

Therapeutic properties of honey

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ABSTRACT

Honey has been successfully used in medicine since antiquity. However, with the advent of modern medicine it has been less used, especially in the English-speaking world. Its beneficial effects in different disorders, rediscovered in recent decades, will be discussed below on the basis of a series of international scientific studies conducted to investigate the therapeutic properties of this natural product and published on Medline. It should be noted, however, that the therapeutic use of honey in everyday clinical practice needs to be validated by relevant guidelines and should only be adopted under medical prescription, in accordance with criteria of efficacy and safety for both patients and healthcare providers.

Keywords: Antibacterial; Oncology; Wounds; Immunostimulation

1. INTERNATIONAL SCIENTIFIC EVIDENCE OF THE USE OF HONEY IN MEDICINE

In ancient times, soldiers with very serious wounds and burns were treated with a mixture of honey and curdled milk applied on the injuries with a cotton bandage. A similar mixture was used in different cultures throughout history, including the Romans, many African tribes, native Americans, and rural populations in the South of the United States [1]. Used as a local treatment, honey is very useful as a healing agent and, compared to pharmaceutical products, has the advantage of being inexpensive – not a minor detail in our days, when medicine is expected to be not only effective and efficient, but also low-cost. In the treatment of dressed or infected wounds, honey is often more effective than pharmaceutical preparations, and more easily available [2,3]. Imbibed gauze is used

to apply it onto the injuries: this confirms something that has been known for centuries, i.e. that honey has a recognized antibacterial activity. Its use in surgery is strongly recommended, also for the topical treatment of postoperative wounds, such as Cesarean sections [4]. The use of alginate honey on ulcers is increasingly becoming a widely used, easy to apply healing agent. Similar results are also demonstrated in the treatment of burns [5]. In particular, the topical use of concentrated raw honey has been proved to promote faster eradication of pathogenic bacteria, reduce the length of antibiotic treatment and hospitalization, and prevent wound dehiscence and eschar formation. The only factor which may limit these effects is inadequate sterility of the preparations, in which case this type of treatment may be highly counterproductive.

In addition to antibacterial properties, scientific evidence supports anti-inflammatory and immunostimulating activity of honey [6-11]. Certain types of honey, obtained from particular flowers found in Australia and New Zealand (*leptospermum* spp) have strong anti-inflammatory properties and have been approved for sale as therapeutic honey (Medihoney and Manuka honey) and used for the treatment of numerous types of skin lesions [12,13,15]. A mixture of honey, olive oil and bee wax is an effective treatment for hemorrhoids and anal fistulas [14]. No side effects are reported. The frequent use of honey-based preparations to be applied on catheters in dialyzed patients is a satisfactory alternative to chemoprophylaxis for patients with central venous catheters [15]. Again, the prerequisite is perfect sterility and, as in other cases, the use of honey for this application must be validated by official medical guidelines.

In oncology, honey has been used as a barrier against the implantation of tumors in laparoscopic oncological surgical procedures. In the same field, the intake of honey reduces chemotherapy-related neutropenia fever by alleviating pancytopenia, of which chemotherapy fever is a symptom. A study by the university of Bonn showed that the use of special honey-based preparations may provide protection

Honey Nutritional Chart (Source: Inran).

Edible part (%)	100
Water (g)	18
Proteins (g)	0.6
Lipids (g)	0
Carbohydrates (g)	80.3
Starch (g)	0
Soluble sugars (g)	80.3
Total fiber	0
Energy (kcal)	304
Energy (kJ)	1270
Sodium	11
Potassium	51
Iron	0.5
Calcium	5
Phosphorous	6
Thiamin	tr.
Riboflavin	0.04
Niacin	0.30
Vitamin A (ret.eq.)	0
Vitamin C	1
Vitamin E	0

International scientific evidence of the use of honey in medicine

from hospital infections in immuno-depressed children with blood cancer. In a Russian study, the use of a food product (Honey Laminolact), containing milk ferments, amino acids, fruit pectines and of course honey, proved effective in protecting the gastrointestinal tract from radiotherapy in women with uterus cancer [18].

In clinical trials, the anti-cancer properties of honey have been tested in rats. Honey proved to be moderately effective against tumors and significantly effective against metastatic growths. It also enhanced the anti-cancer activity of 5-fluorouracile and cyclo-phosphamide [16].

