

Natural Honey: It's Past and Future in Medicine

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Received: September 27, 2019; **Published:** October 17, 2019

Abstract

Natural honey has been the most valued and appreciated product in treatment of various diseases since ancient time. It has been widely used and accepted for its traditional effects. It has been widely used as a sweetener and flavouring agent since ages. It has nutritional, therapeutic and cosmetic benefits.

Keywords: *Natural Honey; Medicine*

Honey does not need to be refrigerated, as it does not spoil on room temperature when kept in dry place [1,2].

Natural honey is mainly composed of glucose and fructose in different composition, depending on the source of plants on which the bee feeds. Almost all-natural honey contains flavonoids, phenolic acids, reduced glutathione, and peptides. These compounds work synergistically to enhance the antioxidant properties of natural honey [3-6].

Most remarkable property of honey is its antibacterial, anti-inflammatory and anti-oxidant properties. Presence of these properties has made honey to be used as a medicinal product since ancient times [7].

Contemporary uses of natural honey

Natural honey has been used in olden days for various diseases. It has been mentioned in various ancient books for its beneficial effects. According to Ayurvedic texts, honey has been a beneficial in patients suffering from constipation. It also has advantages in treating chronic cough. It helps in keeping the teeth and gums healthy, acts as a hypnotic, decreases the incident of cardiac disorders and palpitation. Experts have recommended use of honey for various skin disorders [3].

Ancient Egyptians used honey mostly for its antibacterial properties that helped heal wounds [3].

Hippocrates prescribed a honey based diet, given as oxymel for pain, hydromel for thirst and a mixture of honey and water for acute fever. He also showed uses of honey in treating conditions like constipation, hair-fall, family planning, wound healing, eye infections, surface antiseptics, prevention and treatment of scars [8].

According to Islamic belief, honey has been mentioned in the Holy Qur'an as a healthy drink with potential therapeutic value [3].

Honey in modern medicine

In order for honey to be used in modern practise, it must be consistent with uniform activity. Some of its essential activities are discussed here in brief.

Antimicrobial activity

Approximately 60 species of aerobes, including gram positive and gram negatives, and anaerobes have shown to be sensitive to the inhibitory effect of honey [9].

Due to its both bactericidal as well as bacteriostatic action, honey has reported to not lead to development antibiotic resistance amongst bacteria, as seen with other day to day antibiotics [10,11].

Possible mechanisms of antimicrobial action of honey are: Osmotic action (Dehydrates the bacteria), Acidic medium (pH of 3.2 to 4.5, inhibits bacterial growth, Peroxide action (H_2O_2 produced by glucose oxidase serves as the most important action, Phytochemical actions and low protein content [10,12,13]. Due to these chemical and physical properties, honey is used as an antimicrobial as well as wound dressing agent.

It has unique properties of rapid clearance of microbes, effective debridement of slough, prompt inflammation suppression, decreases scarring and enhances angiogenesis as well as granulation formation [3,14].

Antioxidant property

Free radicals formed by oxidative reactions, harms cells, tissues and ultimately the physiological function. Antioxidants such as Vitamin C suppress free radicals to protect the body from the harmful by-products [7].

The antioxidant property of honey is due to the presence of total phenolic which varies according to the source of honey [7]. Routine use of antioxidants in diet helps to improve health.

Honey contains the right amount of antioxidants, which are responsible for defence, enhance RBCs functions and various biological activity [7].

Due to its antioxidant activity, along with anti-ischemic and vasorelaxant, it has beneficial effect on cardiovascular system. It reduces coronary heart disorders by: a) improving coronary vasodilatation; b) reducing the clotting ability of platelets and c) inhibiting LDL from oxidising [15].

Anti-apoptotic

Cancer cells are described by inappropriate apoptotic turnover and uninhibited cellular proliferation [15]. Natural honey enhances apoptosis in neoplastic cells by mitochondrial membrane depolarisation. Honey due to its phenolic components, stimulates caspase 3 activation and poly (ADP-ribose) polymerase (PARP) cleavage in colon cancer cell lineage [16].

Honey up-regulates the expression of p53, proapoptotic protein Bax and caspase 3 and reduces the expression of anti-apoptotic protein Bcl2 [16].

As many anti-cancer agents used currently are apoptosis inducer agents, these unique properties of honey makes it a possible substance as a chemotherapeutic agent [16].

Natural honey has been shown to inhibit cell proliferation, modify immune responses, enhance apoptosis and cause depolarisation of mitochondrial membrane in various malignancies [16].

Wound healing

Most effective use of honey is found in wound healing. It has a profound cleansing action on slough present in wound, accentuates tissue regeneration and decreases inflammation. Pads impregnated with honey are used as non-adhesive tissue dressing [3,11,17,18].

Honey stimulates leukocytes to release cytokines, which is initial step in tissue repair pathway [15]. Its antibacterial property, high osmotic property helps to maintain a moist wound condition and its high density helps to provide a protective barrier to prevent wound infection and tumour implantation [3,19].

On burns, it has a comforting effect initially and later accentuates the healing process. Dressings done with pads impregnated with honey enhances the wound healing, attenuates pain and sterilises wounds [3].

Amongst the adverse effect of use of honey in wounds is the slight risk of wound botulism, which is due to presence of *Clostridia* spores, which can be reduced by subjecting honey to gamma radiation during packaging, which has negligible effect on the antibacterial properties of honey, but has a sporicidal effect on *Clostridia* spores [11,20].

Fertility

Honey has found to be rich in various nutrients, especially Vitamin B, which is a vital substance in testosterone production. It also improves the egg quality and hence enhancing the fertility and fecundity. Due to its these properties it was essential used by Egyptians during conception [7].

Conclusion

Natural honey has been a successful remedy for various diseases since ages. Its uses in modern medicine is due to its various properties like antibacterial, wound healing, anti-apoptotic etc. But even with various significant properties its use in modern medicine is not significant, mainly due to lack of any significant research studies and controlled trials based on honey. Hence, use of honey at present can only be in a supplementary way, further research is required for honey to be accepted in modern medicine.

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Volume 2 Issue 8 November 2019

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