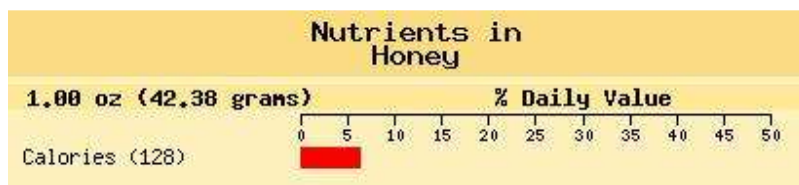


This wonderfully rich golden liquid is the miraculous product of honey bees and a naturally delicious alternative to white sugar. Although it is available throughout the year, it is an exceptional treat in the summer and fall when it has just been harvested and is at its freshest.

The fascinating process of making honey begins when the bees feast on flowers, collecting the flower nectar in their mouths. This nectar then mixes with special enzymes in the bees' saliva, an alchemical process that turns it into honey. The bees carry the honey back to the hive where they deposit it into the cells of the hive's walls. The fluttering of their wings provides the necessary ventilation to reduce the moisture's content making it ready for consumption.



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### Health Benefits

In addition to its reputation as Nature's nutritive sweetener, research also indicates that honey's unique composition makes it useful as an antimicrobial agent and antioxidant.

### Raw Honey - An Anti-Bacterial, Anti-Viral, Anti-Fungal Substance

The health benefits of honey - like all foods - depend on the quality of the honey. But in this case, the situation is even more extreme, because the pollen that collects on the bees' legs as they move from plant to plant is only as healthful and as diverse as those plants. In addition, the processing of honey often removes many of the phytonutrients found in raw honey as it exists in the hive. Raw honey, for example, contains small amounts of the same resins found in propolis. Propolis, sometimes called "bee glue," is actually a complex mixture of resins and other substances that honeybees use to seal the hive and make it safe from bacteria and other micro-organisms. Honeybees make propolis by combining plant resins with their own secretions. However, substances like road tar have also been found in propolis. Bee keepers sometimes use special screens around the inside of the hive

boxes to trap propolis, since bees will spread this substance around the honeycomb and seal cracks with the anti-bacterial, anti-viral, and anti-fungal resins. The resins found in propolis only represent a small part of the phytonutrients found in propolis and honey, however. Other phytonutrients found both in honey and propolis have been shown to possess cancer-preventing and anti-tumor properties. These substances include *caffeic acid methyl caffeate*, *phenylethyl caffeate*, and *phenylethyl dimethylcaffeate*. Researchers have discovered that these substances prevent colon cancer in animals by shutting down activity of two enzymes, *phosphatidylinositol-specific phospholipase C* and *lipoxxygenase*. When raw honey is extensively processed and heated, the benefits of these phytonutrients are largely eliminated.

### **Is the Cough from an Upper Respiratory Infection Keeping Your Child Awake? Try a Dose of Buckwheat Honey**

In a study involving 105 children aged 2-18 years with upper respiratory tract infections of 7 days or less and night-time coughing, a single night-time dose of buckwheat honey was an effective alternative treatment for symptomatic relief of nocturnal cough and sleep difficulty, compared to a single dose of dextromethorphan (DM).

Researchers from the Penn State College of Medicine asked parents to give either honey, honey-flavored dextromethorphan (DM), or no treatment to the children. The first night, the children did not receive any treatment. The following night they received a single dose of buckwheat honey, honey-flavored DM, or no treatment 30 minutes before bedtime. The trial was partially blind as parents could not distinguish between the honey and the medication, although those administering no medication were obviously aware of the fact. Parents were asked to report on cough frequency and severity, how bothersome the cough was, and how well both adult and child slept, both 24 hours before and during the night of the dosage.

Significant symptom improvements were seen in the honey-supplemented children, compared with the no treatment group and DM-treated group, with honey consistently scoring the best and no-treatment scoring the worst. Based on parental "symptom points," children treated with honey improved an average of 10.71 points compared with 8.39 points for DM-treated children and 6.41 points for those who were not treated.

