

**Title** Flesh carotenoid profile in climacteric near-isogenic lines of melon obtained from non-climacteric parentals: implications for fruit design

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### Abstract

Some carotenoids are precursors of melon fruit aroma.  $\beta$ -carotene and  $\beta$ -cryptoxanthin also show provitamin A activity, and lutein and zeaxanthin play a role in preventing macular degeneration. However, little information is available about the genetic basis of carotenoid biosynthesis in melon that can serve for future quality-oriented breeding programs or postharvest applications in the agrifood chain. A collection of aromatic near-isogenic lines (NILs) showing different climacteric behaviour obtained from two non-aromatic and non-climacteric parentals ('Piel de sapo' or PS; 'PI 161375') may serve to establish a basis for such a program. The NILs exhibited differences in flesh colour (pale white-yellow to light orange), while the flesh of PS was pale white-yellow and that of 'PI 161375' green-flesh. This variability was used for carotenoid profile studies. About 12 carotenoid compounds were detected in the population, though only four constituted the profile of the lines studied (trans-violaxanthin, cis-violaxanthin, lutein and trans  $\beta$ -carotene). Five carotenoid compounds were good discriminants among NILS and PS (cis-neoxanthin only present in PS and neoxanthin, phytoene and  $\alpha$ - and  $\beta$ -cryptoxanthin only present in the NILs). Zeaxanthin was only present in one NIL and in PS. The information is discussed in terms of carotenoid biosynthesis, mapping QTLs responsible for carotenoid metabolism and aroma, climacteric or non-climacteric pattern, nutritional implications as a source of provitamin A, and possible implications for the future design of melon cultivars with a predictable carotenoid composition depending on consumer preferences.