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INDO-MALAYAN STINGLESS BEE PROPOPLIS *(Trigona thoracica)* IMPROVES CELLULAR MIGRATION IN FIBROBLASTS: A PROMISING NATURAL WOUND HEALING AGENT

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SUMMARY

Introduction:
Indo-Malayan stingless bee or "lebah kelulut" is one of the bee species found in Malaysia but research on their products has seldom been looked into. One of the medicinal products of "lebah kelulut" is the propolis. Due to its strong anti-inflammatory, anti-microbial and healing properties, propolis could be further developed for potential treatment for complicated wounds in wound care management.
Propolis is a natural sticky resinous substance derived from the collection of various bees from parts of plants, bark and exudates (Wagh 2013). Diverse bioactivities of propolis had been observed such as anti-microbial (Sforcin and Bankova, 2011), anti-oxidant (Teixeira, Message *et al.* 2010), anti-tumour activities (Calhelha *et al.*, 2014; Silva-Carvalho, Baltazar and Almeida-Aguiar, 2015), anti-inflammatory and wound healing properties (Martinotti and Ranzato., 2015; Olczyk, Ramos *et al.* 2013).

Materials and Methods:
The propolis from "lebah kululut"(sourced from Syamille Agrofarm, Taiping, Malaysia) was extracted using 80% ethanol. Propolis was added to DMEM high Glucose with 10% FBS and 1% Strepromycin/Penicillin. The effects of fortified DMEM with propolis- on cell viability were tested *in vitro* on the NIH 3T3 fibroblast (ATCC® CRL-1658™) and human dermal skin fibroblast (SK085-2017) purchased from Tissue Engineering Centre, UKM, Malaysia. Viability assay was carried out using propolis concentrations of 10-100 µg/ml. The cell viability after propolis treatment was analyzed by Trypan Blue staining. IC50 levels were determined by using Compusync software. A scratch wound assay was performed on fibroblasts treated with propolis 10 µg/ml in triplicates and treated with 0.1 % DMSO only as control.

Results:
Fifteen grams propolis was extracted from 30g of crude propolis. Presto Blue viability assay showed that presence of 0.1% and 0.2% of DMSO gave the highest cell viability. Ten and 20 microgram/ml of propolis gave 100% viability. The IC50 of Propolis is 43.5 µg/ml. Scratch wound cellular migration assay using 10 microgram/ml propolis improved cell migration in comparison to control, whereby the gap had closed after 18 hours.

Discussion:
The cellular viability results were similar to the previous findings by Amer et al in 2015 on 3T3 fibroblast. Our results were also in agreement with Jacob *et al* in 2015, where they demonstrated that Malaysian and Brazilian red propolis showed potential to assist in wound healing.

Conclusion:
A non-toxic dose of 10 and 20 microgram/ml of propolis was obtained which gave 100% cell viability which also improved cellular migration of fibroblasts. This data shows a promising therapeutic use of propolis outsourced from Malaysian "lebah kelulut" agro-industry for skin wound healing.

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