

Title Development of new palladium-promoted ethylene scavenger
Author Leon A. Terry, Thomas Ilkenhans, Stephen Poulston, Liz Rowsell and Andrew W.J. Smith
Citation Postharvest Biology and Technology, Volume 45, Issue 2, August 2007, Pages 214-220
Keywords Avocado; Banana; Ethylene adsorption capacity; Strawberry

Abstract

The control of ethylene in stored environments plays a key role in prolonging the postharvest life of many fresh produce types. However, there has been a paucity of research in recent years on developing novel and more effective ethylene scavenging materials. In this study a palladium (Pd)-promoted powdered material that has significant ethylene adsorption capacity ($4162 \mu\text{L g}^{-1}$ material) at 20°C and approximately 100% RH was identified and was shown to be far superior to KMnO_4 -based scavengers when used in low amounts and in conditions of high relative humidity (RH).

Initial screening was carried out in a plug flow reactor with $200 \mu\text{L L}^{-1}$ ethylene, 10% (v/v) O_2 balanced with He at approximately 100% RH. Further work demonstrated that the Pd-promoted material at either 0.01 or 0.03 g L^{-1} effectively scavenged both exogenously administered ($100 \mu\text{L L}^{-1}$) and/or endogenously produced ethylene by banana or avocado, respectively, to sub- $\mu\text{L L}^{-1}$ concentrations within a 24 h period. Optimum ethylene adsorption capacity was calculated as approximately $10,000 \mu\text{L g}^{-1}$. Accordingly, corresponding inhibition of ethylene-induced ripening was observed. When removed, Pd-material did not disrupt subsequent ripening. The results from this study demonstrate that Pd-promoted material has commercial potential.