Title Effect of mode of ripening on ethylene biosynthesis during ripening of diploid banana fruit

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Citation Program and Abstracts, Banana 2008, Banana and plantain in Africa: Harnessing international partnerships to increase research impact, Leisure Lodge Resort, Mombasa, Kenya, 5-9 October 2008. 198 pages.

Keyword banana; ripening; ethylene

Abstract

Ripening is the main physiological process that affects the behaviour of fruit quality traits. The progress of this process in banana fruit is different for fruits that ripen on the tree and those that do not, and according to the treatment applied to the fruit after harvest. We investigated the effect of the mode of ripening on ethylene biosynthesis of IDN 110 (acuminate AA group) banana fruit ripened *in-planta* (in-Fruit) and *ex-plant* on air (air-Fruit) or after acetylene treatment (ace-Fruit). The levels of ACC and ethylene production and, those of ACC oxidase (*MA-ACO1* and *MA-ACO2*) and ACC Syntase (*MA-ACS1* mRNA were examined in pulp tissue of each of these fruits. Our result showed that, from the harvesting point (mature green stage), the ripening speed of fruit was not concomitant with ethylene production. Ace-Fruit took 10 days to reach over-ripe stage with a maximum of 22.6 µl/kg/h of ethylene production, whereas Air- and in-Fruit took 27 and 33 days to reach over-ripe stage, respectively, and produced 11.5 and 29.6 µl/kg/h of ethylene, respectively. During ripening, ACC accumulated differentially and, except for in-Fruit, this accumulation was positively correlated with that of *MA-ACO1* Mrna. No correlation was observed between ACC level and ethylene production. In all cases, the level of *MA-ACO1* mRNA was 100-fold more thatn that of *MA-ACO2*, and both of them increased during fruit ripening. In contrast to *MA-ACO2*, the pattern of *MA-ACO1* gene expression was correlated with that of ethylene production whatever the mode of ripening. The results herein suggested that i) the level of ethylene is not the uaique factor that controls the speed of fruit ripening *in-planta*, ii) the level of ripening-ethylene production of the whole fruit is regulated at downstream stem of ACC biosynthesis mediated by *MA-ACO1* gene and, in pulp tissue, the product of *MA-ACO2* might be involved in this regulation.