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RECEIVED 16 November 2023

ACCEPTED 08 January 2024

PUBLISHED 24 January 2024

CITATION

Breniere T, Fanciullino A-L, Dumont D, Le Bourvellec C, Riva C, Borel P, Landrier J-F and Bertin N (2024) Effect of long-term deficit irrigation on tomato and goji berry quality: from fruit composition to *in vitro* bioaccessibility of carotenoids. *Front. Plant Sci.* 15:1339536. doi: 10.3389/fpls.2024.1339536

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Effect of long-term deficit irrigation on tomato and goji berry quality: from fruit composition to *in vitro* bioaccessibility of carotenoids

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Drought is a persistent challenge for horticulture, affecting various aspects of fruit development and ultimately fruit quality, but the effect on nutritional value has been under-investigated. Here, fruit quality was studied on six tomato genotypes and one goji cultivar under deficit irrigation (DI), from fruit composition to *in vitro* bioaccessibility of carotenoids. For both species, DI concentrated most health-related metabolites in fresh fruit. On a dry mass basis, DI increased total phenolic and sugar concentration, but had a negative or insignificant impact on fruit ascorbic acid, organic acid, and alcohol-insoluble matter contents. DI also reduced total carotenoids content in tomato (−18.7% on average), especially β-carotene (−32%), but not in goji berry DW (+15.5% and +19.6%, respectively). DI reduced the overall *in vitro* bioaccessibility of carotenoids to varying degrees depending on the compound and plant species. Consequently, mixed micelles produced by digestion of fruits subjected to DI contained either the same or lesser quantities of carotenoids, even though fresh fruits could contain similar or higher quantities. Thus, DI effects on fruit composition were species and genotype dependent, but an increase in the metabolite concentration did not necessarily translate into greater bioaccessibility potentially due to interactions with the fruit matrix

KEYWORDS

Solanum lycopersicum, *Lycium barbarum*, drought, quality, phenolic compounds, antioxidant, carotenoid bioaccessibility