MODE OF ACTION OF LACTOBACILLUS PLANTARUM ON ANTIOXIDANT ACTIVITY OF *Curcuma caesia* FOR POTENTIAL APPLICATION IN MAKING HALAL ANTI ACNE SOAP AND CREAM

Jemain, SFP[1,4,*], Jamal, P[1,2,*], Raus, AR[2], Amid, A[2], Jaswir, I[2,3]

[1]Bioenvironmental Engineering Research Centre (BERC), Biotechnology Engineering Department, Kuliyyah of Engineering, International Islamic University Malaysia, Malaysia.
[2]Bioprocess and Molecular Engineering Research Unit (BPMERU), Biotechnology Engineering Department, Kuliyyah of Engineering, International Islamic University Malaysia, Malaysia.
[3] International Institute for Halal Research and Training (INHART), Malaysia
[4]Department of Chemistry, Centre for Foundation Studies, International Islamic University Malaysia, Malaysia

*Corresponding author: sfathimahpj@iium.edu.my, jparveen@iium.edu.my

ABSTRACT

The optimisation study with varying extraction temperature, pH and time using FCCCD showed that pH 6, a temperature of 60℃ and an extraction time of 30 minutes was the most efficient extraction parameters that exhibited high yield of phenolics and high DPPH scavenging activity. The model was verified statistically with ANOVA. All the independent variables had a significant effect ($p<0.05$) on all responses, which indicated that all extraction parameters employed in this study were important in the optimisation process. The R^2 value for DPPH scavenging activity was 0.9782. Media optimisation of *Lactobacillus plantarum* for fermenting *C. caesia* extract for increasing its DPPH scavenging activity was studied too. The highest DPPH scavenging activity of 84.25 % was obtained when the concentration of yeast extract, peptone and sucrose was at 7, 8 and 10 (g/L), respectively with *C. caesia* concentration of 2 % (v/v) and *L. plantarum* concentration of 2 % (v/v). After the fermentation media and process conditions were optimised, the supernatant was used to measure the 5-LOX inhibition activity as an indicator of anti-inflammatory activity present in the supernatant and the mean activity recorded was 76.84%. Twenty respondents with acne vulgaris were selected to test the efficacy and safety of the anti-acne facial soap and cream formulated from the fermented *C. caesia* supernatant. A split-face trial was carried out daily for seven days period. Significant lesion improvements and reduced numbers of acne lesions were observed on the treated side of the face. No erythema, burning, stinging, scaling, drying or oedema of the skin or exacerbation of the pre-existing acne were recorded. A student's paired t-test was carried out to test the reliability of the results, and the obtained p-value of less than 0.05 indicates that the result is significant and that it can be replicated in a larger population.

Keywords: *C. caesia*, DPPH, Ultrasound-assisted extraction, 5-LOX inhibitor, Plackett Burman Design

Acknowledgement: The author would like to express gratitude and thanks to the Kuliyyah of Engineering for facilitating the research.