A polymeric chlorine dioxide self-releasing sheet to prolong postharvest life of cherry tomatoes

Kambiz Sadeghi, Gopinath Kasi, Phuntheera Ketsuk, Sarinthip Thanakkasaranee, Sher Bahadar Khan and Jongchul Seo

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Abstract

Chlorine dioxide (ClO_2) as an effective sanitizer is widely used in postharvest handling. Because of its generation challenge such as equipment requirement for on-site production and ClO_2 generator, application of ClO_2 gas in retail is not currently feasible. In this study, a novel polymeric ClO_2 self-releasing sheet was prepared using solution casting method. As such, sodium chlorite ($NaClO_2$) can react with the citric acid in the polymer matrix in the presence of moisture. Poly (ether-block-amide) as the backbone of sheet was utilized to provide a hydrophilic system and generate of ClO_2 gas. In addition, polyvinyl alcohol was used as a barrier layer to control the releasing level and increase the hydrophilicity. The new developed self-releasing sheet released sufficient ClO_2 concentration to inactivate microbial growth and maintain the quality of cherry tomatoes during actual storage test. Overall, the self-releasing sheet containing lower content of $NaClO_2$ exhibited better postharvest parameters. The new developed ClO_2 self-releasing sheet is not just limited to postharvest handling and cherry tomatoes; it could also be used for wider applications such as medical sterilization or industrial sanitization.