Medical Grade Honey:

ingegnerizzazione o ritorno alle origini?

Dott. Mirko Tessari, PhD

Dottore di Ricerca in Malattie Vascolari (Med/22)

Tecnico di Flebologia

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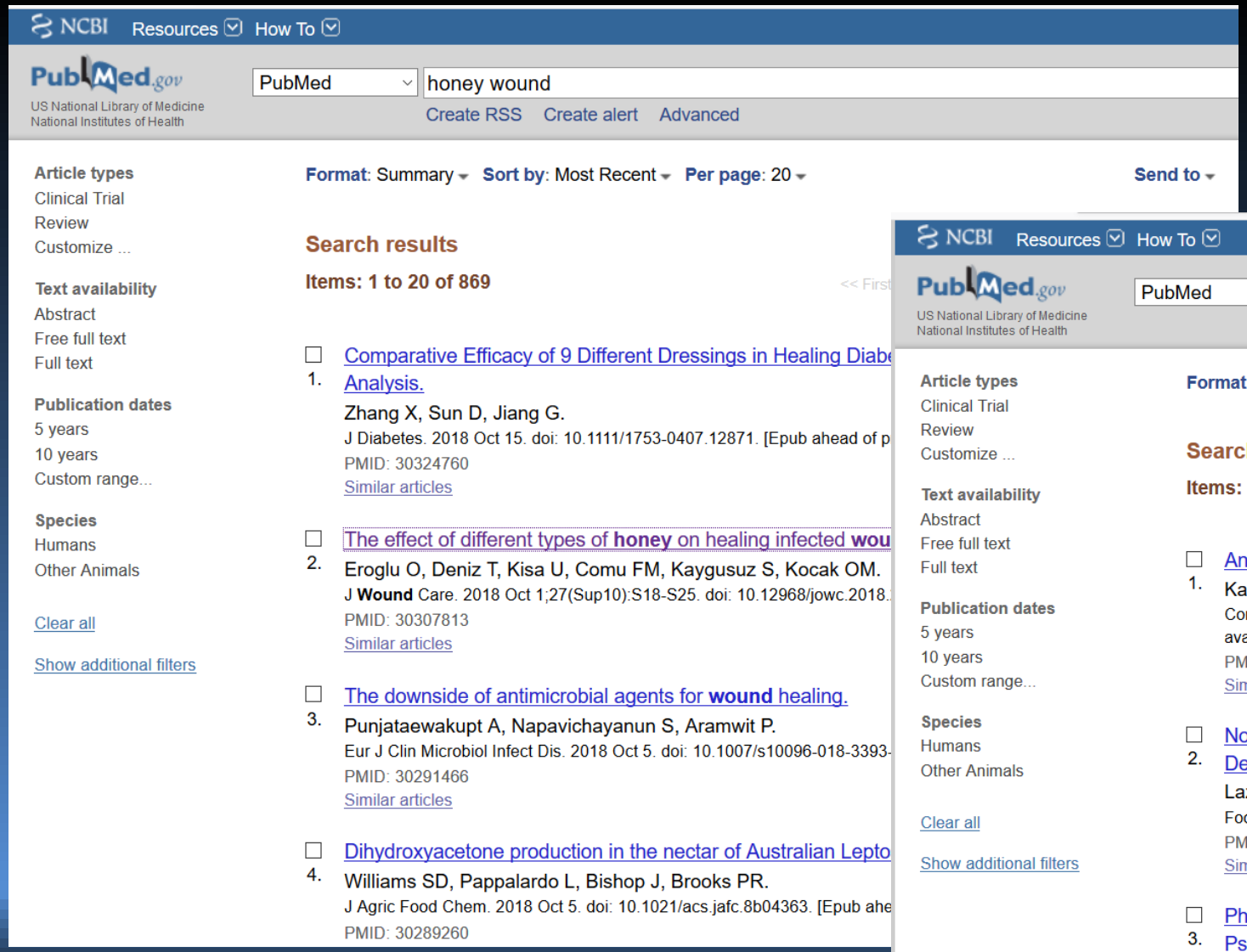
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J Diabetes. 2018 Oct 15. doi: 10.1111/1753-0407.12871. [Epub ahead of p
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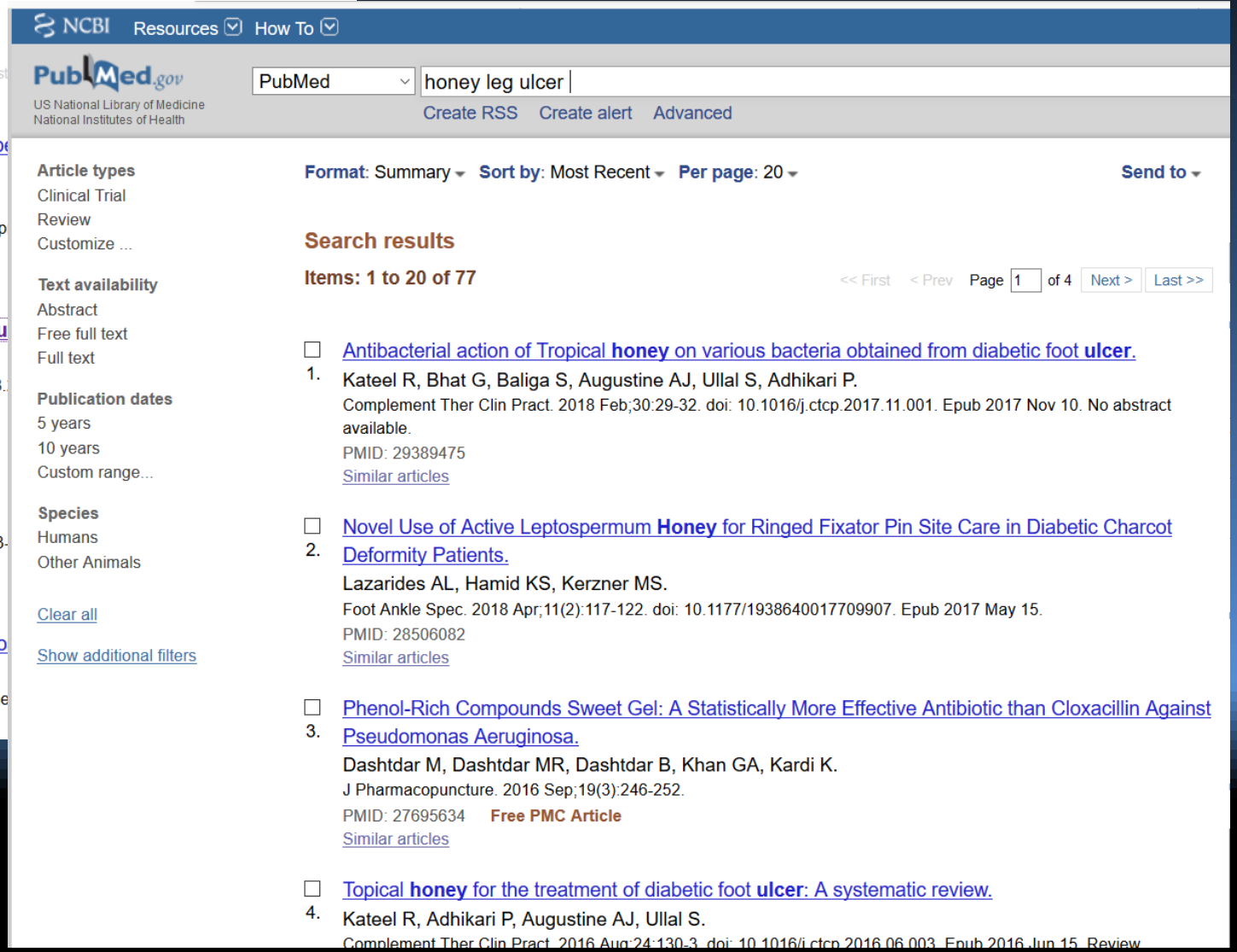
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1. Antibacterial action of Tropical honey on various bacteria obtained from diabetic foot ulcer.
Kateel R, Bhat G, Baliga S, Augustine AJ, Ullal S, Adhikari P.
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2. Novel Use of Active Leptospermum Honey for Ringed Fixator Pin Site Care in Diabetic Charcot Deformity Patients.
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3. Phenol-Rich Compounds Sweet Gel: A Statistically More Effective Antibiotic than Cloxacillin Against Pseudomonas Aeruginosa.
Dashtdar M, Dashtdar MR, Dashtdar B, Khan GA, Kardi K.
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4. Topical honey for the treatment of diabetic foot ulcer: A systematic review.
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Complement Ther Clin Pract. 2016 Aug;24:130-3. doi: 10.1016/j.ctcp.2016.06.003. Epub 2016 Jun 15. Review

