Title Spatiotemporal relationships between abscisic acid and ethylene biosynthesis during tomato fruit ripening

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Abstract

Fruit ripening is a genetically programmed process that involves complex interactions of hormone. Ethylene is the dominant trigger for ripening in climacteric fruit and its production is tightly regulated by internal signals during fruit ripening. Abscisic acid (ABA) plays a major role in late seed development and fruit ripening. Genetic analysis suggests that ABA and ethylene closely interact and both function in plant growth and development. The objective of this study was to investigate the spatiotemporal relationship between endogenous ABA and ethylene during tomato fruit (*Lycopersicon esculentum* Mill. cv. Zhongza 101) ripening. Endogenous abscisic acid content, ethylene production, ACC content, activities of ACC oxidase had been measured during ripening of tomato fruit. Although the maximum of ABA content, ACC content and ethylene climacteric peak occurred at different ripening stages, they all increased in seeds before they increased in pericarp tissues. Maximum ABA and ACC contents preceded ethylene production in both the seeds and pericarp. Changes of the activity of ACC oxidase were coincident with that of ethylene production and ABA content. Exogenous ABA treatment made the internal ABA content increased, both in pericarp and seed; while treated with fluridone, an inhibitor of ABA synthesis, ethylene production was inhibited. The results suggest that seeds may impact on the process of postharvest tomato fruit ripening by regulating of endogenous ABA content and ethylene production, and ABA regulates fruit ripening by triggering ethylene production.