Abstract

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Enhancing of oxidative stability and quality attributes of olive oil using spirulina (Arthrospira platensis) nanoparticles

This study was performed to evaluate the effect of spirulina whole cell (Sp-WC) and spirulina nanoparticles (Sp-NPs) as an antioxidant in olive oil (OO) under accelerated storage at 60 ± 1 °C up to 49 days. Sp-NPs were incorporated into freshly OO at 0.25, 0.5, and 1% (w/v), Sp-WC at 0.5% (w/v), and both of them compared with 0.01% BHT and 0.01% ?-tocopherol as a reference and without antioxidant as the control sample. The kinetic rate of oxidation markers and shelf life (assuming Q10 value of 2.0 for lipid oxidation) of OO were estimated. Sp- NPs exhibited a high phenolic content and antioxidant activity. In Sp-NPs-treated samples, the contents of thiobarbituric acid (TBA), peroxide, p-anisidine, totox, K232, and K270 were significantly lower than the control. The rate constant (k) was low in OO with BHT and 1% Sp-NPs compared with other treatments. Chlorophyll content in olive oil containing Sp-NPs was improved during the storage. The antioxidant indices and sensory attributes of oil samples including Sp-NPs were significantly higher than that of the control. These results confirmed that Sp-NPs were more effective in retarding oxidation, improving oil color, and extending shelf life (up to 475 days at 25 °C).