion fruit, Thermal stability.

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