These results might be good news for parents of children two years and older, since the Food and Drug Administration (FDA) recently recommended that children under six should not be given over-the-counter cough and cold medicines, due to potentially harmful side effects. However, it's important to note that this study did not attempt to test the potential benefits of buckwheat honey for children under two, and recommendations by the American Academy of Pediatrics (AAP) and other children's health organizations for a total avoidance of honey by children one year and younger still make good sense. (The AAP's major concern here is unnecessary risk of infantile botulism that might result from the presence of *Clostridium botulinum* bacteria in the honey).

### **An International Symposium Discusses Likely Benefits of Honey**

Speakers at the First International Symposium on Honey and Human Health, held in Sacramento, CA, January 8, 2008, presented a number of research papers.

(Fessenden R. Report to the Committee for the Promotion of Honey and Health)

Findings include:

- Different varieties of honey possess a large amount of friendly bacteria (6 species of lactobacilli and 4 species of bifidobacteria), which may explain many of the "mysterious therapeutic properties of honey."
- Lactobacilli, which deliver protective and beneficial benefits to bees as well as humans, were not found in the bees' honey stomach during the winter months when the bees under investigation were fed sucrose, indicating that certain bee-feeding practices may have dangerous and unwanted effects on bees.
- Honey may promote better blood sugar control. Proper fueling of the liver is central to optimal glucose metabolism during sleep and exercise. Honey is the ideal liver fuel because it contains a nearly 1:1 ratio of fructose to glucose. Fructose "unlocks" the enzyme from the liver cell's nucleus that is necessary for the incorporation of glucose into glycogen (the form in which sugar is stored in the liver and muscle cells). An adequate glycogen store in the liver is essential to supply the brain with fuel when we are sleeping and during prolonged exercise. When glycogen stores are insufficient, the brain triggers the release of stress hormones - adrenalin and cortisol - in order to convert muscle protein into glucose. Repeated metabolic stress from cortisol produced when less than optimal liver glycogen stores are available during sleep, leads over time, to impaired glucose metabolism, insulin resistance, diabetes, and increased risk for cardiovascular disease and obesity.
- Experimental evidence indicates that consumption of honey may improve blood sugar control and insulin sensitivity compared to other sweeteners. The body's tolerance to honey is significantly better than to sucrose or glucose alone. Individuals with greater glucose intolerance (e.g., those with mild diabetes and Type 1 diabetes) showed significantly better tolerance to honey than sucrose. In addition, the antioxidants in honey, which have been shown to reduce oxidative stress, frequently by a larger factor than can be explained by their actual amount, may be beneficial for diabetics and help to improve endothelial function (the function of the cells that make up the lining of our blood vessels) and vascular health.
- In a year-long animal study comparing the effects of sucrose, honey and a low glycemic index (GI) sugar-free diet, rats on the honey-based diet showed: reduced weight gain and percentage of body fat, decreased anxiety, better spatial recognition memory, improved HDL cholesterol (15-20% higher than rats fed sugar or sucrose diets), improved blood sugar levels (HA1c), and reduced oxidative damage.
- Honey has been shown to be a more effective cough suppressant for children ages 2-18 than dextromethorphan (see "One Study Finds Buckwheat Honey To Be a Successful Cough Medicine" earlier in this Health Benefits section)

- Honey boosts immunity. Research conducted in several hospitals in Israel found honey effective in decreasing the incidence of acute febrile neutropenia (when high fever reduces white blood cell count) in 64% of patients. Honey also reduced the need for Colony Stimulating Factor (a compound produced in the cells lining the blood vessels that stimulate bone marrow to produce more white blood cells) in 60% of patients with acute febrile neutropenia; increased neutrophil count (another type of white blood cell), decreased thrombocytopenia (low platelet count), and stabilized hemoglobin levels at >11 gm/dl (a bit low but way better than full blown anemic).
- 32% of the cancer patients involved in the above immunity research reported improved quality of life.

