Potential use of atmospheric cold plasma for postharvest preservation of blueberries

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Postharvest Biology and Technology, Volume 179, September 2021, 111564

Abstract

Blueberry is one of the major health foods, which is susceptible to microbial contamination during the postharvest storage period. More seriously, the gray mold caused by *Botrytis cinerea* (*B. cinerea*) is a major postharvest disease of blueberries. Atmospheric cold plasma (ACP) holds a great potential as an efficient, economical and ecofriendly method for food sterilization. Herein, this study investigated the effects of ACP treatment with different time (0, 5, 10, 15 and 20 min) on the natural decay, gray mold decay caused by *B. cinerea*, and postharvest quality of blueberries (*Vaccinium corymbosum* L.) during 10-d storage at 25 ± 2 °C. The results showed that ACP treatment inhibited the native microbial growth and natural decay of blueberries during the storage period. Meanwhile, ACP treatment also exhibited marked inhibitory effects on the spore germination and mycelial growth of *B. cinerea in vitro*, and gray mold decay in blueberries inoculated with *B. cinerea* during the postharvest storage. For the postharvest quality, the short-time ACP treatment (≤ 15 min) had minor effects on the firmness, pH, ORP and anthocyanin concentration, but darkened the color and decreased lipid peroxidation, which overall improved the postharvest quality. However, 20-min ACP treatment caused severe oxidative damage to the blueberry peels, resulting in the fruit softening and anthocyanin decrease. Taken together, these results indicate that the short-time ACP treatment may be a promising candidate for the postharvest preservation of blueberries by trading-off between the microbial decay and postharvest quality.