UNIVERSITI TEKNOLOGI MARA

IN VITRO CYTOTOXICITY AND CLINICAL EFFICACY OF AN ECO-FRIENDLY DENTURE ADHESIVE

JUZAILAH BINTI ROFFIE

PhD

October 2020

AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Juzailah Binti Roffie
Student I.D. No.	:	2016839962
Programme	:	Doctor of Clinical Dentistry (Prosthodontic) – DS933
Faculty	:	Dentistry
Dissertation Title	:	In Vitro Cytotoxicity and Clinical Efficacy of An Eco-Friendly Denture Adhesive
Signature of Student	:	
Date	:	October 2020

ABSTRACT

A new denture adhesive known as Eco-Friendly Denture Adhesive (EFDA) has been developed by Universiti Sains Malaysia and claimed to have superior properties than a commercial adhesive. The ingredients in this new product have a mixture of synthetic and natural polymer with more that 50 percent of the ingredients were natural origin. Natural polymer derived from starches has been incorporated as fillers in this product. To evaluate the cytotoxicity and efficacy of EFDA, an in vitro study and a randomized, crossover, and double-blind clinical trial was employed in this study. The in vitro cytotoxicity assessment using Alamar blue assay was executed to four EFDA prototypes with different starches namely native tapioca starch (NTS), modified tapioca starch (MTS), native corn starch (NCS), and modified corn starch (MCS). The output of the in vitro test showed that all adhesives were found to be non-toxic to the fibroblast cells and the mean of optical density was the highest among NTS. Therefore, denture adhesive filled with NTS was chosen in the clinical trial study to identify the efficacy of EFDA. 24 complete denture subjects with the mean (SD) age of 65.83 (6.332) years old were selected in the clinical trial. Polident® was chosen as the positive control for this study. The evaluation of the efficacy done by measuring the retentive strength (RS) and maximum occlusal bite force (MOBF) of the complete dentures. The measurements were made at several time interval with the subject fasting and drinking hot water. The results of the clinical study revealed that both denture adhesives produced a statistically significant ($p = 0.001$) improvement RS and MOBF of complete dentures after 2 hours of fasting and followed by a gradual decline of RS and MOBF when the subject consumed hot water. The RS and MOBF of complete dentures with EFDA were found to be higher than Polident® at most of the time interval, however, no significant difference was seen between both denture adhesives. During the clinical observation, 2 mild oral mucosa reaction were observed on 2 of EFDA subjects in which the adverse events were subside after denture adhesive removal. In conclusion, EFDA was non-toxic to gingival fibroblasts cell and the addition of the native starches in EFDA has improved the retention and bite force of complete dentures.

ACKNOWLEDGEMENT

Alhamdulillah, praised be to Allah for His guidance and infinite and bounties to us. First of all, I wish to thank God for giving me the opportunity to embark on my DClinDent studies and for completing this long and challenging journey successfully. My gratitude and thanks go to my project supervisor Dr Hazlina Abd Ghani and Dr Zuratul Ain Abd Hamid. I am thankful for their support throughout the whole process of completing this project.

I owe great deal to AP. Dr Siti Noor Fazliah for her help and guidance in parts of my research methodology. My appreciation goes to the Fujifilm crewmembers who provided the facilities and assistance during data analysis of the Prescale® film.

I cannot find words to sufficiently thank my great parents, my supportive husband, my wonderful kids and all of my family members who throughout the last four years have gave constant love, support and serenity and have never complained about it. Without their moral and emotional support this thesis would certainly not have existed.

Finally, this thesis is dedicated to the loving memory of my very dear late father for the vision and determination to educate me. This piece of victory is dedicated specially for you.

TABLE OF CONTENTS