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Grape Seeds: From Discarded as Waste By-Products to Beneficial Use as Extract in Dentistry

Khamis A Hassan*

Doctorate (Cons. Dent.), FADI Professor of Operative Dentistry, Global Dental Center Vancouver, BC, Canada

Editorial

Grapes contain polyphenols which are powerful antioxidants or reducing agents. Polyphenols, together with other dietary reducing agents, such as vitamins C and E as well as carotenoids protect body tissues against oxidative stress and associated pathologies such as cancers, coronary heart disease and inflammation. When we eat tasty grapes, most people spit out the seeds. Grape seeds generate in large amounts as waste by-products in the winery and grape juice industries; however, only a fraction of this waste is exploited for other purposes and the majority is commonly discarded. Scientific efforts have focused on the characterization of the chemical components of these grape seeds, and a shift has occurred in considering them for preparing grape seed extract (GSE) for beneficial uses in dentistry. The GSE is rich in polyphenols, specifically proanthocyanidins, which have an effective role in the remineralization process. This process consists of deposition of superficial mineral over dental lesions to form insoluble complexes, and reaction with exposed organic matrix in dentin erosion lesions to induce collagen cross-linking for collagen stabilization [1].

The GSE was encapsulated within polylactide polymeric microcapsules while preserving the GSE bioactivity during the microencapsulation process. The microcapsules were integrated into the adhesive resin of dental restorations to provide for sustained release of GSE to the dentin-resin interface upon exposure to enzymatic or hydrolytic environmental conditions. The sustained delivery of GSE results in prolonged strengthening of collagen structure, and consequently, extended life of restoration service [2]. Another application of the GSE was to immediately treat the bleached enamel surfaces if resin restorations are to be completed immediately after bleaching. Proanthocyanidins were found to reverse the bond strength reduced by bleaching and provide an alternative to delayed bonding [3]. An additional application of GSE was to effectively improve the mechanical properties and biostability of the dentin matrix and the dentin-resin bond strength [4]. The use of proanthocyanidins was reported to increase the number of inter- and intra-microfibrillar cross- links within type I collagen fibrils. The cross-links increase results in strengthening andstabilizing dentin matrix at the dentin–resin interface and improves the long-term stability of the interface materials, and eventually, the longevity of composite restorations [5]. It seems that some progress has been made in this regard, and one wonders what other applications of GSE in dentistry would be in the future.

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*Corresponding author:

Khamis A Hassan
Doctorate (Cons. Dent.)
FADI Professor of Operative Dentistry
Global Dental Center Vancouver
BC, Canada
E-mail: khamis_hassan@yahoo.com

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