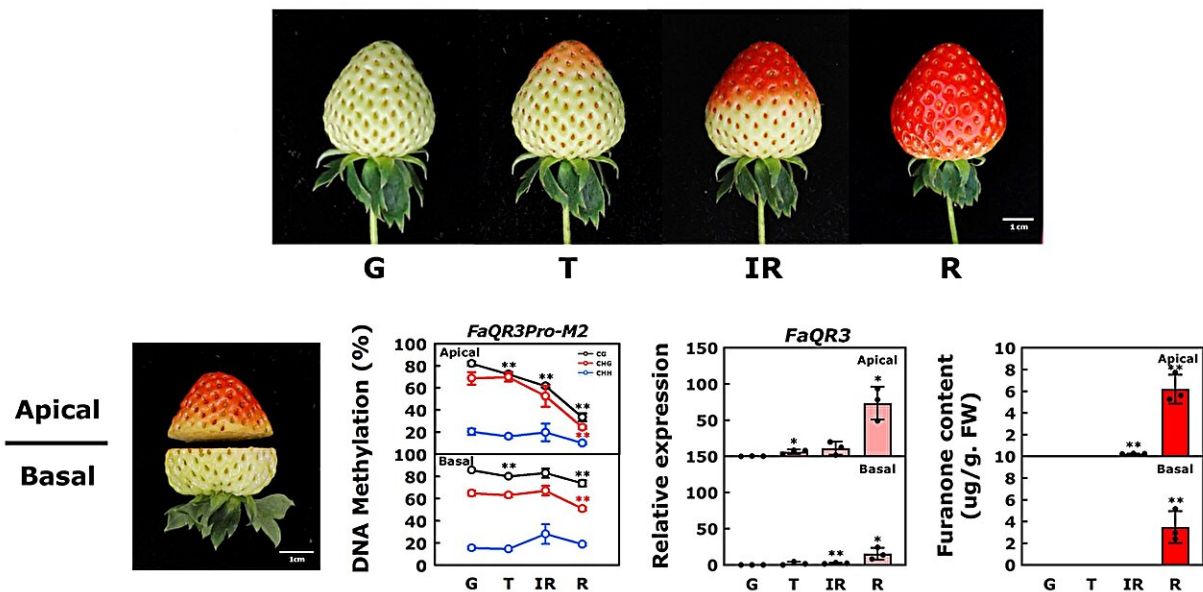


New progress in strawberry fruit flavor quality

July 31 2023



DNA methylation of FaQR3 promoter is associated with FaQR3 expression and furanone biosynthesis. Credit: *Horticulture Research*