Cochrane Database Syst Rev. 2015 Mar 6;(3):CD005083. doi: 10.1002/14651858.CD005083.pub4.

Honey as a topical treatment for wounds.

Jull AB[1], Cullum N, Dumville JC, Westby MJ, Deshpande S, Walker N.

MAIN RESULTS: We identified 26 eligible trials (total of 3011 participants). Three trials evaluated the effects of honey in minor acute wounds, 11 trials evaluated honey in burns, 10 trials recruited people with different chronic wounds including two in people with venous leg ulcers, two trials in people with diabetic foot ulcers and single trials in infected post-operative wounds, pressure injuries, cutaneous Leishmaniasis and Fournier's gangrene. Two trials recruited a mixed population of people with acute and chronic wounds. The quality of the evidence varied between different comparisons and outcomes. We mainly downgraded the quality of evidence for risk of bias, imprecision and, in a few cases, inconsistency.There is high quality evidence (2 trials, n=992) that honey dressings heal partial thickness burns more quickly than conventional dressings (WMD -4.68 days, 95%CI -5.09 to -4.28) but it is unclear if there is a difference in rates of adverse events (very low quality evidence) or infection (low quality evidence).There is very low quality evidence (4 trials, n=332) that burns treated with honey heal more quickly than those treated with silver sulfadiazine (SSD) (WMD -5.12 days, 95%CI -9.51 to -0.73) and high quality evidence from 6 trials (n=462) that there is no difference in overall risk of healing within 6 weeks for honey compared with SSD (RR 1.00, 95% CI 0.98 to 1.02) but a reduction in the overall risk of adverse events with honey relative to SSD. There is low quality evidence (1 trial, n=50) that early excision and grafting heals partial and full thickness burns more quickly than honey followed by grafting as necessary (WMD 13.6 days, 95%CI 9.82 to 17.38).There is low quality evidence (2 trials, different comparators, n=140) that honey heals a mixed population of acute and chronic wounds more quickly than SSD or sugar dressings.Honey healed infected post-operative wounds more quickly than antiseptic washes followed by gauze and was associated with fewer adverse events (1 trial, n=50, moderate quality evidence, RR of healing 1.69, 95%CI 1.10 to 2.61); healed pressure ulcers more quickly than saline soaks (1 trial, n= 40, very low quality evidence, RR 1.41, 95%CI 1.05 to 1.90), and healed Fournier's gangrene more quickly than Eusol soaks (1 trial, n=30, very low quality evidence, WMD -8.00 days, 95%CI -6.08 to -9.92 days).The effects of honey relative to comparators are unclear for: venous leg ulcers (2 trials, n= 476, low quality evidence); minor acute wounds (3 trials, n=213, very low quality evidence); diabetic foot ulcers (2 trials, n=93, low quality evidence); Leishmaniasis (1 trial, n=100, low quality evidence); mixed chronic wounds (2 trials, n=150, low quality evidence).

AUTHORS' CONCLUSIONS: It is difficult to draw overall conclusions regarding the effects of honey as a topical treatment for wounds due to the heterogeneous nature of the patient populations and comparators studied and the mostly low quality of the evidence. The quality of the evidence was mainly downgraded for risk of bias and imprecision. Honey appears to heal partial thickness burns more quickly than conventional treatment (which included polyurethane film, paraffin gauze, soframycin-impregnated gauze, sterile linen and leaving the burns exposed) and infected post-operative wounds more quickly than antiseptics and gauze. Beyond these comparisons any evidence for differences in the effects of honey and comparators is of low or very low quality and does not form a robust basis for decision making.

Update of

Honey as a topical treatment for wounds. [Cochrane Database Syst Rev. 2013]

Cochrane Database Syst Rev. 2015 Sep 14;(9):CD008599. doi: 10.1002/14651858.CD008599.pub2.

Debridement for venous leg ulcers.

Gethin G[1], Cowman S, Kolbach DN.

