

Title Free amino acid production during tomato fruit ripening: a focus on L-glutamate
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Abstract

In tomato, free amino acids increase dramatically during fruit ripening and their abundance changed differentially. More evident is L-glutamate which gives the characteristic “umami” flavor. Glutamate is the principal free amino acid of ripe fruits of cultivated varieties. In this paper, we examined the capacity of tomato fruits to process endogenous as well as exogenous polypeptides during the ripening transition, in order to analyze their contribution to the free amino acid pool. In addition, the activity of some enzymes involved in glutamate metabolism such as γ -glutamyl transpeptidase (γ -GTase), glutamate dehydrogenase (GDH), α -ketoglutarate-dependent γ -aminobutyrate transaminase (GABA-T), alanine and aspartate aminotransferases was evaluated. Results showed that peptidases were very active in ripening fruits, and they were able to release free amino acids from endogenous proteins and glutamate from exogenously added glutamate-containing peptides. In addition, red fruit contained enough γ -GTase activity to sustain glutamate liberation from endogenous substrates such as glutathione. From all the glutamate metabolizing enzymes, GDH and GABA-T showed the higher increase in activities when the ripening process starts. In summary, tomato fruits increase free amino acid content during ripening, most probably due to the raise of different peptidase activities. However, glutamate level of ripe fruit seems to be mostly related to GDH and GABA-T activities that could contribute to increase L-glutamate level during the ripening transition.

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