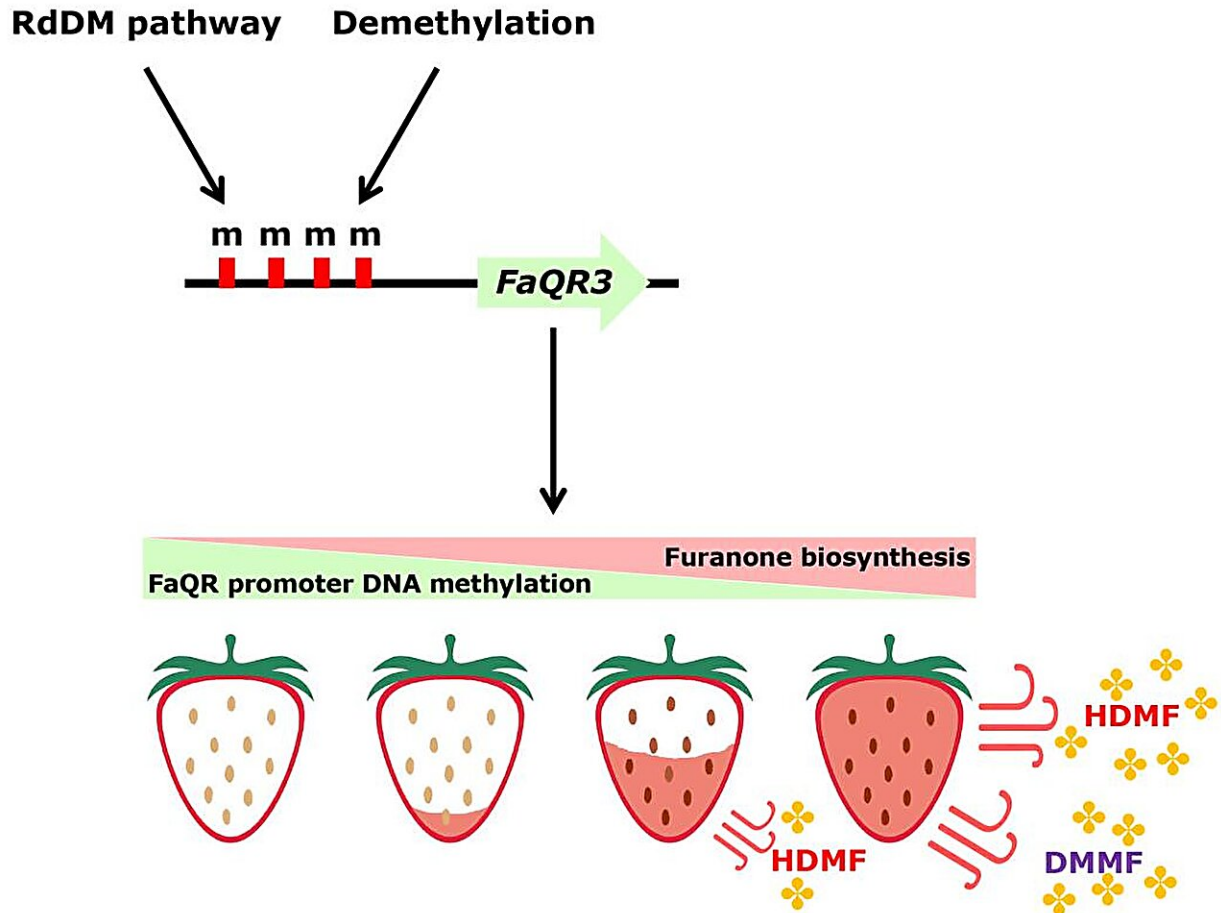
Characteristic volatile compounds in cultivated strawberry (*Fragaria × ananassa*) fruit are the main factors to attract customers, which are highly correlated with consumer preference and overall satisfaction with strawberries.

Furanone is a characteristic aroma in strawberry, and has a significant

impact on fruit flavor. Research on the regulation mechanism of fruit aroma compounds can provide theoretical basis for improving fruit flavor quality. Recently, increasing evidence suggests that DNA methylation plays a crucial role in fruit ripening in horticultural crops. However, the role of DNA methylation in regulating specific traits, such as furanone biosynthesis, remains unclear.

Horticulture Research published online a paper from Professor Kunsong Chen's team at Zhejiang University entitled "DNA methylation mediated by RdDM pathway and demethylation affects furanone accumulation through regulation of QUINONE OXIDOREDUCTASE in strawberry."

Here a role of DNA methylation in affecting furanone biosynthesis in strawberry was reported. Strawberry quinone oxidoreductase (FaQR) is a key enzyme in furanone biosynthesis. There are four FaQR homologs in strawberry cultivar 'Yuexin', and one of them, FaQR3 contributes to approximately 50% of FaQR transcripts, indicating a major role of FaQR3 in furanone biosynthesis.



Regulation mechanism of furanone biosynthesis in strawberry fruit based on DNA methylation modification. Credit: *Horticulture Research*

Through characterization of levels of DNA methylation, FaQR3 transcript and furanone contents during fruit ripening and after the application of DNA methylation inhibitor, it was found that the DNA methylation level of FaQR3 promoter was negatively correlated with FaQR3 expression and furanone accumulation, suggesting that DNA methylation may be involved in furanone biosynthesis through adjusting FaQR3 expression, and responded to different temperatures consistently.

In addition, transient expression of a gene in the RNA-directed DNA methylation (RdDM) pathway, FaAGO4, and enrichment analysis of the 24-nt siRNAs suggested that DNA methylation in FaQR3 promoter is mediated by RdDM pathway. Transient RNAi of FaDML indicated that demethylation pathway may be involved in regulating furanone accumulation.

These findings provide new insights into the role of DNA methylation and demethylation in affecting flavor quality in strawberry during fruit ripening. These findings add new contents to the metabolic regulation network of plant volatiles and provide a new basis for the improvement of fruit flavor quality.

More information: Yunduan Li et al, DNA methylation mediated by RdDM pathway and demethylation affects furanone accumulation through regulation of QUINONE OXIDOREDUCTASE in strawberry, *Horticulture Research* (2023). [DOI: 10.1093/hr/uhad131](https://doi.org/10.1093/hr/uhad131)

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