MAIN RESULTS: We identified 10 RCTs involving 715 participants. Eight RCTs evaluated autolytic debridement and included the following agents or dressings: biocellulose wound dressing (BWD), non-adherent dressing, honey gel, hydrogel (gel formula), hydrofibre dressing, hydrocolloid dressings, dextranomer beads, Edinburgh University Solution of Lime (EUSOL) and paraffin gauze. Two RCTs evaluated enzymatic preparations and one evaluated biosurgical debridement. No RCTs evaluated surgical, sharp or mechanical methods of debridement, or debridement versus no debridement. Most trials were at a high risk of bias.Three RCTs assessed the number of wounds completely debrided. All three of these trials compared two different methods of autolytic debridement (234 participants), with two studies reporting statistically significant results: one study (100 participants) reported that 40/50 (80%) ulcers treated with dextranomer beads and 7/50 (14%) treated with EUSOL achieved complete debridement (RR 5.71, 95% CI 2.84 to 11.52); while the other trial (86 participants) reported the number of ulcers completely debrided as 31/46 (76%) for hydrogel versus 18/40 (45%) for paraffin gauze (RR 0.67, 95% CI 0.45 to 0.99). One study (48 participants) reported that by 12 weeks, 15/18 (84%) ulcers treated with BWD had achieved a 75% to 100% clean, granulating wound bed versus 4/15 (26%) treated with non-adherent petrolatum emulsion-impregnated gauze.Four trials assessed the mean time to achieve debridement: one (86 participants) compared two autolytic debridement methods, two compared autolytic methods with enzymatic debridement (71 participants), and the last (12 participants) compared autolytic with biosurgical debridement; none of the results achieved statistical significance.Two trials that assessed autolytic debridement methods reported the number of wounds healed at 12 weeks. One trial (108 participants) reported that 24/54 (44%) ulcers treated with honey healed versus 18/54 (33%) treated with hydrogel (RR (adjusted for baseline wound diameter) 1.38, 95% CI 1.02 to 1.88; P value 0.037). The second trial (48 participants) reported that 7/25 (28%) ulcers treated with BWD healed versus 7/23 (30%) treated with non-adherent dressing.Reduction in wound size was assessed in five trials (444 participants) in which two autolytic methods were compared. Results were statistically significant in one three-armed trial (153 participants) when cadexomer iodine was compared to paraffin gauze (mean difference 24.9 cm^2, 95% CI 7.27 to 42.53, P value 0.006) and hydrocolloid compared to paraffin gauze (mean difference 23.8 cm^2, 95% CI 5.48 to 42.12, P value 0.01). A second trial that assessed reduction in wound size based its results on median differences and, at four weeks, produced a statistically significantly result that favoured honey over hydrogel (P value < 0.001). The other three trials reported no statistically significant results for reduction in wound size, although one trial reported that the mean percentage reduction in wound area was greater at six and 12 weeks for BWD versus a non-adherent dressing (44% versus 24% week 6; 74% versus 54% week 12).Pain was assessed in six trials (544 participants) that compared two autolytic debridement methods, but the results were not statistically significant. No serious adverse events were reported in any trial.

AUTHORS' CONCLUSIONS: There is limited evidence to suggest that actively debriding a venous leg ulcer has a clinically significant impact on healing. The overall small number of participants, low number of studies and lack of meta-analysis in this review precludes any strong conclusions of benefit. Comparisons of different autolytic agents (hydrogel versus paraffin gauze; Dextranomer beads versus EUSOL and BWD versus non-adherent dressings) and Larvae versus hydrogel all showed statistically significant results for numbers of wounds debrided. Larger trials with follow up to healing are required.

Cochrane Library

Burns. 2017 Feb;43(1):50-57. doi: 10.1016/j.burns.2016.07.004. Epub 2016 Aug 28.

The effects of honey compared to silver sulfadiazine for the treatment of burns: A systematic review of randomized controlled trials.

Aziz Z[1], Abdul Rasool Hassan B[2].

Author information

Abstract

Evidence from animal studies and trials suggests that honey may accelerate wound healing. The objective of this review was to assess the effects of honey compared with silver dressings on the healing of burn wounds. Relevant databases for randomized controlled trials (RCTs) of honey compared with silver sulfadiazine (SSD) were searched. The quality of the selected trials was assessed using the Cochrane Risk of Bias Assessment Tool. The primary endpoints considered were wound healing time and the number of infected wounds rendered sterile. Nine RCTs met the inclusion criteria. Based on moderate quality evidence there was a statistically significant difference between the two groups, favoring honey in healing time (MD -5.76days, 95% CI -8.14 to -3.39) and the proportions of infected wounds rendered sterile (RR 2.59; 95% CI 1.58-2.88). The available evidence suggests that honey dressings promote better wound healing than silver sulfadiazine for burns.

KEYWORDS: Burn; Dressing; Healing time; Honey; Meta-analysis; Silver sulfadiazine

Bioengineering (Basel). 2018 Jun 14;5(2). pii: E46. doi: 10.3390/bioengineering5020046.

Honey-Based Templates in Wound Healing and Tissue Engineering.

Minden-Birkenmaier BA[1], Bowlin GL[2].

Author information

Abstract

Over the past few decades, there has been a resurgence in the clinical use of honey as a topical wound treatment. A plethora of in vitro and in vivo evidence supports this resurgence, demonstrating that honey debrides wounds, kills bacteria, penetrates biofilm, lowers wound pH, reduces chronic inflammation, and promotes fibroblast infiltration, among other beneficial qualities. Given these results, it is clear that honey has a potential role in the field of tissue engineering and regeneration. Researchers have incorporated honey into tissue engineering templates, including electrospun meshes, cryogels, and hydrogels, with varying degrees of success. This review details the current state of the field, including challenges which have yet to be overcome, and makes recommendations for the direction of future research in order to develop effective tissue regeneration therapies.

J Funct Biomater. 2018 May 8;9(2). pii: E34. doi: 10.3390/jfb9020034.

Honey, Wound Repair and Regenerative Medicine.

Martinotti S[1], Ranzato E[2].