Honey also helps treat cough and breathing difficulties in children with upper respiratory tract infections [19]. Other studies have confirmed its antibacterial activity, including an Australian study where the use of 13 types of honey had antibacterial effects against the growth of *Escherichia coli* and *Pseudomonas aeruginosa* colonies [6,7,10]. These antibacterial properties were similar in both farm-made and industrial products, as long as the concentration of pure honey was 2.5% or higher. According to studies conducted in the Arab Emirates, honey added to bacteria cultures, especially in the case of anaerobic bac-

teria, reduces their growth with dose-dependant efficacy. [8]

Honey is also recommended in dental hygiene. The use of honey chewing-gum three times a day after meals significantly reduces plaque and the risk of gingivitis. It also has therapeutic properties in the treatment of gingivitis and periodontal disorders. [13] In a study on 10 cases of dental infections, the local use of natural honey in dental abscesses and chronic osteomyelitis proved to have antibacterial effects [20]. In dermatology, the use of mixtures containing honey, olive oil and bee wax is very helpful in the treatment of dermatitis and psoriasis vulgaris, as well as seborrheic dermatitis and dandruff (provided the treatment is applied every day for at least four weeks), by combining antibacterial activity with antifungal and antioxidant effects. So far we have examined the therapeutic properties of honey for topical use; however, honey taken orally also has medicinal properties as demonstrated by other important studies. In particular, propolis, a product of honey, seems to have positive effects on intestinal giardiasis, a parasitosis which affects mostly children [22]. In some studies on rats, the intake of honey was effective against the onset of colitis [23]. As no relevant studies on humans have yet been conducted, the use of honey to treat these disorders requires further investigation. For the moment, we may assume that honey plays an important role in preventing inflammatory tissues from producing free radicals [23]. As regards the gastrointestinal tract, the intake of honey helps treat *Helicobacter pylori* infections, particularly difficult to eradicate, by fighting the bacteria's tendency to develop resistance to antibiotics [24], which is the primary cause of treatment failure. Honey is a traditional treatment for dyspepsia, highly recommended by physicians based on professional experience, although no scientific evidence exists to support its efficacy. It has been discovered, however, that *Helicobacter pylori* is probably the agent that causes dyspepsia: this suggested that the therapeutic action of honey at the systemic level may be attributable to antibacterial properties [25]. A comparison between the effects of glucose and honey in increasing the blood sugar levels of patients with diabetes mellitus has demonstrated that honey causes less hyperglycemia than sugar [26]. Therefore, in diabetic patients, honey is indicated as a good substitute for sugar, with the additional benefit of a lower glycemic value.

REFERENCES

- [1] Ahmed, A.K., Hoekstra, M.J., Hage, J.J. and Karim, R.B. (2003) Honey-medicated dressing: transformation of an ancient remedy into modern therapy. *Ann Plast Surg.*, **50**(2), 143-7, 147-8.

