

Senior Project

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Health Benefits of Honey

For centuries, honey has been a significant contributor to traditional medicine, widely used for its remedial qualities. Honey is not only effective as a sweetener, but has been indicated to improve health as well. The benefits of honey have been recorded by ancient Egyptians, Assyrians, Chinese, Greeks, and Romans, who used it to treat wounds and intestine-related diseases (Eteraf-Oskouei & Najafi, 2013). Additionally, honey's medicinal potency has been inscribed in religious scriptures. Current research explores honey's potential medicinal value, and recent findings suggest its remedial qualities, as well as the effects of honey's production and composition on its medicinal effectiveness.

Honey production begins with the gathering of nectar from a wide variety of flowers. Bees search for nectar rich in sugar and return to their hives once an ample amount has been accumulated. They then proceed to repeatedly consume and regurgitate the nectar until a percentage of it has been digested. After the nectar has reached its "desired quality", it is stored in an uncapped honeycomb to dry (Ediriweera & Premarathna, 2012, Formation of Bee's Honey section, para. 1). To further prevent this raw honey from fermenting (or spoiling) due to its water and yeast content, bees fan honeycombs with their wings, and seal them with wax once dried (Ediriweera & Premarathna, 2012). In addition, bees use propolis, otherwise known as "bee glue" ("Bee Propolis", 2011, "What is Bee Propolis?" section, para. 1) to preserve honey's quality and nutritional value by filling in any gaps not covered by the wax. This serves as a barrier, protecting the honey from any bacterial contamination. To produce this "glue",

specialized bees gather sap from coniferous trees and store it in their abdomens, incorporating it with wax. Once honeybees have completed their jobs, beekeepers take charge.

It is a beekeeper's duty to regularly examine a beehive's condition, check food stores, search for signs of pests or disease, and perform several hive-maintenance tasks. Part of their job entails replacing the queen bee biannually or at the first signs of infertility. Furthermore, it is important that beehives are inspected regularly throughout the year (Webster, 2005). Beekeepers also monitor and ensure that there are no mites or diseases in the beehive, and manage them if they happen to find any ("Ontario Treatment Recommendations for Honey Bee Disease and Mite Control", 2014). These inspections are essential in maintaining a manmade hive's functions, and the process of managing honey's freshness continues during its distribution.

Once honey has been distributed, it must be properly stored so as not to result in fermentation ("Honey Facts and Nutrition", n.d.). Honey that is properly produced and stored should not ferment ("Honey: A Reference Guide", n.d.). Moreover, raw honey, as removed from the hive by a beekeeper, has a long shelf life and will not ferment if properly sealed (Ediriweera & Premarathna, 2012). To further ensure its freshness, the U. S. Department of Agriculture (USDA) has set standards for honey based on water content, flavor, aroma, and absence of defects ("Honey: A Reference Guide", n.d.).

Honey's floral origination contributes not only to its variety of colors and flavors, but also the amount of antioxidants in each type of honey. There are over 300 floral sources of honey in the United States, including: clover, alfalfa, buckwheat, and orange blossom. According to the U.S. Department of Agriculture, honey is categorized into seven types: water white, extra white, white, extra light amber, light amber, amber, and dark amber ("Honey: A Reference Guide",

n.d.). Generally, darker honeys have been shown to have higher antioxidant content than lighter colored honeys (Gheldof, Wang, & Engeseth, 2002). For example, the darker manuka honey is known for its more effective antibacterial activity and remedial composition (McCallum, 2015). Nicki Engeseth, PhD, assistant professor of food chemistry at the University of Illinois, illustrates the theory suggesting that the varying hues of honey correlate with its antioxidant content. "Buckwheat is the highest of the honeys tested," she says, "with about three times as many antioxidants as acacia honey, which is much lighter in color" (Harrar, 2011, para. 3).

