



Official Journal of TESMA

Regenerative Research

www.regres.tesma.org.my
E-ISSN 2232-0822

Tissue Engineering
and Regenerative
Medicine Society of
Malaysia

Regenerative Research 7(1) 2018 56

ANTIBACTERIAL EVALUATION OF NEWLY DEVELOP RESIN MODIFIED GLASS IONOMER CEMENT WITH INCORPORATION OF SYNTHESIZED COUMARIN DERIVATIVES

Dasmawati Mohamad^{1*}, Fatimah Suhaily Abdul Rahman¹, Hasnah Othman², Habsah Hasan³

¹School of Dental Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu Kelantan, Malaysia

²School of Chemical Sciences, Universiti Sains Malaysia Main Campus, 16150 Kota Bharu Kelantan, Malaysia

³School of Medical Sciences, Universiti Sains Malaysia Health Campus, 16150 Kota Bharu Kelantan, Malaysia

ARTICLE INFO

Published: 26th August 2018

*Corresponding author:

Habsah Hasan

Email:

drhabsah@usm.my

KEYWORDS

Coumarin derivatives;
Streptococcus sanguinis;
Resin modified glass
ionomer cement;
Antibacterial activity

SUMMARY

Resin modified glass ionomer cement (RMGIC), is a tooth coloured restorative material which can be used to restore teeth with caries. However, after restoration secondary caries may happened. Within this study, RMGIC was incorporated with coumarin, a chemical compound which can be synthesized to improve its antibacterial properties. Hence, the aim of this study is to determine the antibacterial activity of synthesised 3-acetylcoumarin and coumarin thiosemicarbazone incorporated with (RMGIC), Fuji II LC (Ketac Nano) on *Streptococcus sanguinis* (*S. sanguinis*). The synthesis process of 3-acetylcoumarin was performed via Knoevanagel condensation technique and coumarin thiosemicarbazone was synthesised by Schiff base reaction. Chemical properties of all the synthesized compounds were analysed by using Fourier Transform Infrared (FTIR) and Nuclear Magnetic Resonance (NMR). The fabrication process of synthesized compounds with RMGIC was performed in triplicate at different percentages (0.5, 1.0 and 1.5 %, w/w) according to the manufacturer's instructions. *S. sanguinis* was cultured and adjusted to the 0.5 McFarland standards, prior to agar diffusion test which was carried out for 24 hours incubation. Further analysis with Scanning Electron Microscopy (SEM) on representative of each sample group were carried out to observe the morphology of the bacteria. The antibacterial activity of fabricated RMGIC with coumarin thiosemicarbazone showed a larger diameter of inhibition zone on *S. sanguinis* as compared to the 3-acetylcoumarin which could be attributed due to the existence of azomethine group (C=N). As a conclusion, the fabricated RMGIC with incorporation of both synthesized coumarin derivatives had improved the antibacterial activity of RMGIC, especially with coumarin thiosemicarbazone. This potential property of newly developed RMGICs could enhance their performance in treating dental caries.

Acknowledgement: This work was financially supported by the Research University Grant Scheme RUI 1001/PPSG/813076, Universiti Sains Malaysia, Malaysia.