Author information

Abstract

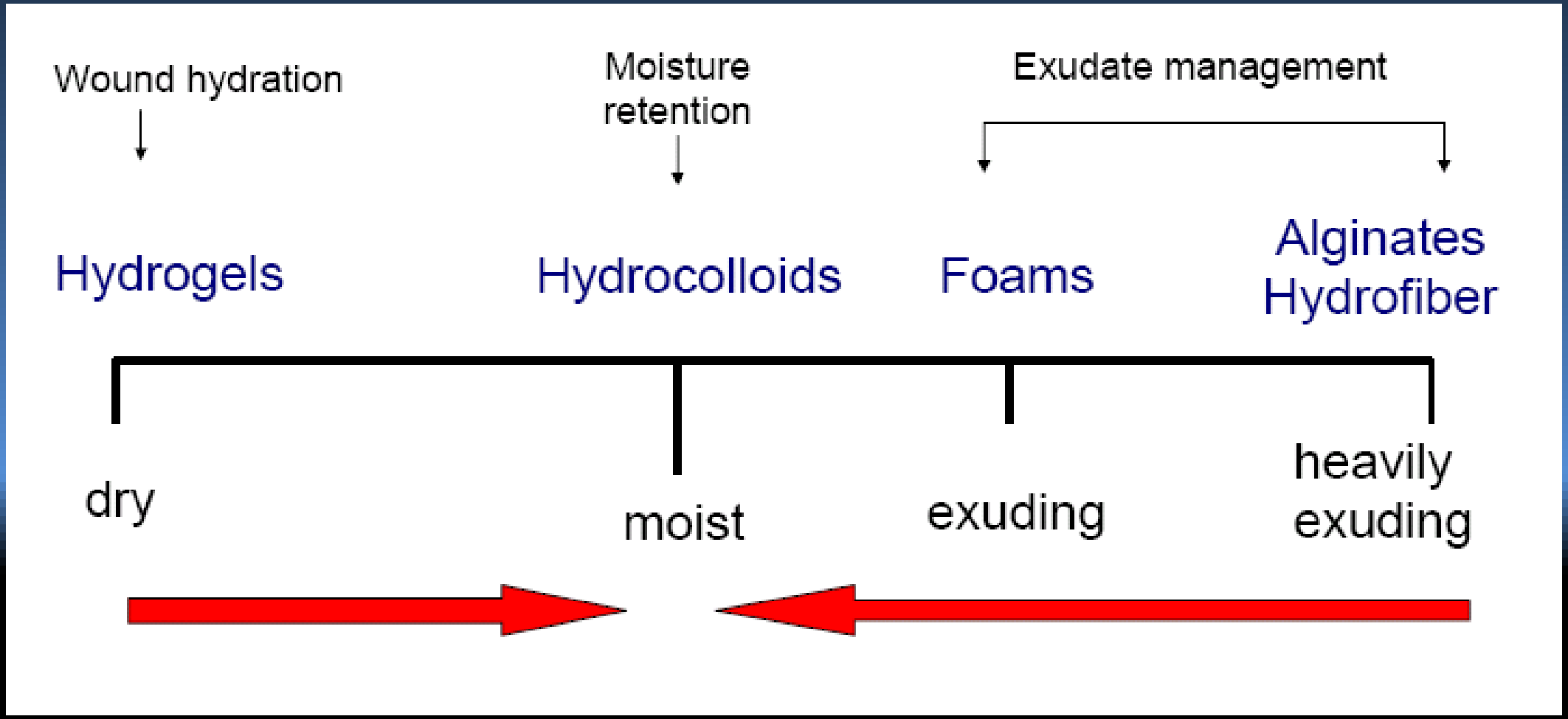
Honey possesses anti-bacterial, anti-inflammatory and other properties that are useful for wound healing and tissue regeneration. Furthermore, honey has been used for millennia in folk medicine. The misuse of antibiotics has again boosted the use of honey in regenerative medicine. The multifaceted properties of honey could possibly be exploited for scaffold applications in tissue healing.

KEYWORDS: honey; scaffold; wound repair mechanisms

Nature. 1963 Jan 5;197:91-2.

Effect of air drying and dressings on the surface of a wound.

WINTER GD, SCALES JT.



- Leptospermum Scoparium Honey - Manuka (millefiore)
- Buckwheat Honey - (grano saraceno)
- Acacia Honey (acacia)
- Stingless Bee Honey (semplice)
- Chestnut Honey (castagna)
- Rhododendron Honey (rododendro)
- Eucalyptus Honey (eucalipto)
- Polyfloral Honeys (millefiore)
- Medical Grade Honey - Revamil
- Certified Organic Honey – (miele organico certificato)

Honey type	Antibacterial and antioxidant components				
	Low pH High sugar	High GOX	High Methyl glyoxal	High antioxidants	High Bee-Defensin-1 peptide
Leptospermum	+	-	+	+	-
Chestnut	+	+	-	+	-
Buckwheat	+	-	-	+	-
Acacia	+	+	-	-	-
Stingless bee	+	?	-	+	-
Rhododendron	+	?	-	?	-
Eucalyptus	+	+	-	+	-
Tualang	+	?	-	+	-
Polyfloral	+	?	-	?	-
Medical grade	+	+	-	-	+
Certified organic	+	?	-	?	-

Honey Gox free or Gox positive?

GOX FREE

No Peroxide Activity

Methyglioxal MGO

GOX POSITIVE

Peroxide Activity

Glucosio-Ossidasi GOX

Bee defensin-1 peptide

E' prodotta dalle ghiandole faringee delle api, coinvolte nella produzione di pappa reale e di miele

Czech J. Food Sci., 34, 2016 (3): 233–243 — *Food Analysis, Food Quality and Nutrition*

doi: 10.17221/422/2015-CJFS

Quantification of Bee-Derived Peptide Defensin-1 in Honey by Competitive Enzyme-Linked Immunosorbent Assay, a New Approach in Honey Quality Control

Ivana VALACHOVÁ[1], Marcela BUČEKOVÁ[2,3] and Juraj MAJTÁN[2,3,4]

..l'attività antibatterica di questi campioni di miele ha mostrato una significativa correlazione dipendente dalla concentrazione con la produzione di Bee Defensin-1..

FASEB J. 2010 Jul;24(7):2576-82. doi: 10.1096/fj.09-150789. Epub 2010 Mar 12.

How honey kills bacteria.

Kwakman PH[1], te Velde AA, de Boer L, Speijer D, Vandenbroucke-Grauls CM, Zaat SA.

..la grande maggioranza delle proprietà antibatteriche del miele proviene da questa proteina..

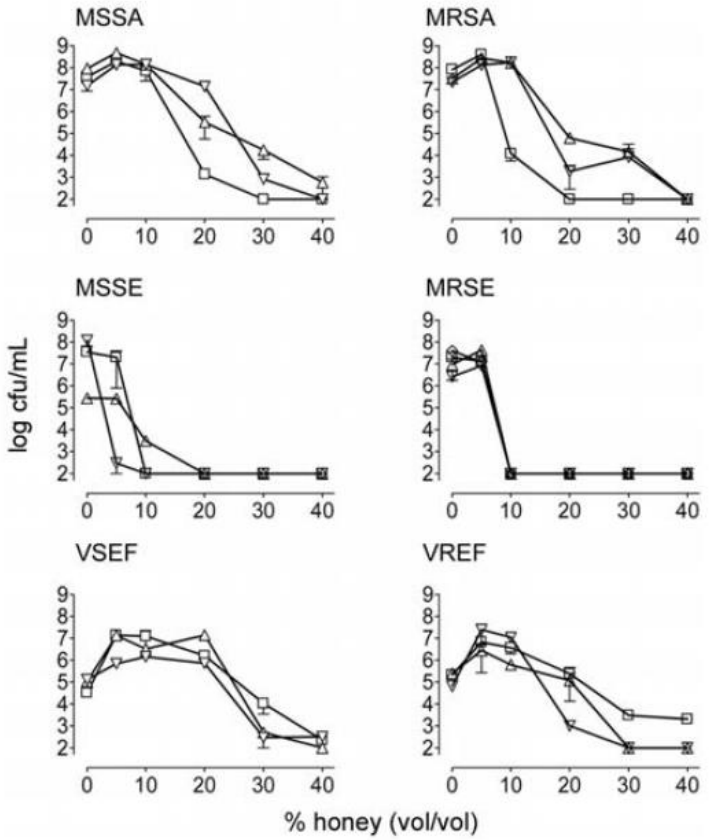


Figure 2. Susceptibility of gram-positive bacteria to honey. Methicillin-susceptible *Staphylococcus aureus* (MSSA), methicillin-resistant *S. aureus* (MRSA), methicillin-susceptible *Staphylococcus epidermidis* (MSSE), methicillin-resistant *S. epidermidis* (MRSE), vancomycin-susceptible *Enterococcus faecium* (VSEF), and vancomycin-resistant *E. faecium* (VREF) isolates were exposed to the indicated concentrations of honey for 24 h, after which survival was determined quantitatively as cfu/mL.