Antioxidants aid in protecting cells from free radicals, which are damaged cells that can be dangerous (Davis, 2006). Heidrun Gross and other researchers at the University of California-Davis explain that antioxidants protect the body from diseases by slowing their development ("Honey Sweetens Your Health", 2004). Thus, the antioxidants present in honey strengthen the body by fighting against diseases. Honey that is rich in antioxidants also contains high concentrations of polyphenols, which are believed to "reduce the risk of heart disease and cancer" ("Honey Sweetens Your Health", 2004, para. 3).

Another factor that contributes to honey's antioxidant content is its chemical composition. Honey is a solution mostly composed of water and simple sugars, such as dextrose and levulose. The varying percentages of its sugars contribute to honey's unique characteristics, such as being easily digestible. Honey also contains a small percentage of Vitamins A, B, and C, which play a role as antioxidants (White et al., 1962). In addition to honey's sugars and vitamins, the amounts of pigments, acids, and minerals contribute to its medicinal properties as well (White & Doner, 1980). For example, the components hydrogen peroxide, methylglyoxal, and gluconic acid are chief contributors to its antibacterial quality (McCallum, 2015; "Manuka Honey", 2012).

Honey's effectiveness in killing bacteria on the skin was explored in a study performed by the University of Amsterdam in 2008, and in the *Clinical Infectious Diseases* journal, a leading journal in the field of infectious diseases. The researchers concluded that honey may even destroy drug-resistant bacteria ("Manuka Honey", 2012). The same year, a study in Northern Ireland was recorded in the *Complementary Therapies in Clinical Practice* journal. In this study, several types of honey were applied to drug-resistant bacteria, and throughout all trials, the bacteria were destroyed within 24 hours ("Manuka Honey", 2012). Additionally, The Journal of the Federation of American Societies for Experimental Biology (FASEB), one of the world's most cited biology journals, reported that scientists from the Academic Medical Center of the University of Amsterdam concluded in 2010 that the protein defensin-1 in honey is largely responsible for killing bacteria (Nordqvist, 2014).

Honey's antibacterial quality has been suggested to contribute to its detoxification qualities – cleansing the body both internally and externally. When consumed regularly, honey cleanses the liver and kidney. Honey also whitens teeth and maintains gum health (Al-Jauziyah, 1999). Acacia honey, for example, "promotes intestinal health, and reduces inflammation in the respiratory tract" (May, 2012, "The Many Varieties of Honey" section, para. 2). Additionally, honey also treats and cleanses the skin. Honey is a humectant, meaning that it "attracts and retains moisture" ("Nature's Skin Care", n.d., para. 2). This regulates the skin's pH and prevents bacterial infections (Burlando & Cornara, 2013). Honey has also been suggested to be effective in treating acne. While different factors cause acne, and while remedies are subjective, honey cleanses pores and prevents microbial growth. Its stickiness removes dust and dead skin from pores, while its antibacterial property protects the skin from further infection ("Honey Mask for Acne", n.d.)

In addition to honey's detoxification qualities, research indicates honey's effectiveness in wound treatment. An article published in the U.S. National Library of Medicine states, "In general, honey is also been mentioned to have deodorizing, debridement, anti-inflammatory and wound pain reducing properties..." (Vandamme, 2013, para. 1). Specifically, honey's small hydrogen peroxide content contributes to its antibacterial capacity. When honey is diluted, hydrogen peroxide is produced. Hydrogen peroxide is known for its antibacterial property; however, honey lessens its harmful effects. Honey prevents the development of free radicals created by hydrogen peroxide by deactivating free iron, a catalyst for its formation. Moreover, honey's antibacterial qualities promote autolytic debridement, a process by which the body removes dead tissue and secures healthy tissue, thus healing wounds. These qualities help this wound-healing process by stimulating its tissues. Research also suggests that these qualities help expedite the healing process of dormant wounds, and stimulate moist wound healing ("Health Benefits of Honey", n.d.). In addition, various studies have indicated that honey reduces wound inflammation (Molan, 2001). In World War I, Russian soldiers used honey to heal wounds and to prevent infections, and the Germans used honey to treat burns (Eteraf-Oskouei & Najafi, 2013). More recently, a study of 19 controlled trials with a total of 2554 participants suggests that honey may honey may heal acute wounds and "partial thickness burns" faster than other conventional dressings (Jull et al., 2008, "Main Results" section, para. 1).

