

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

A new, easy-to-make, Pectin - Honey hydrogel enhances wound healing in rats

This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1570469> since 2016-06-22T14:45:56Z

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

A new, easy-to-make, Pectin – Honey hydrogel enhances wound healing in rats

Gessica Giusto^a, Cristina Vercelli^a, Francesco Comino^a, Vittorio Caramello^a, Marco Gandini^a

^a Department of Veterinary Sciences, University of Turin, Largo P.Braccini 2-5, Grugliasco (TO), Italy

The use of honey in wound healing is ancient. It could be used alone or in combination with other compounds and became a topic of interest in several investigations in the last decade [1-2]. Pectin has been recently investigated for various biomedical applications, such as drug delivery, skin protection and as scaffold for cells [3]. Pectin is inexpensive, can be extracted from renewable sources, is not cytotoxic, acts as a gelling agent, and is suitable for many biomedical applications [4]. The aim of the present study was to develop and evaluate a pectin-honey hydrogel (PHH), forming a membrane applicable on the wound, and to compare this dressing to liquid honey for wound healing.

Thirty-six adult male Sprague-Dawley rats were anesthetized and a 2x2 cm full thickness excisional model was used to create the wounds [5]. Animals were randomly assigned to four groups (PHH, LH, Pec and C). Pectin-honey hydrogel was applied under a bandage on the wound (group PHH), liquid Manuka honey was applied under a bandage on the wound (group LH), pectin only hydrogel was applied under a bandage on the wound (group Pec), while in C group only the bandage was applied to the wound. Images of the wound were taken on days 0,2,4,6,8,11,13,15,18,21 and 23 after surgery. The comparison between the area at day 0 and at the time-set days was used to calculate the ratio of the wound reduction and compared between groups.

Wound area reduction rate was faster for PHH, LH and Pec group compared to the control group and among PHH, LH and Pec even significantly faster for the PHH group. Surprisingly Pec group had a faster wound healing than LH, even if it was not statistically significant.

This is the first study, to date, to use pectin in combination with honey to produce biomedical hydrogels for wound treatment. Considering the results obtained in the present study, the use of PHH is effective to promote and accelerate wound healing.

References:

- [1] Aljady AM, Kamaruddin MY, Jamal AM, Mohd Yassim MY: Biochemical study on the efficacy of Malaysian honey on inflicted wounds: an animal model. *Med J of Islam Academy of Sciences* 2000; 13(3): 125-132
- [2] Davis SC, Perez R. Cosmeceuticals and natural products: wound healing. *Clin Dermatol* 2009; 27(5): 502-506
- [3] Lin HY, Chen HH, Chang SH, Ni TS: Pectin-chitosan-PVA nanofibrous scaffold made by electrospinning and its potential use as a skin tissue scaffold. *J Biomater Sci Polym Ed* 2013; 24(4): 470-484
- [4] Munarin F, Tanzi MC, Petrini P: Advances in biomedical applications of pectin gels. *Int J of Biol Macromol* 2012; 51: 681-689
- [5] Tan MK, Hasan Adli DS, Tumiran MA, Abdulla MA, Yusoff KM: The efficacy of gelam honey dressing towards excisional wound healing. *Evid Based Complement Alternat Med* 2012; 805932