

Deposition, strain, and microcracking of the cuticle in developing 'Riesling' grape berries

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Summary

The objectives of this study were to quantify deposition, strain, and microcracking of the cuticular membrane (CM) in developing 'Riesling' (*Vitis vinifera* L.) berries. Mass of the CM, the cutin matrix (DCM), and wax increased pre-veraison (26 to 65 days after anthesis, DAA) on a berry (+ 236, + 211, and + 332 %, respectively) and a surface area basis (+ 11, + 3, and + 43 %, respectively). Post-veraison (65 to 138 DAA), CM and DCM mass per berry remained about constant at 3.4 (\pm 0.16) and 2.4 (\pm 0.11) mg per berry, respectively, while wax mass continued to increase from 0.8 (\pm 0.02) to 1.1 (\pm 0.02) mg per berry. On an area basis, however, CM and cutin mass decreased from 5.0 (\pm 0.13) to 4.6 (\pm 0.04) g·m⁻² and from 3.5 (\pm 0.10) to 3.2 (\pm 0.03) g·m⁻² between 65 and 138 DAA, respectively, but wax mass remained constant at about 1.5 (\pm 0.04) g·m⁻². The calculated rate of cutin and wax deposition peaked at about 40 DAA, and declined continuously thereafter. There was no strain and no microcracking of the CM up to veraison. Post-veraison strain of the CM and microcracking in the stylar scar region increased linearly with time. The data suggest that the cessation of cutin deposition in post-veraison berries and the ongoing berry expansion resulted in increased strain of the CM which in turn caused microcracking in the CM.

Key words: cutin, fracture, skin, splitting, *Vitis vinifera* L., wax.