Honey is also beneficial in that it is easily digestible. According to the USDA, "honey contains about 64 calories per tablespoon" ("Health Benefits of Honey", n.d.). Although honey contains about 50 more calories than sugar, it aids in digesting stored fat, especially when taken with warm water. Moreover, honey contains carbohydrates that can be easily converted into

glucose, which enters the bloodstream for further use (“Health Benefits of Honey”, n.d.; Kappico, Suzuki, & Hongu, 2012). Honey is easier for the body to digest primarily because nectar contains enzymes that break down sucrose, or table sugar, into the simple sugars glucose and fructose. Regular sugar, however, requires enzymes in the liver to perform that task (Kappico, Suzuki, & Hongu, 2012). Furthermore, the glucose in honey immediately provides the body with energy without going through the process of digestion (Fantar, n.d.).

Despite the growing attention and studies on honey by researchers and medical professionals, “reviews have been critical of the design of some of those studies,” as reported by Wounds International (Seckam & Cooper, 2013, para. 2). In addition, some professionals dismiss the integration of honey in modern medicine and argue against it (Molan, 1999). Regarding wound treatment, a review argued that there is insufficient clinical evidence to conclude honey’s effectiveness in this implementation. However, while it can be argued that there is not enough evidence to legitimize honey’s suggested benefits, it has been clinically recognized in recent years. The Australian Therapeutic Goods Administration, for instance, has accepted a honey product as a treatment for wounds. Even without mass clinical recognition, that does not mean that honey is not beneficial in any way. Rather, it has been proven in various studies and through individual feedback, and continues to be professionally researched today (Seckam & Cooper, 2013).

Modern research on the potential effectiveness of honey in medicine progresses by the day; however, Islam has already shed light on many of the questions posed by researchers. Honey has been considered miraculous in its healing properties 14 centuries ago in the Holy Qur’an and through the Prophet Muhammad (peace be upon him)’s teachings. For instance, in Chapter *An-Nahl*, or *The Bees*, Allah (SWT) says, “And your Lord revealed to the bee saying:

‘Make hives in the mountains and in the tress and in what they build, then eat of all the fruits and walk in the ways of your Lord submissively. There comes forth from within it a beverage of many colors, in which there is healing for mankind; surely there is a sign in this for a people who reflect’” (Qur’an 16:68-69). These verses correlate with modern science findings indicating the locations of beehives and the varying hues of honey. In another narration, the Prophet (peace be upon him) said, “Honey is a remedy for every illness, and the Qur’an is a remedy for all illnesses of the mind; therefore, I recommend to you both remedies: the Qur’an, and honey” (Saheeh Bukhari).

In another narration reported by Bukhari, a man approached the Prophet (peace be upon him) and told him that his brother suffered from a stomach disorder. The Prophet instructed him to treat his brother with honey. The man approached the Prophet a second time with negative results, and was instructed to treat his brother again. The man returned a third time and said, “I have done that [treated my brother with honey].” The Prophet replied, “You have spoken the truth, but your brother’s stomach has spoken a lie. Let him drink honey.” It was reported that the ill brother was eventually cured after consuming the honey another time (Saheeh Bukhari).

These Islamic proofs signify honey’s healing potency, and serve as important reminders that scientific proof isn’t entirely necessary in determining honey’s curative ability. It was clearly written in Islamic texts, and Allah knows what is best for His Creation. Thus, even without sufficient studies reporting the success of honey’s use, one can conclude that honey possesses beneficial qualities. One can also encourage others to try to implement it into their lives, and to use it as a substitution for antibiotics and chemical products when possible.