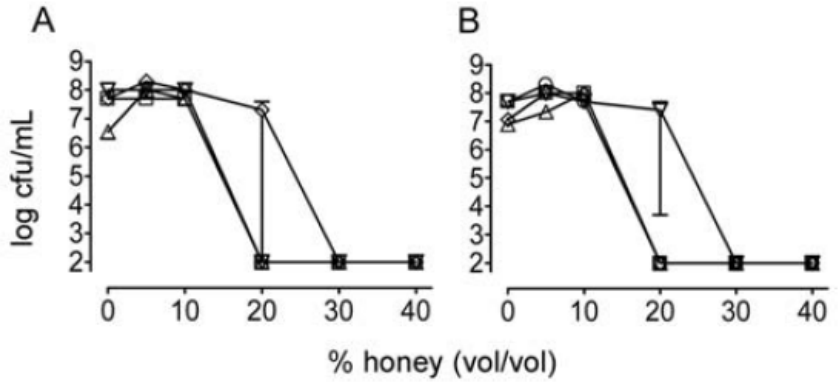


Figure 3. Susceptibility of various gram-negative bacteria to honey. Antibiotic-susceptible isolates *(A)* and extended-spectrum β-lactamase–producing isolates *(B)* of *Escherichia coli (squares), Pseudomonas aeruginosa (upward-pointing triangles), Enterobacter cloacae (diamonds), Klebsiella oxytoca (downward-pointing triangles),* and gentamicin-resistant *E. coli (circles)* were exposed to the indicated concentrations of honey for 24 h, after which survival was determined quantitatively as cfu/mL.

NO antibiotico-resistenza

We demonstrate that Revamil medical-grade honey had reproducible bactericidal activity in vitro and was equally active against antibiotic-resistant and -susceptible isolates for all species tested. Application of Revamil for 2 days on forearm skin of healthy volunteers was highly effective in reducing both the frequency of positive skin cultures and the numbers of cfu cultured (both $P < .001$, for comparison with controls).

[26–28], new antimicrobial agents are needed. Revamil had potent in vitro bactericidal activity against antibiotic-resistant gram-positive and gram-negative bacteria. Inocula of all *S. epidermidis* strains tested were completely killed after 24 h of incubation in 20% vol/vol honey, and 40% vol/vol honey killed all *S. aureus* and *E. faecium* strains tested. Antibiotic-susceptible and -resistant strains of all gram-negative bacteria tested were killed by 20%–30% vol/vol honey. Therefore, medical-grade honey has the potential to be a topical antibacterial prophylaxis or to be a treatment for topical infections caused by antibiotic-resistant bacteria.

Clin Infect Dis. 2008 Jun 1;46(11):1677-82. doi: 10.1086/587892.

Medical-grade honey kills antibiotic-resistant bacteria in vitro and eradicates skin colonization.

Kwakman PH[1], Van den Akker JP, Güçlü A, Aslami H, Binnekade JM, de Boer L, Boszhard L, Paulus F, Middelhoek P, te Velde AA, Vandenbroucke-Grauls CM, Schultz MJ, Zaat SA.

WORLD UNION OF WOUND HEALING SOCIETIES

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DOCUMENTO DI POSIZIONAMENTO

GESTIONE DEL BIOFILM

Il ruolo del biofilm nella guarigione ritardata delle ferite

La gestione del biofilm nella pratica

Progressi della ricerca nella conoscenza del biofilm

Una seconda area di interesse della ricerca suggerisce che i biofilm di batteri infettivi contribuiscono a una bassa tensione dell'ossigeno localizzata all'interno della ferita. I primi studi *in vitro* che utilizzavano microelettrodi hanno individuato aree discrete di significativo consumo di ossigeno all'interno dei biofilm[38]. Ulteriori studi che ricorrevano ai microelettrodi con CLSM, hanno individuato microdomini in diverse aree del biofilm che ospitava ambienti biochimici alterati, comprese alterazioni di pH e ossigeno[39]. La creazione di aree anossiche all'interno del biofilm può spiegare la presenza di anaerobi in biofilm a specie miste. Le condizioni anossiche sono state osservate anche in infezioni polmonari croniche in pazienti con FC[40]. All'interno di un polmone affetto cronicamente da FC, è stato osservato che i PMN consumano principalmente ossigeno, causandone l'esaurimento che soffoca i batteri, i quali diminuiscono così l'attività metabolica[19,20].

Da dati del 2016 raccolti da James e colleghi, si evincono ulteriori evidenze a sostegno del concetto di basse tensioni di ossigeno localizzate, che contribuiscono alla cronicità della ferita[21]. Ricorrendo a miscrosensori di ossigeno e alla trascrittomica (analisi delle attività metaboliche dei microbi) per studiare i biofilm *in situ*, James e colleghi hanno individuato i gradienti ripidi di ossigeno e indotto risposte da stress per carenza di ossigeno nei batteri. Analizzati complessivamente, questi dati sostengono il concetto secondo cui il biofilm aiuti a mantenere basse tensioni di ossigeno localizzate nella ferita, contribuendo così alla cronicità[21].

Risulta lampante da questo articolo che la diagnosi, il trattamento e la comprensione del ruolo svolto dai biofilm nella cronicità delle ferite sono ancora allo stato primordiale. Gli sforzi scientifici mirati a questa area di nicchia stanno prendendo ritmo man mano che le evidenze mostrano che il cammino intrapreso è quello giusto. Si sta ormai accettando pienamente che le ferite croniche che non guariscono contengono biofilm e che questi ultimi, in qualche modo, ritardano o impediscono la guarigione della ferita.

