Effects of extract ethanolic propolis Apis Trigona towards carbohydrate and arginine metabolism in pulp-necrose *Enterococcus bacteria*

Arya Adiningrat[1], Rizqi Alifna Waskita Prabowo[2] , Ridho Kurnia[2], Erma Sofiani[3]

[1] Oral Biology and Biomedical Sciences Department, School of Dentistry, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta

[2] Clinical Student, School of Dentistry, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta

[3] Endodontics Department, School of Dentistry, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta

Abstract:

Virulence factors possessed by Enterococcus faecalis bacteria commonly responsible for the occurence of failure in endodontic treatment. This virulency is assumed to be supported by energy metabolism activity derived from carbohydrates and arginine. Propolis as a potential herbal natural substance was reported in harboring antibacterial properties. This study aims to determine the effects of extract ethanolic propolis on carbohydrate and arginine metabolism of Enterococcus spp from clinically pulp-necrose condition. This research was conducted through an in vitro laboratory experimental design. Phenol-red and arginine dehydrogenase culture media were used to observe carbohydrate and arginine metabolism activity respectively on both clinical and control bacteria (Enterococcus faecalis ATCC 29212) based on colour change qualitatively and intensity measurement by imageJ quantitatively. Extract ethanolic propolis with 0.00125%, 0.4%, 10% concentration were used, while 2% chlorhexidine digluconate was utilized as a positive control. The results showed colour-change from the treated-group, while positive controls showed no color change. Intensity quantification by imageJ showed that all treated-group had a significant difference with positive control ($p < 0.05$). Compared to the pH confirmation, It showed that treated-group had no effect in the inhibition of carbohydrate and arginine metabolism activity of in both Enterococcus spp and Enterococcus faecalis in contrast to the positive control treatment using chlorhexidine.

Key words: *Extract ethanolic propolis, Enterococcus faecalis, Enterococcus spp, Energy metabolism*