



Faculty of Dentistry

**Single and Combined Effect of Grape Seed Extract and
Nanohydroxyapatite on Remineralization of Bleached
Enamel**
**[Scanning Electron Microscope Attached With Energy
Dispersive X-ray Analyzer Study]**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ"**

صدق الله العظيم (البقرة - 32)

Dedication

Dedication

I dedicate this work to my beloved parents

&

to the soul of my Grandparents.

Acknowledgment

Acknowledgement

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Arabic summery	

List of Abbreviations

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Abbreviation	Full Name
C	Carbon
Ca	Calcium
CaCl ₂ .2H ₂ O	Calcium chloride dihydrate
EDXA	Energy Dispersive X-ray Analysis
EREs	Enamel Rod Ends
GIC	Glass ionomer cement
GSE	Grape seed Extract
GSPE	Grape Seed Proanthocyanidin Extract
HA	Hydroxyapatite
HP	Hydrogen Peroxide
KCl	Potassium chloride
K ₂ HPO ₄	Dipotassium hydrogen phosphate
KH ₂ PO ₄	Potassium dihydrogen phosphate
MgCl ₂ .6H ₂ O	Magnesium chloride hexahydrate
MMP	Matrix metalloproteinase
MSA	Modern Science and Arts University
NaF	Sodium- Fluoride
Nano-P	Nanohydroxyapatite-based desensitizing agent
nHA	Nano- Hydroxyapatite
NIH	United States National Institution of Health
OPA	Oligomeric Proanthocyanidin
OTC	over-the-counter Product
P	Phosphorus
p	Probability
PA	Proanthocyanidin
PG	Perikymata Grooves
pH	Potential Hydrogen
PR	Perikymata Ridges
S.D.	Standard deviation
SEM	Scanning Electron Microscope
USA	United States of America
wt.	Weight

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