Tabella 1: Potenziali agenti anti-biofilm

Meccanismo d'azione	Esempi	Altri dati
Interferenza con l'attacco del biofilm alla superficie	Lactoferrina Acido etilendiamminote-traacetico (EDTA) Xilitolo Miele	La lactoferrina, in base ad un meccanismo di risposta umano innato, si lega alle pareti cellulari causando destabilizzazione, fuoriuscite ed infine morte cellulare[17]. L'EDTA è stato usato come agente permeante e sensibilizzante per patologie da biofilm in odontoiatria e in altri campi[18]. Inoltre, è stato dimostrato che anche lo xilitolo (un dolcificante artificiale) e il miele sono in grado di bloccare l'attaccamento[17]
Interferenza con il "quorum sensing", un meccanismo di segnalazione chimica o di comunicazione tra le cellule all'interno del biofilm	Farnesolo Iberina Ajoene Miele	Vari agenti bloccano o interferiscono con il quorum sensing, tra cui: • il farnesolo, • l'iberina (ricavata dal rafano), • l'ajoene (ricavato dall'aglio). Il miele di Manuka sottoregola 3 dei 4 geni responsabili del processo di "quorum sensing"[17]
rottura della sostanza polimerica extracellulare (EPS), una matrice protettiva secreta dal biofilm, che lo circonda.	EDTA	L'EDTA supporta e potenzia gli antimicrobici topici rompendo l'EPS in cui sono incapsulati i microrganismi[18]. Esistono anche prodotti registrati che vantano, tra le varie azioni, di poter rompere l'EPS[19]
Falsi metaboliti	Gallio, xilitolo	È stato dimostrato che basse dosi di gallio e di xilitolo interferiscono con la formazione del biofilm[20]
Rottura del biofilm esistente	Betaina (combinazione di PHMB e betaina)	Le soluzioni attuali preferite per la rottura del biofilm contengono tensioattivi, come la betaina, che abbassano la tensione superficiale del mezzo in cui sono disciolte, permettendo di aspirare sporcizia e detriti e di sospenderli nella soluzione[21,22]


Biotechnology
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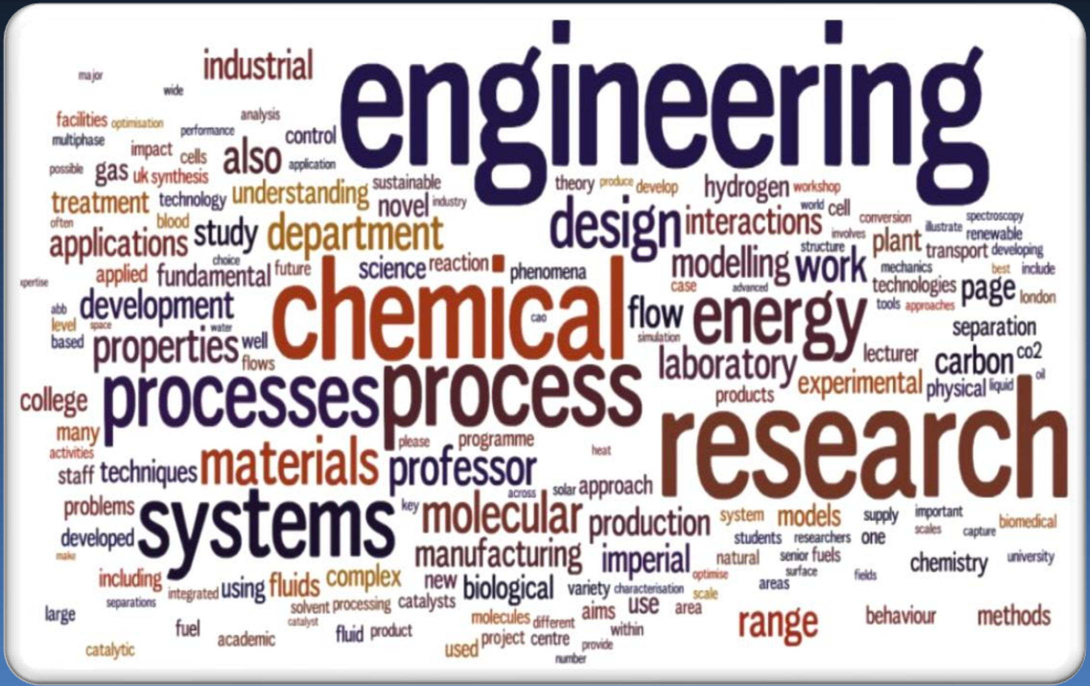
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Antibiotic Resistance - Taking the Sting Out With Honey

June 06, 2017 | Von Ross Campbell | Life | English

Ross Campbell
Life/Health Chief Underwriter, Research & Development, London
Alle Artikel lesen

Bacterial infection is fast becoming resistant to treatment with antibiotics - faster, that is, than new drugs can be developed. This makes it harder to treat infection caused by injury, surgery or even a suppressed immune system as a result of chemotherapy cancer treatment. Antimicrobial Resistance (AMR) is caused by over-prescription and improper use of antibiotics by humans and in animals, but bacteria also develop resistance naturally as they evolve. However, with some help from bioengineers, nature could be about to provide the sweetest of solutions.

Honey has been used for centuries to treat wounds. Its low pH and moisture content combine with high levels of sugar to inhibit bacterial growth. When honey becomes diluted in a wound, hydrogen peroxide is produced, which in turn releases low concentrations of reactive oxygen that kills microbes and promotes healing. Additionally, bacterial cell membranes are disrupted by the antimicrobial peptide bee defensin-1 secreted into honey by bees. It is also thought that methylglyoxal (MGO) in honey fights tissue damage caused by infection and stimulates cell repair.

Honey sourced naturally from bees that pollinate manuka bushes, native to Australia and New Zealand, is known for having high concentrations of MGO. Manuka has received official approval for use as a medicine and because, unlike table honey, it has proven antimicrobial activity. Revamil, which is medical-grade honey, is one alternative that is much lower in MGO but could have more consistent therapeutic properties because it is produced under controlled conditions.

A new "bioengineered" medical-grade honey could be about to switch things up. SHRO is biologically modified honey that produces a sustained release of reactive oxygen. In trials SHRO has shown a broad-spectrum antibiotic effect against organisms, including gram-positive bacteria Staphylococcus aureus (MRSA) and gram-negative bacteria Enterobacteriaceae (E. coli), but also against multidrug-resistant bacteria. Trials suggest the engineered version of honey is comparable with chemical antiseptics in its antimicrobial activity. Just a smear of honey prevents the build-up of bacteria-laden biofilm on catheters and indwelling medical devices significantly reducing infection risk.

Aug 12, 2013 20:56 GMT · By Laura Sinpetru · Share:

Scientists in the United Kingdom claim they have successfully created a new type of honey that can fight back severe infections typically labeled as incurable.

What's more, the researchers maintain that the newly developed bioengineered honey can significantly shorten the recovery period for people who have sustained noteworthy wounds.

Doctors discover 'super honey' with amazing power to treat soldiers' wounds and kill superbug infections

- has been tested in Hampshire hospitals for a year
- Wounds, ulcers and MRSA healed within days thanks to the honey

'Miracle' honey that can prevent limb amputation with bacteria-killing properties

J Glob Antimicrob Resist. 2014 Sep;2(3):168-172. doi: 10.1016/j.jgar.2014.03.006. Epub 2014 Apr 26.

Engineered honey: In vitro antimicrobial activity of a novel topical wound care treatment.

Dryden M[1], Lockyer G[2], Saeed K[2], Cooke J[3].

