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The characteristic and effect of local honey compared to manuka honey for chronic wound treatment

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Background: Honey has been used as medicine for centuries. Manuka honey and Medihoney™ has been accepted for medical use. Research shows that they are suitable for the treatment of ulcers, infected wounds and burns. But using Manuka honey and MediHoney™ in Indonesia is still difficult due to its high cost and availability. This study aims to compare local honey (Nusantara Honey and Java Honey) and Manuka honey in the treatment of chronic wound in animal model and compare their physical and chemical component, unique manuka factor, and antibacterial effect.

Methods: Thirty-six rats were wounded at muscle based on the dorsum side and were given bacteria *Pseudomonas* Sp. until the wound has a chronic wound appearance and then treated with Manuka Honey, Nusantara Honey, and Java Honey. A macroscopic evaluation was observed on day 0, 3, 5, 7, 10, and 13 post wound treatment. The observed parameters were wound area, presentation of necrotic tissue, slough and granulation and were evaluated by Image J application. We also checked the honey samples for physical and chemical characteristic, the methylglyoxal as the unique manuka factor, and antimicrobial effects.

Results: Statistically, there was a significant difference between the three honey treatment groups on the wound area parameters on day 3-day 0 ($p=0.021$) with post-hoc analysis found a significant difference between Manuka honey and Java honey ($p=0.009$) and Nusantara honey and Java honey ($p=0.03$) and slough presentation on day 3 - day 0 ($p=0.025$) with post-hoc analysis found significant differences between Manuka honey and Java honey ($p=0.059$) and Nusantara honey and Java honey ($p=0.008$). The next day of treatment there was no significant difference in all macroscopic evaluation parameters. *In vitro* tests showed that Manuka honey has lower pH, higher acidity, higher viscosity, and higher sugar content compared to Indonesian

local honey, Manuka honey has higher MGO content and NPA compared to Indonesian local honey, but Nusantara honey shows has higher MGO level compared to Java honey. Manuka honey has higher antibacterial activity for *P. aeruginosa* compared to Indonesian local honey but Nusantara honey shows comparable effect with Manuka honey UMF 5+

Conclusion: Local honey can be used as an alternative modality for wound chronic treatment the same as Manuka Honey, but with low cost and easily available in the market.

Recent publications

1. N Tunjung and Putri NM et al. Closure of meningomyelocele defects using various types of keystone-design perforator island flaps. *Archives of Plastic Surgery.* (2021); 48:3.
2. N Tunjung and Putri NM. Keystone Flap for Reconstruction of Sacral and Ischial Pressure Injury. *Jurnal Plastik Rekonstruksi: Vol. 8 No. 1 (2021): 3*
3. Tunjung, N, Kreshanti P, Saharman, Y R, et al. 2020. Clinical Evaluation of Locally Made Flocked Swabs in Response to the COVID-19 Pandemic in a Developing Country. *International Journal of Technology.* Volume 11(5), pp. 878-887

Speaker Biography

Nandita Melati Putri has completed his plastic reconstructive and aesthetic surgery training program from the Faculty of Medicine Universitas Indonesia. She then continued her fellowship program at Chang Gung Memorial Hospital Taiwan, Vancouver General Hospital Canada, The Christie NHS Cancer Center Manchester UK, and Zurich Hospital for Burns Switzerland. Currently, she holds the position of medical and teaching staff at the burn and wound section of plastic reconstructive, and aesthetic surgery division, Dr. Cipto Mangunkusumo Hospital, Faculty of Medicine Universitas Indonesia. She has more than 20 international publications and serves as speakers and instructors in various plastic surgery events and trainings. She has interest in the field of research of burn and wound, scar treatment, tissue repair, regenerative medicine.

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