DIFFERENT COMBINATIONS OF ANTHOCYANIN REGULATORY GENES ARE ABLE TO CHANGE THE COMPOSITION AND THE AMOUNTS OF THE ANTHOCYANINS IN MAIZE KERNEL

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Among the cereals maize is one of the most important crops; it is used for many purposes, as staple food in several countries, as feed for animals and in industrial activity.

For its broad usage it is important to improve not only the yield but also of the quality of the production of this crop, in this contest the anthocyanins can play a pivotal role.

Pigmented maize contains anthocyanins or carotenoids, and phenolic compounds which are phytochemicals synthesized in the plant by secondary metabolism; although these compounds are considered as non-nutritive, in these years the interest in antioxidant and bioactive properties has increased due to their health benefits.

Anthocyanins are water soluble secondary metabolites belonging to the class of flavonoids and in plants they play important roles in particular in the recruitment of pollinators, signaling with microorganisms, male fertility, antimicrobial activity, UV protection and in general they protect from oxidative damage.

The anthocyanins are present in the vacuole in a glycosilated form and their colour is influenced in part by the pH of this compart. In maize they are synthesized by a complex pathway made up of more than 20 genes, and regulated by two classes of transcription factors: r1/b1 bHLH genes and c1/pl1/p1 MYB gene families.

The objective of this study was to determine and to compare the composition and the levels of anthocyanins in the kernels of different pigmented genotypes of maize.

In the genotypes analyzed, the regulatory genes present are Pl1 (Purple plant1) and B1 (Booster 1), responsible for anthocyanins accumulation in the pericarp; R1 (Red color1), conferring color to the aleuronic layer of the seeds and P1 (Pericarp color1) enhancing the pigmentation due to the production of phlobaphenes (another class of phenolic pigment) in the pericarp. The results obtained showed that different combinations of regulatory genes are able to change the composition and the amount of the anthocyanins in the kernel.