

Shelf life extension of bell pepper by application of chitosan nanoparticles containing *Heracleum persicum* fruit essential oil

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Abstract

In the present research, the impregnated filter papers with *Heracleum persicum* essential oil (HPEO) and HPEO loaded chitosan nanoparticles (HPEO-CSNPs) were put into packages and the effect of HPEO fumigation and controlled release of HPEO from HPEO-CSNPs on color, firmness, weight loss, total phenolic and flavonoid as well as ascorbic acid contents were evaluated. In addition, the activity of superoxide dismutase (SOD), catalase (CAT), peroxidase (POD) and polyphenol oxidase (PPO) measured during 30 d of storage at 9 ± 1 °C. The HPEO was encapsulated in chitosan nanoparticles by ionic gelation technique. The synthesized nanocapsules were characterized by high resolution transmission electron microscopy (HRTEM) and dynamic light scattering (DLS) technique was used for the particle size distribution assay. According to HRTEM, the average size of HPEO-CSNPs were between 40–80 nm. At the end of storage, the lowest changes in color, firmness and weight and the highest contents of phenolic compounds, flavonoids and ascorbic acid were observed in samples packed with HPEO-CSNPs. In addition, the highest activity of SOD, CAT and POD was obtained in bell peppers treated with HPEO-CSNPs at the day 24 of storage, while PPO activity increased throughout storage period, but its activity in control samples was higher than other treatments. The treated fruits with HPEO-CSNPs indicated overall acceptability up to day 24 of storage, while the untreated samples lost their acceptability on day 18. Our results revealed antioxidant activity of the investigated oil and effectiveness its encapsulation to extend sweet bell pepper fruit shelf life.