

CONTENTS

	Page
Abstract.....	(3)
Acknowledgements.....	(5)
Contents.....	(7)
List of Tables.....	(9)
List of Figures.....	(10)
List of Abbreviations.....	(11)
Chapter	
1 Introduction.....	1
Prevalence of dental caries among 3-12 years old children.....	1
Mechanism of fluoride in caries prevention.....	1
Effect of fluoride in demineralising solution.....	3
Development of fluoride varnish.....	4
Type and application technique of fluoride varnish.....	5
Effect of fluoride varnish on reducing enamel dissolution.....	6
Application frequencies of fluoride varnish.....	8
SEM studies of enamel surfaces.....	9
Objectives.....	10
2 Materials and Methods.....	11
Materials.....	11
Equipments.....	13
Methods.....	13
3 Results.....	22
4 Discussion.....	30

CONTENTS (CONTINUED)

	Page
5 Conclusion.....	39
References.....	40
Appendices.....	50
Appendix 1 Artificial saliva preparation.....	51
Appendix 2 Equipments.....	53
Appendix 3 Raw data of dissolved calcium measurement.....	55
Appendix 4 Solubility and solubility product constant.....	56
Vitae.....	57

LIST OF TABLES

Table	Page
1 Percentage of decayed, missing and filling teeth in all age groups.....	1
2 Product name, presentation, fluoride concentration and manufacturer of fluoride varnish.....	6
3 Means, standard deviation and range of dissolved calcium concentration...	23
4 Studies of the fluoride level in demineralising solution on reducing enamel dissolution.....	31
5 Raw data of dissolved calcium measurement by ICP-OES.....	55

LIST OF FIGURES

Figure	Page
1 Mechanism of fluoride in caries prevention.....	3
2 Fluoride varnish (Duraphat®) used in this study.....	12
3 A custom-made rotator shaking machine used in this study.....	13
4 Sectional guide path of the teeth (4A) and a window on enamel surface sized 2x2 mm for fluoride varnish application (4B).....	14
5 Custom-made rotator shaking machine, teeth were immersed in artificial saliva.....	15
6 Preparation of the teeth for treatment	16
7 Treatment of the teeth	18
8 Enamel dissolution and examination of dissolved enamel surface by scanning electron microscope.....	20
9 The amount of calcium dissolved (mg/L) from enamel in group A, B and C...24	
10 SEM photographs of non-exposed areas from the three groups A, B, C at High magnification, x 7000.....	26
11 SEM photographs of marginal areas at low magnification, x 500.....	27
12 SEM photographs of exposed areas at low magnification, x 500.....	28
13 SEM photographs of exposed areas at high magnification, x 7000.....	29
14 pH meter (Precisa; model pH 900).....	52
15 Rotator shaking machine and composition of the machine.....	53
16 Magnetic stirrer (Corning; model PC 420).....	53
17 Inductively couple plasma optical Emission Spectrometer, ICP-OES.....	54
18 Scanning electron microscope (JEOL; model JSM 5800 CV).....	54

LIST OF ABBREVIATIONS

dmft	= decay, missing and filling teeth due to caries in primary dentition
DMFT	= decay, missing and filling teeth due to caries in permanent dentition
$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$	= hydroxyapatite
APF	= acidulated phosphate fluoride
Conc	= concentration
%	= percent
h	= hour
F	= fluoride
Ca	= calcium
P	= phosphate
CaF_2	= calcium fluoride
KCl	= potassium chloride
$\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$	= magnesium chloride hexahydrate
$\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$	= calcium chloride dihydrate
K_2HPO_4	= potassium hydrogen phosphate (dibasic)
KH_2PO_4	= potassium hydrogen phosphate (monobasic)
KOH	= potassium hydroxide
NaOH	= sodium hydroxide
<i>et al.</i>	= and (the) other people
SEM	= Scanning Electron Microscope
ICP-OES	= Inductively Couple Plasma Optical Emission Spectrophotometer

LIST OF ABBREVIATIONS (CONTINUED)

AAS	= Atomic Absorption Spectrometer
U.S.	= United State
am	= ante meridiem
pm	= post meridiem
x 500	= at 500 times of magnification
x 7000	= at 7000 times of magnification
Fig.	= figure
Inc.	= Incorporate
FDA	= Food and Drug Administration
ppm	= part per million
ppb	= part per billion