- [2] Lusby, P.E., Coombes, A., Wilkinson, J.M. (2002) Honey: a potent agent for wound healing? *J Wound Ostomy Continence Nurs.*, **29(6)**, 295-300.
- [3] Cooper, R.A., Halas, E. and Molan, P.C. (2002) The efficacy of honey in inhibiting strains of *Pseudomonas aeruginosa* from infected burns. *J Burn Care Rehabil.*, **23(6)**, 366-70.
- [4] Al-Waili, N.S. and Saloom, K.Y. (1999) Effects of topical honey on post-operative wound infections due to gram positive and gram negative bacteria following caesarean sections and hysterectomies. *Eur J Med Res.*, **4(3)**, 126-30.
- [5] Subrahmanyam, M., A prospective randomised clinical and histological study of superficial burn wound healing with honey and silver sulfadiazine., **24(2)**, 157-61.
- [6] Mullai, V. and Menon, T. (2007) Bactericidal activity of different types of honey against clinical and environmental isolates of *Pseudomonas aeruginosa*. *J Altern Complement Med.*, **13(4)**, 439-41.
- [7] Estrada, H., Gamboa Mdel, M., Arias, M.L. and Chaves, C. (2005) Evaluation of the antimicrobial action of honey against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Salmonella enteritidis*, *Listeria monocytogenes* and *Aspergillus niger*. Evaluation of its microbiological charge. *Arch Latinoam Nutr.*, **55(2)**, 167-71.
- [8] Al-Waili, N.S., Akmal, M., Al-Waili, F.S., Saloom, K.Y. and Ali, A. (2005) The antimicrobial potential of honey from United Arab Emirates on some microbial isolates. *Med Sci Monit.*, **11(12)**, 433-8.
- [9] Lusby, P.E., Coombes, A.L. and Wilkinson J.M. (2005) Bactericidal activity of different honeys against pathogenic bacteria. *Arch Med Res.*, **36(5)**, 464-7.
- [10] Wilkinson, J.M. and Cavanagh, H.M. (2005) Anti-bacterial activity of 13 honeys against *Escherichia coli* and *Pseudomonas aeruginosa*. *J Med Food*, **8(1)**, 100-3.
- [11] Elbagoury, E.F. and Rasmy, S. (1993) Antibacterial action of natural honey on anaerobic bacteroides. *Egypt Dent J.*, **39(1)**, 381-6.
- [12] Simon, A., Sofka, K., Wiszniewsky, G., Blaser, G., Bode, U. and Fleischhack, G. (2006) Wound care with antibacterial honey (Medihoney) in pediatric hematology oncology. *Support Care Cancer*, **14(1)**, 91-7.
- [13] English, H.K., Pack, A.R. and Molan, P.C. (2004) The effects of manuka honey on plaque and gingivitis: a pilot study. *J Int Acad Periodontol.*, **6(2)**, 63-7.
- [14] Al-Waili, N.S., Saloom, K.S., Al-Waili, T.N. and Al-Waili, A.N. (2006) The safety and efficacy of a mixture of honey, olive oil, and beeswax for the management of hemorrhoids and anal fissure: a pilot study. *Scientific World Journal.*, **6**, 1998-2005.
- [15] Johnson, D.W., van Eps, C., Mudge, D.W., Wiggins, K.J., Armstrong, K., Hawley, C.M., Campbell, S.B., Isbel, N.M., Nimmo, G.R. and Gibbs, H. (2005) Randomized, controlled trial of topical exit-site application of honey (Medihoney) versus mupirocin for the prevention of catheter-associated infections in hemodialysis patients. *J Am Soc Nephrol.*, **16(5)**, 1456-62.
- [16] Gribel', N.V. and Pashinskiĭ, V.G. (1990) The antitumor properties of honey. *Vopr Onkol.*, **36(6)**, 704-9.
- [17] Zidan, J., Shetver, L., Gershuny, A., bzah, A., Tamam, S., Stein M. and Friedman, E. (2006) Prevention of chemotherapy-induced neutropenia by special honey intake. *Med Oncol.*, **23(4)**, 549-52.
- [18] Smirnova, I.I., Filatova, E.I., Suvorov, A.N. and Bylinskaia, E.N. (2000) The use of therapeutic/prophylactic dragee "honey laminolact" in radiotherapy of uterine tumors. *Vopr Onkol.*, **46(6)**, 748-50.
- [19] Paul, I.M., Beiler, J.A., McMonagle, M., Shaffer, L., Duda, L. and Berlin, C.M. (2007), Effect of honey, dextromethorphan, and no treatment on nocturnal cough and sleep quality for coughing children and their parents. *JrArch Pediatr Adolesc Med.*, **161(12)**, 1140-6.
- [20] Okeniyi, J.A., Olubanjo, O.O., Ogunlesi, T.A. and Oyelami, O.A. (2005) Comparison of healing of incised abscess wounds with honey and EUSOL dressing. *J Altern Complement Med.*, Jun, **11(3)**, 511-3.
- [21] Al-Waili, N.S. (2001) Therapeutic and prophylactic effects of crude honey on chronic seborrheic dermatitis and dandruff. *Eur J Med Res.*, **6(7)**, 306-8.
- [22] Abdel-Fattah, N.S. and Nada, O.H. (2007) Effect of propolis versus metronidazole and their combined use in treatment of acute experimental giardiasis. *J. Egypt Soc Parasitol*, 691-710.
- [23] Bilsel, Y., Bugra, D., Yamaner, S., Bulut, T., Cevikbas U. and Turkoglu. U. (2002) Could honey have a place in colitis therapy? Effects of honey, prednisolone, and disulfiram on inflammation, nitric oxide, and free radical formation. *PMIDig Surg.*, **19(4)**, 306-11, discussion 311-2.
- [24] Drouin, E. (1999) *Helicobacter pylori*: novel therapies. *Can J Gastroenterol.*, **13(7)**, 581-3.
- [25] Somal, A.N., Coley, K.E., Molan, P.C. and Hancock, B.M. (1994). Susceptibility of *helicobacter pylori* to the antibacterial activity of manuka honey. *J R Soc Med.*, **87(1)**, 9-12.
- [26] Samanta, A., Burden, A.C. and Jones, G.R. (1985) Plasma glucose responses to glucose, sucrose, and honey in patients with diabetes mellitus: an analysis of glycaemic and peak incremental indices. *Diabet Med.*, **2(5)**, 371-3.