Two-phase flavonoid formation in developing strawberry (Fragaria x ananassa) fruit

Abstract:
Flavonoids are important secondary metabolites in strawberry as they fulfill a wide variety of physiological functions. In addition, they are beneficial for human health. Previous studies have shown for selected enzymes from the flavonoid pathway that flavonoid biosynthesis shows two peaks during fruit development. We provide optimized protocols for the determination of the activities of the key flavonoid enzymes: phenylalanine ammonia lyase, chalcone synthase/chalcone isomerase, flavanone 3-hydroxylase, dihydroflavonol 4-reductase, flavonol synthase, flavonoid 3-O-glucosyltransferase, and flavonoid 7-O-glucosyltransferase. Using these protocols we were able to demonstrate two distinct activity peaks during fruit ripening at early and late developmental stages for all enzymes with the exception of flavonol synthase. The first activity peak corresponds to the formation of flavanols, while the second peak is clearly related to anthocyanin and flavonol accumulation. The results indicate that flavonoid 3-O-glucosyltransferase activity is not essential for redirection from flavanol to anthocyanin formation in strawberry.

Stichworte:
Acyltransferases/metabolism; Alcohol Oxidoreductases/metabolism; Anthocyanins/biosynthesis; Flavonoids/biosynthesis; Flavonols/biosynthesis;