Author information

Abstract

Surgihoney is a novel engineered organic honey product for wound care. Its antimicrobial activity can be controlled and adjusted by the engineering process, allowing preparation of three different potencies, labelled Surgihoney 1-3. Susceptibility testing of a range of wound and ulcer bacterial isolates to Surgihoney by the disc diffusion method, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) determination, and time-kill measurements by time suspension tests were performed. Surgihoney demonstrated highly potent inhibitory and cidal activity against a wide range of Gram-positive and Gram-negative bacteria and fungi. MICs/MBCs were significantly lower than concentrations likely to be achieved in topical clinical use. The topical concentration of Surgihoney in wounds was estimated at ca. 500g/L. MICs/MBCs for Staphylococcus aureus were 32/125g/L for Surgihoney 1 and 0.12/0.25g/L for Surgihoney 3. Cidal speed depended on potency, being 48h for Surgihoney 1 and 30min for Surgihoney 3. Maintenance of the Surgihoney inoculum preparation for up to a week demonstrated complete cidal activity and no bacterial persistence. Surgihoney has wide potential as a highly active topical treatment combining the effects of the healing properties of honey with the potent antimicrobial activity of the engineered product for skin lesions, wounds, ulcers and cavities. It is highly active against multidrug-resistant bacteria. It is more active than other honeys tested and is comparable with chemical antiseptics in antimicrobial activity.

KEYWORDS: Honey; MBC; MIC; Soft tissue infection; Surgihoney; Tissue viability; Topical therapy

Mater Sci Eng C Mater Biol Appl. 2016 Oct 1;67:276-284. doi: 10.1016/j.msec.2016.05.006. Epub 2016 May 4.

The effect of increasing honey concentration on the properties of the honey/polyvinyl alcohol/chitosan nanofibers.

Sarhan WA[1], Azzazy HME[2], El-Sherbiny IM[3].

Author information

Abstract

The effect of increasing honey concentrations from 10% to 30% within the Honey (H)/polyvinyl alcohol (P)/chitosan (CS) nanofibers was investigated. Changes in the electrospun nanofiber diameters, crystallinity, thermal behavior, porosity and antibacterial activity have been assessed using SEM, XRD, DSC, TGA, mercury porosimeter and viable cell count technique. The HPCS nanofibers were cross-linked and tested for their swelling abilities and degradation behavior. The mean diameter of HPCS nanofibers increased from 284±97nm to 464±185nm upon increasing the honey concentration from 10% to 30%. Irrespective the honey concentrations, the nanofibers have demonstrated enhanced porosity. Increasing the honey concentration resulted in a reduction in the swelling of the 1h cross-linked HPCS nanofibers containing 10% and 30% H from 520% to 100%; respectively. Degradation after 30days was reduced in the 3h cross-linked HPCS nanofibers compared to the non-crosslinked HPCS nanofibers. Enhanced antibacterial activity was achieved against both Staphylococcus aureus and Escherichia coli upon increasing the honey concentration. Changing the honey concentration and the extent of nanofiber crosslinking can be used to adjust different parameters of the HPCS nanofibers to suit their applications in wound healing and tissue engineering.

KEYWORDS: Antibacterial activity; Biomaterials; Honey chitosan nanofibers; Porosity; Swelling

J Mater Sci Mater Med. 2018 Mar 13;29(3):31. doi: 10.1007/s10856-018-6038-4.

Repositing honey incorporated electrospun nanofiber membranes to provide anti-oxidant, anti-bacterial and anti-inflammatory microenvironment for wound regeneration.

Sarkar R[1], Ghosh A[1], Barui A[1], Datta P[2].

Author information

Abstract

Topical application of honey for tissue regeneration, has recently regained attention in clinical practice with controlled studies affirming its efficacy and indicating its role in regeneration over repair. Parallely, to overcome difficulties of applying raw honey, several product development studies like nanofibrous matrices have been reported. However, one approach concentrated on achieving highest possible honey loading in the nanofiber membranes while other studies have found that only specific honey dilutions result in differential cellular responses on wound healing and re-epithelization. From these results, it can be suggested that high honey loading provides optimum external microenvironment, low-loaded membranes could provide a more conducive internal microenvironment for tissue regeneration. With this hypothesis, this paper sought to evaluate ability of low-honey loaded nanofibers to modulate the anti-oxidant, anti-biofilm and anti-inflammatory properties which are important to be maintained in wound micro-environment. A loading-dependent reduction of biofilm formation and anti-oxidant activity was noted in different concentration ranges investigated. After scratch assay, a certain honey loading (0.5%) afforded the maximum re-epithelization. Since there is lack of methods to determine anti-inflammatory properties of nanofiber membranes during epithelial healing process, we performed anti-inflammatory assessment of nano-fibers by evaluating the expressions of pro-inflammatory markers-Cycloxygenase-2 (COX-2) and Interleukin-6 (IL-6) and to confirm the optimized concentration. Considering the role of COX-2 and IL-6, the novel methodology used in this study can also be developed as an assay for anti-inflammatory matrices for wound healing.

J Biomed Mater Res B Appl Biomater. 2018 Jul;106(5):1918-1933. doi: 10.1002/jbm.b.34002. Epub 2017 Sep 27.

A preliminary in vitro evaluation of the bioactive potential of cryogel scaffolds incorporated with Manuka honey for the treatment of chronic bone infections.

Hixon KR[1], Lu T[1], Carletta MN[1], McBride-Gagyi SH[2], Janowiak BE[3], Sell SA[1].

Author information

Abstract

Previous studies have identified honey as an agent in bacterial inhibition and a mediator in lowering the pH at the wound site. Manuka honey (MH), indigenous to New Zealand, contains a Unique Manuka Factor that provides an additional antibacterial agent. While there are many potential benefits to incorporating MH into wounds, there is currently no ideal way to deliver the material to the site of injury. Cryogels are a type of scaffold that possess high porosity, mechanical stability, and a sponge-like consistency. This study uniquely incorporates varying amounts of MH into cryogel scaffolds, utilizing its properties in a sustained release fashion to assist in the overall healing process, while using the cryogel structure as a tissue template. All cryogels were evaluated to determine the effects of MH on porosity, swelling potential, mechanical durability, and cell compatibility. The release of MH was also quantified to evaluate bacterial clearance potential, and the scaffolds were mineralized to replicate native bone. It was determined that a 5% MH silk fibroin cryogel has the potential to inhibit bacterial growth while still maintaining adequate porosity, mechanical properties, and cell infiltration. Such a scaffold would have use in a number of applications, including bone regeneration.

KEYWORDS: Manuka honey; bactericidal; cryogels; scaffolds; tissue engineering

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Trends Biotechnol. 2002 Jan;20(1):3-4.

Honey I've shrunk biomedical technology!

Berry S[1].