### First International Symposium on Honey and Human Health

Practical Tip: Look for honey produced in the summer by flower-fed bees-it's most likely to contain friendly lactobacilli and bifidobacteria.

#### **Improve Athletic Performance and Heal Wounds with Honey?**

Primarily honey has been used as an energy source, but recent research has examined the use of honey as an *ergogenic aid* (a food or ingredient that helps an athlete's performance) and wound healing agent, both of which were once considered merely age-old anecdotes.

In the time of the ancient Olympics, athletes were reported to eat special foods, such as honey and dried figs, to enhance their sports performance. Recently, however, one group of researchers has investigated the use of honey as an *ergogenic aid* in athletes. The study involved a group of 39 weight-trained athletes, both male and female. Subjects underwent an intensive weight-lifting workout and then immediately consumed a protein supplement blended with either sugar, maltodextrin or honey as the carbohydrate source. The honey group maintained optimal blood sugar levels throughout the two hours following the workout. In addition, muscle recuperation and glycogen restoration (carbohydrates stored in muscle) was favorable in those individuals consuming the honey-protein combination.

Sustaining favorable blood sugar concentrations after endurance training by ingesting carbohydrates before, during and after training is important for maintaining muscle *glycogen* stores (*glycogen* is the form in which sugar is stored in muscle as ready-to-use fuel), so that muscle recuperation is more efficient and the athlete is ready to perform again at their highest level the next day. The best-studied ergogenic aid is carbohydrates because they are necessary for maintaining muscle *glycogen* stores. For now, honey appears to be just another source of carbohydrates that can help athletes perform at their best, rather than a superior choice over any other carbohydrate.

The wound healing properties of honey may, however, be its most promising medicinal quality. Honey has been used topically as an antiseptic therapeutic agent

for the treatment of ulcers, burns and wounds for centuries. One study in India compared the wound healing effects of honey to a conventional treatment (silver sulfadiazene) in 104 first-degree burn patients. After one week of treatment, 91 percent of honey treated burns were infection free compared with only 7 percent receiving the conventional treatment. Finally, a greater percentage of patients' burns were healed more readily in the honey treated group. Another study examined the wound healing benefits of honey applied topically to patients following Caesarean section and hysterectomy. Compared to the group receiving the standard solution of iodine and alcohol, the honey treated group was infection free in fewer days, healed more cleanly and had a reduced hospital stay.

Several mechanisms have been proposed for the wound healing benefits that are observed when honey is applied topically. Because honey is composed mainly of glucose and fructose, two sugars that strongly attract water, honey absorbs water in the wound, drying it out so that the growth of bacteria and fungi is inhibited (these microorganisms thrive in a moist environment). Secondly, raw honey contains an enzyme called *glucose oxidase* that, when combined with water, produces hydrogen peroxide, a mild antiseptic.

In addition to the specific enzymes found in honey, which may help in the healing process, honey also contains antioxidants and flavonoids that may function as antibacterial agents. One antioxidant in particular, *pinocembrin*, which is unique to honey, is currently being studied for its antibacterial properties. One laboratory study of unpasteurized honey samples indicated the majority had antibacterial action against *Staphylococcus aureus*, a common bacteria found readily in our environment that can cause infections, especially in open wounds. Other reports indicate honey is effective at inhibiting *Escherichia coli* and *Candida albicans*. Darker honeys, specifically honey from buckwheat flowers, sage and tupelo, contain a greater amount of antioxidants than other honeys, and raw, unprocessed honey contains the widest variety of health-supportive substances.

#### **A Spoonful a Day Keeps Free Radicals at Bay**

Daily consumption of honey raises blood levels of protective antioxidant compounds in humans, according to research presented at the 227th meeting of the American Chemical Society in Anaheim, CA, March 28, 2004. Biochemist Heidrun Gross and colleagues from the University of California, Davis, gave 25 study participants each about four tablespoons buckwheat honey daily for 29 days in addition to their regular diets, and drew blood samples at given intervals following honey consumption. A direct link was found between the subjects' honey consumption and the level of polyphenolic antioxidants in their blood.

