

An alternative technique using ethylene micro-bubble technology to accelerate the ripening of banana fruit

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Abstract

Banana is commercially harvested at the mature green stage, and post-harvest ripening is necessary to increase its marketability and obtain it in its ideal ripened form with the desired color and texture. This study investigated the effectiveness of the ethylene microbubble (C_2H_4 -MBs) technique as an alternative to accelerating the post-harvest ripening of banana (*Musa* spp.). Bananas commercially harvested at the mature green stage were separated into four groups: (1) dipped in aqueous C_2H_4 -MBs for 10 min; (2) dipped in aqueous C_2H_4 -MBs for 20 min; (3) fumigated with 1000 mg L^{-1} of C_2H_4 gas at $25 \text{ }^\circ\text{C}$ for 12 h, and (4) allowed to ripen naturally (untreated controls). Treated fruit were stored at $25 \text{ }^\circ\text{C}$ for 10 d. The C_2H_4 -MBs were successfully generated with a mean diameter of $50 \text{ }\mu\text{m}$, and the size reduced with time. The application of both C_2H_4 -MBs and fumigation hastened the ripening of bananas compared to the untreated controls. The treatment with C_2H_4 -MBs for just 10 min satisfactorily ripened the bananas in a similar manner as the fumigated technique. The treated fruit exhibited earlier climacteric rise in respiration and outburst of C_2H_4 production, accompanied by a drastic acceleration in chlorophyll degradation and yellowing, fruit softening, and total soluble solids content. Present study demonstrated the efficiency and effectiveness of this alternative post-harvest application of C_2H_4 -MBs to accelerate banana ripening. This innovative technology is convenient and easy to carry out without the complication of airtight and cooling facilities and, thus, has high commercial potential.