Author information

1 Trends in Biotechnology, Elsevier Science London, 84 Theobald's Road, London, UK WC1X 8RR. suzanne.berry@eslo.co.uk

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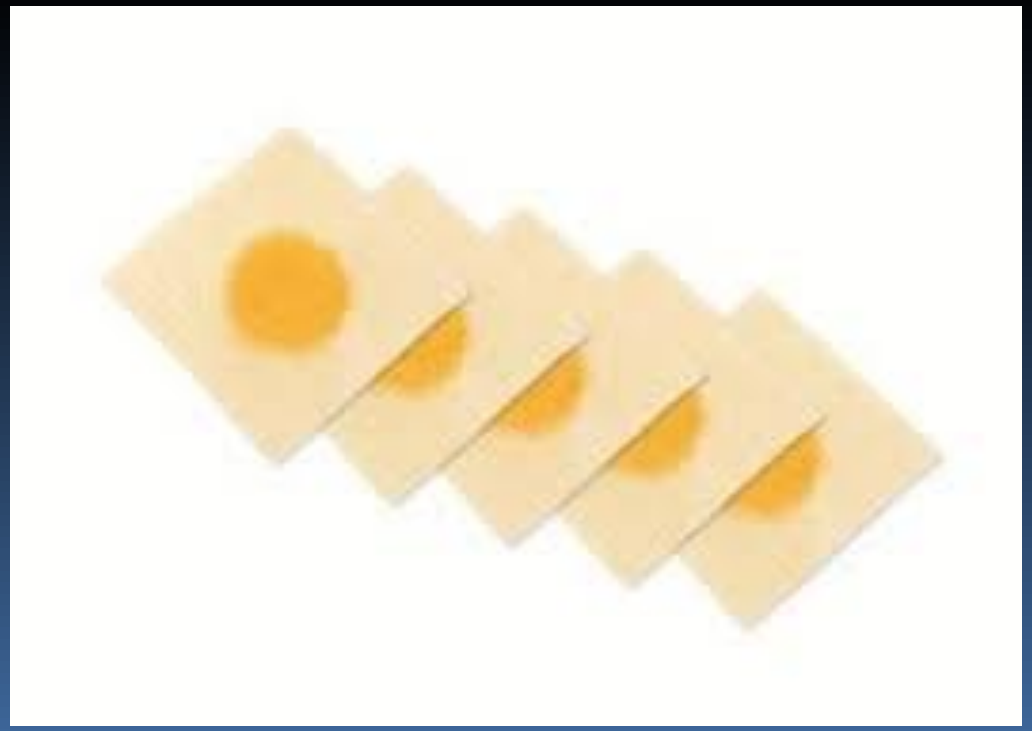
CALIFORNIA HONEY RUSH 2018

Collagen + Honey



Calcium Alginate + Honey

Ulcera da trauma
con ematoma in pz deambulante in TP con coumadin
Uomo 85 aa

Collagen + Honey

Ulcera Linfatica in pz obeso >30 BMI

Uomo 60 aa

Scarsamente

Deambulante

Fumatore

Calcium Alginate

+

Honey

…giocano (e soprattutto **giocheranno**) un ruolo fondamentale nello **sviluppo della medicina personalizzata**: l'approccio al trattamento personalizzato prevede l'utilizzo di strumenti di analisi e test di diagnostica molecolare, con l'obiettivo di prescrivere i farmaci **“su misura”**, più adatti, efficaci e mirati, il più possibile incentrati sulle esigenze dei singoli pazienti…

…nella messa a punto di **prodotti sempre più mirati** ed efficaci, la convergenza tra **nanotecnologia e biotecnologie** è un formidabile strumento a disposizione dei ricercatori nella diagnosi e nella terapia di un gran numero di patologie, nella **realizzazione di mezzi per il rilascio controllato di farmaci** e nel campo dei biomateriali con svariate applicazioni nelle scienze della vita e **nell’ingegnerizzazione dei tessuti** connettivi del corpo umano, fino alla realizzazione di organi vitali…

Apicoltore egizio che preleva miele. Dipinto proveniente dalla tomba di Pabusa a Luxor (600 a. C.).

medicazione popolare nell'antico Egitto, basato sulla traduzione del papiro di Ebers (1550 A.C.)

147 modi per applicare il miele al corpo.

trattamento di ustioni, piaghe e per accelerare la guarigione da alcuni interventi chirurgici, tra cui la circoncisione

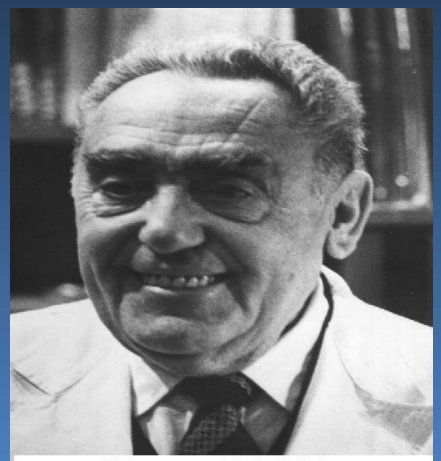
TRAITEMENT LOCAL DES PLAIES PAR LA BAGASSE (*)

Par L. LÉGER (**), J. MARCHAL, B. DELAITRE (Paris),
S. FASSLER (Bogota) et R. KARLIN (***) (Lyon)

Depuis plus d'un an, nous utilisons dans le service la bagasse pour le traitement local des plaies ulcériformes.

Employée empiriquement dans les régions productrices de canne à sucre, pour soigner les plaies des animaux, c'est vers 1925 que son usage en médecine humaine devient courant. Ce traitement est particulièrement répandu en Colombie où la bagasse est utilisée en pratique hospitalière dans les plaies de guerre et les ostéomyélites.

Leger L. 1974



Glauco BASSI

Bagasse

La pressatura della canna da zucchero produce da una parte un liq.spesso e sciropposo chiamato masquado e d'altra parte la bagasse, che è un residuo legnoso. Quello che viene utilizz.dagli AA.non è la bagasse, ma la masquado (che poi, per raffinaz.,dà lo zucchero). Viene usata per polverizzaz.abbond.sulle U., 1 x x di, dopo pulizia con Dakin o siero fisiol. Poi l'U.viene ricoperta da un bendaggio secco ecc. Sembra che essa abbia un potere detergente, dovuto in parte a forma. di alcool per fermentaz.del saccarosio (ma l'applicaz.di zucchero raffin.dà risult. assai meno buoni), dall'altra parte dalla presenza di germi (bac.subtilis)e di qualche fungo tipo penicillio che probabilm.ha az.disinfett. Avrebbe inoltre una az.cicatrizz., forse legata alla sua notevole quant.di vit.(sp.B6). La bagasse fu sperim.su 20 casi, in parte arter.in parte venosi. I risult.furono buoni in 16. (L.LECER e coll.,Phlébol.,1974, 27, 123; LD; TP).

Bassi G. 1982

Dott. Mirko Tessari, PhD

Dottore di Ricerca in Malattie Vascolari (Med/22)

Tecnico di Flebologia