#### **Honey Helpful for Healthy Individuals and Those with High Cholesterol, Type 2 Diabetes**

In a series of experiments involving healthy subjects and those with either high cholesterol or type 2 diabetes, honey has proved itself the healthiest sweetener.

For 15 days, 8 healthy subjects, 6 patients with high cholesterol, 5 patients with high cholesterol and high C-reactive protein (a risk factor for cardiovascular disease), and 7 patients with type 2 diabetes were given solutions containing comparable amounts of sugar, artificial honey or natural honey.

In healthy subjects, while sugar and artificial honey had either negative or very small beneficial effects, natural honey reduced total cholesterol 7%, triglycerides 2%, C-reactive protein 7%, homocysteine 6% and blood sugar 6%, and increased HDL (good) cholesterol 2%. (Like C-reactive protein, homocysteine is a significant risk factor for cardiovascular disease.)

In patients with high cholesterol, artificial honey increased LDL (bad) cholesterol, while natural honey decreased total cholesterol 8%, LDL cholesterol 11%, and C-reactive protein 75%.

And in patients with type 2 diabetes, natural honey caused a significantly lower rise in blood sugar than either dextrose or sucrose (refined sugars). So, enjoy a little honey in your morning coffee, lunchtime yogurt or afternoon cup of green tea. Looks like a daily spoonful of honey may help your need for medicine go down.

Although our food ranking system did not qualify honey as a dense source of traditional nutrients, it did emerge as a source of vitamin B2, vitamin B6, iron and manganese.

### **Description**

Honey is a delicious viscous sweetener made naturally by bees for their own nourishment. The fascinating process of making honey begins when the bees feast on flowers, collecting the flower nectar in their mouths. This nectar then mixes with special enzymes in the bees' saliva, an alchemical process that turns it into honey. The bees carry the honey back to the hive, where they deposit it into the cells of the hive's walls. The fluttering of their wings provides the necessary ventilation to reduce the honey's moisture content, making it ready for consumption.

Honey comes in a range of colors including white, amber, red, brown and almost black. Its flavor and texture vary with the type of flower nectar from which it was made. While the most commonly available honeys are made from clover, alfalfa, heather and acacia flowers, honey can be made from a variety of different flowers, including thyme and lavender.

### **History**

Honey has been used since ancient times both as a food and as a medicine. Apiculture, the practice of beekeeping to produce honey, dates back to at least 700 BC. For many centuries, honey was regarded as sacred due to its wonderfully sweet properties as well as its rarity. It was used mainly in religious ceremonies to pay tribute to the gods, as well as to embalm the deceased. Honey was also used for a variety of medicinal and cosmetic purposes. For a long time in history, its use in

cooking was reserved only for the wealthy since it was so expensive that only they could afford it.

The prestige of honey continued for millennia until one fateful event in culinary and world history - the "discovery" of refined sugar made from sugar cane or sugar beets., Once these became more widely available, they were in great demand since they provided a relatively inexpensive form of sweetening. With their growing popularity, honey became displaced by sugar for culinary use. Since then, although honey is still used for sweetening, much of its use has become focused on its medicinal properties and its use in confectionary.

### **How to Select and Store**

Honey is sold in individual containers or in bulk. It is usually pasteurized, although oftentimes at farmer's markets you can find raw honey. Raw honey that has not been pasteurized, clarified, or filtered - provided it is of the highest organic quality - is your best choice. Look for honey that states "100% pure." While regular honey is translucent, creamy honey is usually opaque and is made by adding finely crystallized honey back into liquid honey. Specialty honeys, made from the nectar of different flowers, such as thyme and lavender, are also available. Remember that the darker the color, the deeper the flavor.

You might also look for darker-colored "honeydew" varieties produced by bees that collect the sugary secretions insects leave on plants, which is called honeydew.

