

LIST OF CONTENTS

RATIFICATION.....	ii
ACKNOWLEDGEMENTS	vi
LIST OF CONTENTS	viii
LIST OF TABLES	x
LIST OF FIGURES	xi
ABSTRACT.....	xii
INTISARI.....	xiii
1. INTRODUCTION.....	1
A. Background	1
B. Formulation of Problem	4
C. Research Originality.....	4
D. Research Objective.....	5
E. Research Benefits	5
2. LITERATURE OVERVIEW.....	6
A. Literature Review	6
1.Tongue.....	6
2.Tongue Epithelium.....	7
3.Papilla.....	10
4.Wistar tongue	11
5.E-cigarette	13
6.E-liquid.....	17
7.Aerosol Content.....	18
B. Theoretical Framework	19
C. Hypothesis.....	20
3. RESEARCH METHODOLOGY.....	22
A. Research Type.....	22
B. Identifying Variables.....	22
1.Independent variable	22
2.Dependent variable.....	22
3.Controlled variable.....	22

4.Uncontrolled variable.....	22
C. Operational Definition.....	23
D. Subjects of Research	23
E. Materials and Instruments	23
F. Research Venue.....	24
G. Study Procedures.....	24
1.Ethical Clearance.....	24
2.Preparation of instruments	24
3.Nicotine dosage for Wistar rats	25
4.Exposure of vapors.....	26
5.Histologic preparation	26
6.Sample Observation	27
H. Data Analysis	27
I. Research Steps.....	28
4. RESULTS AND DISCUSSION	29
A. Results	29
B. Discussion	34
5. CONCLUSIONS AND SUGGESTIONS.....	38
A. Conclusions	38
B. Suggestions.....	38
REFERENCES.....	39
APPENDIXES	

LIST OF TABLES

Table 1. Comparative characteristic of tongue in female and male rat	12
Table 2. Surface area ratios of some common laboratory species and man.....	25
Table 3. Thickness of tongue epithelium (μm)	29
Table 4. Shapiro Wilk normality test on the thickness of tongue epithelium data..	32
Table 5. Homogeneity of variance test on thickness of tongue epithelium.....	32
Table 6. One way ANOVA test on the mean thickness of tongue epithelium.....	33
Table 7. Post Hoc least significant difference (LSD) test on the mean thickness of tongue epithelium.....	33

LIST OF FIGURES

Figure 1. Criteria for Grading of Oral Dysplasia (Rastogi, et al., 2013).....	10
Figure 2. Anterior region of tongue (longitudinal region). Stain: Hematoxylin and eosin (Eroschenko, 2008)	11
Figure 3. Circumvallate papillae of rat showing taste buds, B; taste pore, P. (Cheshmi and Ghassemi, 2013).....	13
Figure 4. Transverse section of distal portion of rat tongue showing circumvallate papillae, CP; taste buds, B; lamina propria, LP; and muscular core, M (Cheshmi and Ghassemi, 2013).....	13
Figure 5. E-cigarettes Designs and Characteristics (Brandon, et al., 2015).....	16
Figure 6. Thermographic image that shows the temperature distribution of heating element without ‘liquid’ (> 350 °C in the centre) (Schripp et al., 2013)	16
Figure 7. The parts inside E-cigarette (Hiemstra and Bals, 2016)	17
Figure 8. The mean values of thickness of tongue epithelium after exposure with different concentration of nicotine.	30
Figure 9. Microscopic images of tongue epithelium; tongue without any exposure (A) control, with (B) 0 mg, (C) 3 mg and (D) 6 mg nicotine exposure.....	31