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Genetically Modified Purple Tomato – Modern Age Innovation

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Abstract

The main objective of genetically modified crops and conventional plant breeding is to develop crops according to market and consumer needs by changing the genetic makeup accordingly. So, the genetically modified technique involves the use of adding new foreign gene or genes to the genomes of crop plant. A transgenic tomato is having its genes modified by using genetic engineering techniques.

Introduction

Tomatoes are an excellent source of antioxidant lycopene which is commonly found in ordinary tomatoes. Other antioxidant found in tomato is Flavonoids. It is natural substance found in various types of fruits, vegetables, grains, bark, roots, stems, flowers, tea and wine. This substance is having the beneficial effects on health and so efforts are being made to isolate the ingredients, called flavonoids. Flavonoids having a number of medicinal benefits, including anticancer, antioxidant, anti-inflammatory and antiviral properties. Reports are there that they also have neuro-protective and cardio-protective effects but it depends upon the type of flavonoid, its (possible) mode of action, and its bioavailability. So the best protection against disease can be achieved when both types of antioxidants are present in the diet.

If we talk about the genes present in the tomato crop, than anthocyanin pigment producing genes are there, but they are limited to the leaf and stem portion. They are not typically expressed in the fruits in most of the commercial varieties. In the year 2012, Oregon State University has developed the blue tomato which became commercially available under the cultivar name 'Indigo Rose'. And this blue color is produced mostly by the anthocyanin pigment petunidin. The concentration of this pigment is still very low as compared to other fruits.

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Professor Cathie Martin and her co-workers at the famous John Innes Centre in the UK developed the purple tomatoes by incorporating the genes from the snapdragons to increase the anthocyanin levels in the flesh of the tomatoes by combining the use of transcription factors, various biosynthetic genes and RNAi with the availability of some natural mutants of tomatoes. The transcription factor of the MYB gene class is responsible for the biosynthesis of anthocyanin pigments in the flesh of the tomatoes. By utilizing genetic engineering, the engineered variety of tomato is capable in producing the 100-fold higher concentration of anthocyanins compared to conventionally bred varieties.

Conclusion

A genetically modified crop has some kind of scepticism. But the new innovation, ideas has to overcome and face certain challenges. So these new product i.e. purple tomatoes developed by Cathie Martin and his co-workers are seeking the all necessary approvals from the US regulatory agencies. They have also founded a company named 'Norfolk Plant Sciences for commercializing the purple tomato. Hoping soon the availability of purple

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tomatoes in the market and might eventually reducing the risk of cancer, cardio-vascular disease as anti-oxidant and anthocyanins both will simultaneously present in it.

References

https://www.bigpurpletomato.com

https://www.jic.ac.uk/research-impact/purple-tomatoes/