It is clear that honey provides us with benefits from nutrition to skin care; however, honey supply is not infinite. In recent years, the bee population has dwindled at alarming rates. Yale Environment 360 reports that beekeepers in the United States and Europe have reported “annual hive losses of 30 percent or higher, substantially more than is considered normal or sustainable” (Grossman, 2013, para. 2). In just the winter of 2013, U.S. beekeepers lost 40 to 50 percent or higher of their bee population. Neonicotinoids, the world’s most popular pesticide class, are largely to blame for this decline. In the U.S., neonicotinoids treat the vast majority of corn, canola, cotton, fruit, and vegetable crops, and are used on cereal grains, rice, and nuts. Considering this mass pesticide treatment of crop supply, pollinators, especially bees, suffer frightening decline rates (Grossman, 2013). Additionally, the USDA reports that since 2006, beekeepers have witnessed the dire consequences of Colony Collapse Disorder (CCD), a syndrome defined the rapid loss of bee colonies, with the exception of the queen bee and developing bees (“Honey Bee Health and Colony Collapse Disorder”, 2015). Experts have recognized the correlation between dying worker bees and the use of neonicotinoids, leading to the conclusion that they are to blame for CCD (vanEngelsdorp et al., 2009). In response to this crisis, the European Commission stated that it would ban neonicotinoids for two years (Grossman, 2013).

In an effort to combat this issue, initiatives such as: Avaaz, Save the Bees, Bee or Not to Bee, and Bring Back the Pollinators, to name a few, aim to reduce colony losses and raise awareness of the bee decline pandemic. To participate in this effort on an individual level, one can support these organizations, as well as raise pollinator-friendly plants and refrain from the use of insecticides. In the future, perhaps these efforts will save pollinators and retain the globe’s crop and honey supply.

In conclusion, honey's medicinal benefits stem from its unique chemical composition, as well as its floral sources and proper production. These are instrumental in determining certain types of honeys' medicinal potency. Through proper care of beehives and successful production and maintenance of honey, its organic nature and medicinal value is preserved. Moreover, modern research adds credence to the ancient claims of honey's curative characteristics and, in the future, honey may be implemented into advanced medicine. For now, bees must be protected and nurtured so that the world's honey supply is not depleted.

Works Cited

- Al-Jauziyah, I. (1999, November 1). Healing with the Medicine of the Prophet Hardcover – November 1, 1999. Retrieved January 30, 2015, from <http://www.amazon.com/Healing-Medicine-Prophet-Qayyim-Al-Jauziyah/dp/1591440432>
- Bee Propolis. (2011). Retrieved January 31, 2015, from <http://www.herbwisdom.com/herb-bee-propolis.html>
- Burlando, B., & Cornara, L. (2013, December). Honey in dermatology and skin care: A review. Retrieved February 1, 2015, from <http://www.ncbi.nlm.nih.gov/pubmed/24305429>
- Davis, J. (2006, April 22). How Antioxidants Work: Preventing Free Radical Damage and Oxidation. Retrieved February 1, 2015, from <http://www.webmd.com/food-recipes/features/how-antioxidants-work1>
- Ediriweera, E., & Premarathna, N. (2012, June 1). Medicinal and cosmetic uses of Bee's Honey – A review. Retrieved January 31, 2015, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3611628/> doi: 10.4103/0974-8520.105233
- Eteraf-Oskouei, T., & Najafi, M. (2013, June 1). Traditional and Modern Uses of Natural Honey in Human Diseases: A Review. Retrieved January 31, 2015, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758027/>

Fantar, S. (n.d.). Honey vs. Sugar Digestion. Retrieved January 31, 2015, from

<http://healthyeating.sfgate.com/honey-vs-sugar-digestion-9212.html>

Gheldof, N. & Engeseth, N.J. (2002). Honey: A reference guide to nature's sweetener. Retrieved

January 31, 2015, from <http://www.honey.com/images/downloads/refguide.pdf>

Harrar, S. (2011, November 1). Honeybees Guard Your Heart. Retrieved January 31, 2015, from

<http://www.prevention.com/food/food-remedies/heart-health-honey-antioxidants>

Health Benefits of Honey. (n.d.). Retrieved February 1, 2015, from

<https://www.organicfacts.net/health-benefits/health-benefits-of-honey.html>

Honey: A reference guide to nature's sweetener. (n.d.). Retrieved January 31, 2015, from

