

ABSTRACT

Skin is involved in protection, sensory transduction, thermoregulation and metabolic functions. Thus, wound on the skin needs to be effectively addressed and treated. Wound healing process is a complex, systematic and overlapping process that leads to restoration of tissue integrity and also its functions. This complicated wound healing process involves several phases including inflammatory phase, proliferative phase and remodelling phase. Fundamental to wound healing research is the search for best wound healing experimental model and for the substance that best treats wounds. Honey, which in natural state is mildly acidic, is one of the potential candidates for wound treatment. It is a mixture of carbohydrate, proteins, free amino acids, several essential minerals and vitamins. Its efficacy in wound healing may be due to its stimulatory and anti-inflammatory effects, anti-bacterial activity and anti-oxidant activity. Thus, two pure Malaysian honey (Gelam honey and Nenas honey) were selected as wound dressings in this study. Honey purity test, which involved 21 randomly selected honey, was conducted in this study to ensure the purity of the two selected Malaysian honey. The honey purity tests included the determination of the hydroxymethylfurfural level, sugar profile, water content, hydrogen peroxide content and pH level in honey samples. The two types of Malaysian honey were considered as pure honey as they met all the characteristics of pure honey from tropical country. There are reports on the effectiveness of honey in treatments of different wound types, but in depth investigation of *in vivo* wound healing process using Malaysian honey is lacking. Hence, this study was done to evaluate the complex mechanism of excisional wound healing process treated with selected Malaysian honey using *in vivo* model. The study helped in delineating specific contributions of the treatment to the healing process from macroscopic and histological perspectives. Total of 150 male *Sprague-Dawley* rats, weighing between 180 to 300g, were used in this study. A 4cm² cutaneous

excisional wound model was chosen for this study. It was created on the posterior neck area between the shoulders of each rat. Wounds were dressed topically according to five groups: No dressing, Saline, Intrasite gel, Gelam honey and Nenas honey. Assessment of the wound healing process were done using the parameters of macroscopic and microscopic evaluations. Three types of staining techniques (H&E stain, Masson's Trichome stain and Verhoeff's Elastic Stain) were used in the histological approaches of assessing the wound healing process in this study. Wounds were observed to be fully recovered on the 13th days of treatments in three treatments groups (Intrasite gel, Gelam honey and Nenas honey). Both results obtained from the macroscopic and microscopic evaluations showed that both honey treated wounds exhibited less scab and only thin scar formations. Histological features demonstrated positive effects of Gelam honey and Nenas honey in accelerating general wound healing process and specifically different phases of the process. However, the macroscopic evaluation showed that efficacy of Nenas honey in wound healing was greater. Overall, this study showed both selected Malaysian honey accelerated the wound healing process.