

Title Metabolism of reactive oxygen: dynamic changes during tomato fruit ripening and senescence
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Abstract

Recently, reactive oxygen species (ROS) have been shown to play an important role as signaling molecules in many processes, including hypersensitive responses (HR) and senescence. Some studies have confirmed that ROS acts in concert with ethylene in HR and senescence. However, little is known about the source of ROS production and its metabolic dynamics during fruit ripening and senescence. Tomato (*Lycopersicon esculentum* Mill.) pericarp and seed were used to investigate the changes of ROS and activities of antioxidant enzymes during fruit ripening and senescence. Superoxide (O_2^-) production rate and hydrogen peroxide (H_2O_2) content in seeds were significantly higher than those in the pericarp at all maturity stages, and the H_2O_2 content in seeds increased sharply after the pink stage. Higher activities of SOD, CAT and GR occurred in seeds than that in the pericarp. At the beginning of fruit ripening, an increase of CAT activity followed accumulation of H_2O_2 , but declined quickly by the end of ripening. These patterns of enzyme activity suggest that the AsA-GSH cycle might play an important role in scavenging H_2O_2 . The maximum MDA content appeared in seeds earlier than that in the pericarp, the maximum being 1.5 fold of that in the pericarp. High concentration of ROS in seed is closely related with fruit ripening, and H_2O_2 might be an important factor in triggering senescence.