While all honey has impressive levels of disease-fighting antioxidants, a recent study of Spanish honey varieties shows that honeydew honey has even higher levels of antioxidant polyphenols than honeys bees make from nectar. (Perez RA, *Journal of the Science of Food and Agriculture*)

Spanish researchers looked at 36 varieties of Spanish honey in two groups: clover honey, which bees make from the nectar of flower blossoms, and honeydew honey, made by bees from a sweet, sticky substance secreted by insects such as aphids that live off plants. Honeydew honey tends to be darker and more acidic than clover varieties. Although harder to find than clover honey in the U.S., honeydew honey produced in America should also provide higher levels of antioxidants, noted study co-author Rosa Anna Perez, a researcher with the Instituto Madrilen0 de Investigacion y Desarrollo Rural, Agrario y Alimentario in Madrid.

It is important to keep honey stored in an airtight container so that it doesn't absorb moisture from the air. Honey stored this way in a cool dry place will keep almost indefinitely. One reason for this is that its high sugar content and acidic pH help to inhibit microorganism growth. Honey that is kept at colder temperatures tends to thicken, while honey that is kept at higher temperatures has a tendency to darken and have an altered flavor.

### **How to Enjoy**

For some of our favorite recipes, click [Recipes](#).

#### **Tips for Cooking with Honey:**

If your honey has crystallized, placing the container in hot water for 15 minutes will help return it to its liquid state. Do not heat honey in the microwave as this alters its taste by increasing its hydroxymethylfurfural (HMF) content. To prevent honey from sticking to measuring cups and spoons, use honey that is in its liquid form.

Honey makes a good replacement for sugar in most recipes. Since honey is sweeter than sugar, you need to use less, one-half to three-quarters of a cup for each cup of sugar. For each cup of sugar replaced, you should also reduce the amount of liquid in the recipe by one-quarter of a cup. In addition, reduce the cooking temperature by 25°F since honey causes foods to brown more easily.

#### **A Few Quick Serving Ideas:**

Use honey in place of table sugar as a sweetener in your tea.

Drizzle apple slices with honey and sprinkle with cinnamon.

To enjoy sweetened yogurt without excess sugar, mix a little honey into plain yogurt.

A delicious sandwich that is enjoyed by kids of all ages is a combination of peanut (or almond) butter, with bananas and honey.

In a saucepan over low heat, combine soymilk, honey and unsweetened dark chocolate to make a deliciously nutritious chocolate "milk" drink.

#### **Safety**

Remember that the quality of honey is a function of the plants and environment from which pollen, saps, nectars and resins were gathered. Other substances found in the environment - including traces of heavy metals, pesticides, and antibiotics - have been shown to appear in honey. The amount varies greatly.

Do not feed honey-containing products or use honey as a flavoring for infants under one year of age; honey may contain *Clostridium botulinum* spores and toxins that can cause infant botulism, a life-threatening paralytic disease. Honey is safe for children older than 12 months and adults.

#### **Nutritional Profile**

##### **Introduction to Food Rating System Chart**

The following chart shows the nutrients for which this food is either an excellent, very good or good source. Next to the nutrient name you will find the following

information: the amount of the nutrient that is included in the noted serving of this food; the %Daily Value (DV) that that amount represents (similar to other information presented in the website, this DV is calculated for 25-50 year old healthy woman); the nutrient density rating; and, the food's World's Healthiest Foods Rating. Underneath the chart is a table that summarizes how the ratings were devised. Read detailed information on our [Food and Recipe Rating System](#).

<b>Honey</b> <b>1.00 oz</b> <b>42.38 grams</b> <b>128.82 calories</b>					
<b>Nutrient</b>	<b>Amount</b>	<b>DV (%)</b>	<b>Nutrient Density</b>	<b>World's Healthiest Foods Rating</b>	
<b>World's Healthiest Foods Rating</b>		<b>Rule</b>			
excellent	DV>=75%	OR	Density>=7.6	AND	DV>=10%
very good	DV>=50%	OR	Density>=3.4	AND	DV>=5%
good	DV>=25%	OR	Density>=1.5	AND	DV>=2.5%

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