ABSTRACT

Marine ecology and environment is an immense yet untapped source for new bioactive compounds with unique biochemical features. Some of the compounds derived from marine organism exhibited a wide variety of biological activities that can be used for pharmaceutical and therapeutical purposes. The objective of the study is to screen the Malaysian green mussels (*Perna viridis*) for their biological activity such as antioxidant, antimicrobial, spermicidal and wound healing property. The extracts of green mussels were prepared by microwave assisted extraction (MAE) and animal tissue homogenization (ATH) methods using solvents such as water, methanol and ethanol. The extracts were subjected to biochemical analysis and screened for antimicrobial activity by disc diffusion and well diffusion methods. The antioxidant property was determined by DPPH, ABTS, H_2O_2 and FRAP methods. Spermicidal activity was assessed by measuring parameters such as sperm morphology, viability, plasma membrane and acrosome integrity in semen samples from Fertile Brangus-Simmental Cross-bred bulls. Excision wound model method was used to assess the wound healing activity in rat models. The biochemical analysis of the extracts revealed the presence of carbohydrates, reducing sugars, proteins, poly-phenols, alkaloids, saponins, and steroids. Ethanolic extract showed high amount of phenolics contents (294.90 ± 2.17 mgGAE/g) and antioxidant activity (H_2O_2: 68.14 ± 2.12 %) meanwhile the methanolic extract showed high amount of protein contents (478.42 ± 2.22 mgBSA/g) and antioxidant activities (DPPH: 75.96 ± 1.40 %; ABTS: 95.63 ± 1.37%; FRAP: 206.56 ± 1.25 µM Fe (II)/g). The methanolic and ethanolic extracts showed higher inhibition zones 22.99 ± 0.08 mm and 24.25 ± 0.25 mm, respectively against *Neisseria gonorrhoeae.* The ethanolic extract of *Perna viridis* exhibited significant reduction in parameters that correlates with spermicidal activity such as sperm morphology, viability, plasma membrane and acrosome integrity. The mean numbers of viable sperm were found to be significantly different ($p < 0.001$) compared with normal control. The ethanolic extract of *P. viridis* showed higher wound healing activity

(reduction of wound area of about 93.02%) as compared to the water extract (77.30%), methanolic extract (89.99%), positive control (89.91%) and normal control (80.85%) at the end of study period. In the end of the study, it was suggested that animal tissue homogenization (ATH) is the more suitable choice of extraction method when compare to microwave-assisted extraction (MAE) due to the presence of biochemical metabolites and its capability to exhibit more positive results when compare to the latter method on the test conducted in this study.

KEYWORDS: Malaysia green mussels, Methanolic extract, Ethanolic extract, Water extract, Microwave-assisted extraction, Animal tissue homogenization, Antioxidant activity, *Neisseria gonorrhoeae*, Antimicrobial, Spermicidal activity, Wound healing activity.