

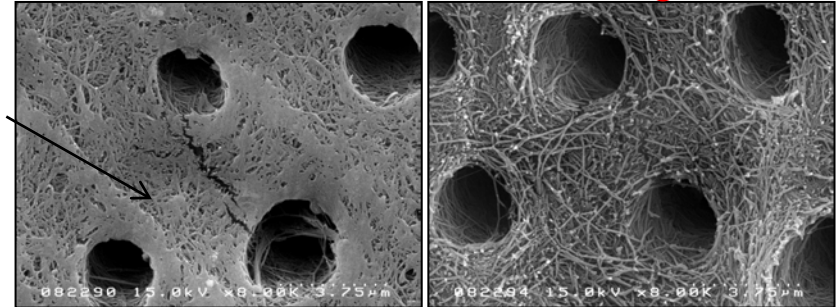
Stabilizes collagen with cross-linking agents

Protection of collagen by flavonoids, inhibiting demineralization and remineralizing effect on tooth structure

When the demineralize dentin was observed at **high vacuum SEM** condition, the control (without cross-linker) showed collapse collagen network,. Meanwhile, glutaraldehyde, grape seed extract and hesperidin preserved collagen networks.

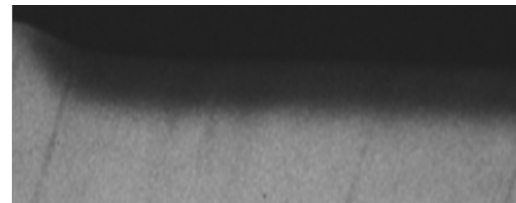
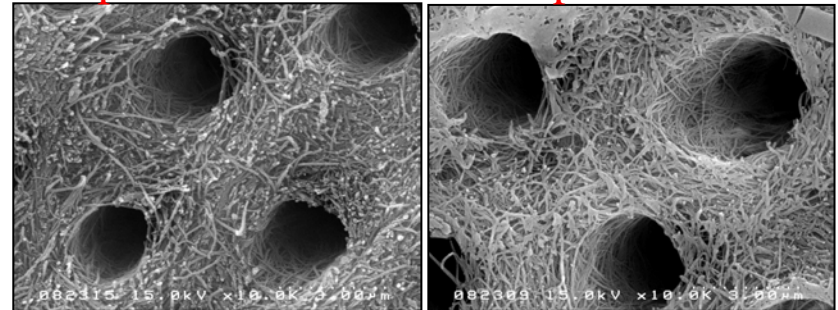
The remineralizing process should be regulated through interactions of mineral crystallites with the collagen matrix. We reported the role of collagen matrix on potential of remineralization and the effect of natural cross-linkers such as hesperidin. Hesperidine preserved collagen and inhibited demineralization, and enhanced remineralization.

Control: No fixing Fixed with glutaraldehyde

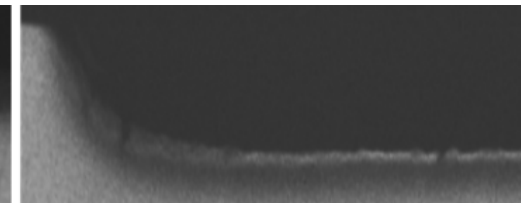


Grape Seed Extract

Hesperidin



Mineral loss NOT increased when collagen matrix preserved



Mineral loss increased when collagen matrix degraded

Dental materials DOI: [10.1016/j.dental.2016.09.035](https://doi.org/10.1016/j.dental.2016.09.035)

Dental materials journal DOI: [10.4012/dmj.2011-203](https://doi.org/10.4012/dmj.2011-203)

Journal of dentistry DOI: [10.1016/j.jdent.2011.03.002](https://doi.org/10.1016/j.jdent.2011.03.002)