

Orange-brown tomato with carotenoids and chlorophyll

Tomatoes are a significant source of antioxidant compounds such as carotenoids, lycopene and β -carotene. During ripening, carotenoid accumulation and chlorophyll degradation determine the colour of the fruit. These traits continue to be essential for varietal selection and genetic improvement activities.

A previous study found a correlation between gene expression CYC-B (β -lycopene cyclase) and the orange colour of fleshy fruit, while another study identified a point mutation in gene SGR (Stay Green) that impedes chlorophyll mutation causing a brown flesh colour.

"Based on these results, our study focused on the development of a new colour for a tomato, rich both in β -carotene and chlorophyll. We assessed colour segregation as well as β -carotene and chlorophyll levels in populations F1 and F2 obtained by crossing orange and brown tomatoes," explains a researcher from the Sunchon National University (North Korea).

"We crossed two inbred lines - KNY2 (orange) and KNB1 (brown) - and assessed the relation between these genes and their effect on the colour of the fruit. The phenotypes of generation F2 plants were then analysed and a new orange-brown colour was identified."

The molecular analysis of the genome confirmed that there are two SNPs in the CYC-B and SGR gene sequence associated with the segregation of the orange-brown colour in generation F2. The carotenoid and chlorophyll content was analysed in the different phenotypes and showed a strong correlation between carotenoid biosynthesis genes and the function of gene SGR.

This study developed a new tomato colour with an orange-brown phenotype. The fruit has a high β -carotene content and retains its chlorophyll content during ripening.

Gene expression CYC-B coincides with β -carotene accumulation, while the point mutation of gene SGR inhibits the protein function and therefore impedes chlorophyll degradation.

Researchers concluded that "our results provide important information to develop and grow tomato cultivars with a new colour using molecular markers."

Source : <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5226094/>

Lien article : <http://www.freshplaza.com/article/172622/Orange-brown-tomato-with-carotenoids-and-chlorophyll>