<http://www.honey.com/images/downloads/refguide.pdf>

Honey Bee Health and Colony Collapse Disorder. (2015, January 23). Retrieved February 1,

2015, from <http://www.ars.usda.gov/News/docs.htm?docid=15572>

Honey Facts & Nutrition. (n.d.). Retrieved January 31, 2015, from

<http://honey.glorybee.com/content/honey-facts-nutrition>

Honey Mask for Acne. (n.d.). Retrieved February 1, 2015, from

<https://www.organicfacts.net/home-remedies/honey-mask-for-acne.html>

Honey Sweetens Your Health. (2004, March 30). Retrieved February 1, 2015, from

<http://www.webmd.com/women/news/20040330/honey-health>

Jull, A., et al. (2008, October 8). Honey as a topical treatment for wounds. Retrieved February 1,

2015, from <http://www.ncbi.nlm.nih.gov/pubmed/18843679>

Kappico, J., Suzuki, A., & Hongu, N. (2012, September 1). Is Honey the Same as Sugar?

Retrieved January 31, 2015, from

<http://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1577.pdf>

Manuka Honey: Medicinal Uses, Benefits, and Side Effects. (2012, December 17). Retrieved

January 31, 2015, from <http://www.webmd.com/a-to-z-guides/manuka-honey-medicinal-uses>

May, L. (2012, April 7). The benefits of raw honey. Retrieved February 1, 2015, from

http://www.naturalnews.com/035493_raw_honey_health_benefits_antibacterial.html#

McCallum, K. (2015, January 28). Components of Natural Honey. Retrieved January 31, 2015,

from <http://www.livestrong.com/article/323065-components-of-natural-honey/>

Molan, P. (1999). Why honey is effective as a medicine. Retrieved February 1, 2015, from

<http://researchcommons.waikato.ac.nz/bitstream/handle/10289/2059/?sequence=1>

Molan, P. (2001). Honey as a topical antibacterial agent for treatment of infected wounds.

Retrieved February 1, 2015, from

<http://www.worldwidewounds.com/2001/november/Molan/honey-as-topical-agent.html>

Nature's Skin Care. (n.d.). Retrieved February 1, 2015, from [http://www.honey.com/honey-at-](http://www.honey.com/honey-at-home/honeys-natural-benefits/natures-skin-care/)

[home/honeys-natural-benefits/natures-skin-care/](http://www.honey.com/honey-at-home/honeys-natural-benefits/natures-skin-care/)

Nordqvist, J. (2014, September 26). What are the health benefits of honey? Retrieved January

31, 2015, from <http://www.medicalnewstoday.com/articles/264667.php>

Ontario Treatment Recommendations for Honey Bee Disease and Mite Control. (2014, April 1).

Retrieved January 31, 2015, from

<http://www.omafra.gov.on.ca/english/food/inspection/bees/2014-treatment.pdf>

Seckan, A., & Cooper, R. (2013, December 3). Understanding how honey impacts on wounds:

An update on recent research findings › Practice › March 4(1) › Wounds International.

Retrieved February 1, 2015, from <http://www.woundsinternational.com/practice-development/understanding-how-honey-impacts-on-wounds-an-update-on-recent-research-findings>

The Holy Qur'an. Mecca pp. 274

Vandamme, L., et al. (2013, December). Honey in modern wound care: A systematic review.

Retrieved February 1, 2015, from <http://www.ncbi.nlm.nih.gov/pubmed/23896128>

vanEngelsdorp, D., et al. (2009, August 3). Colony Collapse Disorder: A Descriptive Study.

Retrieved February 1, 2015, from

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0006481>

White, Jr., J. W., et al. (1962). Composition of American honeys. Retrieved January 31, 2015,

from <http://www.honey.com/images/downloads/refguide.pdf>

White, Jr., J., & Doner, L. (1980, October 1). Honey Composition and Properties. Retrieved

January 31, 2015, from <http://www.beesource.com/resources/usda/honey-composition-and-properties/>

