INVITED SPEAKERS: SCIENCE &TECHNOLOGY

Trigona Bee Products: From Laboratory to Community

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ABSTRACT

In Malaysia, the use of honey and propolis - including from the Trigona bee – has been widely-accepted as easily-accessible food supplements. Yet, few have specifically known about their antioxidant activities, and the protective potential against oxidative stress, atherosclerosis and infertility. The objective of our studies is to enhance the health benefits of Trigona bee products, especially on wound healing, atherosclerosis and infertility by capitalizing on its antioxidative properties. Specifically, we have determined that the optimum conditions of extraction temperature and time for aqueous propolis extract offering the highest antioxidant activity were at 43.75°C and 52.86 hours, respectively, whereas methanolic propolis extract should be done at 75.54 v/v concentration, 46.0°C and 25.41 hours, respectively. Similarly, the optimal combination of honey and propolis provided the highest antioxidant yield was determined to be at 15.26g (50.43%) and 15g (49.57%), respectively. This research output on aqueous propolis extraction will be directly shared with several small and medium-sized enterprises (SMEs) in an ongoing collaborative project among IIUM and Pahang apiculture SMEs. When tested on wounded guinea pig model, the supplementation of Trigona propolis has significantly promoted the wound healing process by reducing lipid peroxidation and inflammatory biomarkers, as well as increasing endogenous antioxidant enzymes, hence hasten the wound closure. Furthermore, we have investigated the anti-atherosclerotic effect of a mixture of honey including the Trigona honey in hypercholesterolemic atherosclerotic rabbits. The honey mixture has been shown to induce a significant increase in serum superoxide dismutase and glutathione peroxidase, as well as reduction in serum malondialdehyde, serum IL-1β, IL-6 and TNF-α cytokines, and serum ICAM-1 and VCAM-1 adhesion molecules in comparison to the rabbits in the high cholesterol diet group. In addition, the honey mixture has also been shown to positively affect male reproductive system in hypercholesterolemic male rabbits. Particularly, the honey mixture at the dose of 0.6 g/kg/day improved testicular weight, ameliorated the testicular tubular degenerative changes and enhanced spermatogenesis. Moreover, the honey-supplemented rabbits exhibited improved serum and intra-testicular testosterone and FSH, serum pro-inflammatory cytokines as well as higher percentages of progressive and total motility, normal sperm, live sperm and sperm concentration. Hence, we are currently looking into the next phase of clinical testing to understand its effect on infertile men. The findings of our continuous studies suggest that the Trigona honey mixture offers protection against atherosclerosis and male infertility. Eventually, these outputs are expected to be translated into clinical use and commercialization for the benefits of the community.