

**Evaluation of Remineralization of Grape Seed
Extract versus Sodium Fluoride on demineralized
Primary Anterior Teeth: An *In-vitro* study**

A Thesis

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Dedication

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List of Abbreviations

Abbreviation	Explanation
CPP-ACP	Casein phosphopeptide-amorphous calcium phosphate
DMFS	Decay-missing-filled surface index
EDTA	Ethylene diamine tetra acetic acid
EDX	Energy dispersive X-ray
FDA	Food and Drug Administration
GAE	Gallic Acid Equivalents
GSE	Grape Seed Extract
HAP	Hydroxyapatite
MMP _s	Matrix metalloproteinases
NaF	Sodium fluoride
PA	Proanthocyanidin
RI	Refractive index
VHN	Vickers hardness number
WSL	White spot lesion

Introduction

Introduction

Dental caries is a highly prevalent disease and a constant problem in public health **(Silva et al., 2015)**. The acid-producing bacteria in the dental plaque (biofilm) metabolize dietary carbohydrates producing weak acids. This causes the local pH to fall below a critical value. The fall in the pH allows the mineral component of the tooth (hydroxyapatite) to dissolve releasing calcium and phosphate ions. This process is known as demineralization **(Bansal et al., 2014)**.

White spot lesion is the earliest clinical sign of dental caries, characterized by subsurface enamel demineralization. When the pH increases, some minerals can be re-precipitated by diffusion of calcium and phosphate ions from the saliva back into the porous surface created by mineral loss. This is known as remineralization process **(Bansal et al., 2014)**.

Many components that are naturally present in regular diet have been shown to promote health and reduce risk for many common diseases. It is believed that antimicrobial compounds of plant origin can serve as alternatives to the commonly used chemical types for controlling dental plaque and dental diseases **(Wu, 2009; Silva et al., 2015)**.

Grape seed extract (GSE) is a rich source of proanthocyanidin (PA), mainly composed of monomeric catechin and epicatechin, gallic acid and polymeric and oligomeric procyanidins **(Mirkarimi et al., 2013)**.

Proanthocyanidin (PA) has been proved to strengthen collagen-based tissues by increasing collagen cross-links. It is claimed that it can increase collagen synthesis and accelerates the conversion of soluble collagen into insoluble collagen. Proanthocyanidin has proved safe in different clinical applications and has been used as dietary supplements as well (**Mirkarimi et al., 2013**).

Accordingly, the present study was designed to assess whether GSE, mainly consisting of PA, can effectively influence the remineralization of artificial caries in human primary teeth.

Review of Literature