

## All About Honey

How is honey made? Is it nutritious? Can it be substituted for sugar? Read further for the answers to these questions and many more details about one of nature's sweetest treasures.



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Honey Comb

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### Floral Nectar becomes Honey

- Plants pollinated by animals produce nectar from glands called floral nectaries.
- The amount of nectar produced by a flower depends on the type of flower, size & age of the flower, weather, time of day, amount of rainfall, and how often the flower is visited.
- Honey bees store nectar (simple sugars) as a carbohydrate source in beehives. They are able to convert unripe nectar into unripe honey by adding enzymes and reducing the water content.
- The rate at which water evaporates from unripe honey depends on the type of nectar, temperature, humidity, and the amount of fanning done by honey bees with their wings to draw out moisture.

- Honey is ripe when capped with a thin layer of wax by honey bees at about 18.6% moisture (approximately  $\frac{1}{5}$  water).
- Beekeepers rob beehives of ripe honey and extract it from the honeycomb for consumption.
- Honey products include cut comb, bottled raw honey, creamed honey, and mead (honey wine). Honey is also used in soaps, ointments, exfoliators, lotions, lip balms, and other numerous products.

### Honey Nutrition & Health

- Honey consists primarily of glucose and fructose (simple sugars that both are carbohydrates) and 17-18% water.
- Unlike some sweeteners, honey has trace vitamins and minerals including calcium, copper, iron, magnesium, manganese, niacin, pantothenic acid, phosphorus, potassium, riboflavin, and zinc.
- Flavonoids and phenolic acids found in honey act as antioxidants. Antioxidants scavenge and eliminate free radicals. The Journal of American Dietetic Association reports that honey provides more antioxidants than white sugar, corn syrup, or agave. Unfiltered raw honey is particularly rich in antioxidants as well as enzymes that aid digestion.
- Darker honeys tend to have higher quantities of antioxidants.
- Honey makes an effective antimicrobial agent for treating sore throats and other bacterial infections.

- Bee pollen is believed to reduce the symptoms of pollen-related allergies through inoculation.

### Why process honey and does it create a final product that is less nutritious?

- While there is no official U.S. federal definition of “raw” honey, it generally refers to honey that has not been heated or filtered. Often claims are made that raw honey is more nutritious or “healthier”. This is primarily because raw honey may contain small amounts of pollen grains that are often removed during processing or filtering.
- Honey is produced by honey bees from the nectar of plants, not pollen. Pollen occurs only incidentally in honey. The amount of pollen in honey is miniscule and insufficient enough to impact the nutrient value of honey.
- A 2012 study by the National Honey Board analyzed vitamins, minerals, and antioxidant levels in raw and processed honey. The study showed that processing significantly reduced the pollen content of the honey, but did not affect the nutrient content or antioxidant activity. This led researchers to conclude that the micronutrient profile of honey is not associated with its pollen content and is not affected by commercial processing. The 2012 study and abstract with statistical analysis were presented at the Federation of American Societies for Experimental Biology (FASEB) Conference.

**\*Note\*** The National Honey Board is not an educational research institute.

### Food Safety Considerations

- The primary food safety issue related to honey is infant botulism. Because infants have an immature gastrointestinal tract, the spores of the *Clostridium* bacteria (the causal pathogen of botulism) are provided the amount of time needed and the environment to produce toxins. Babies under the age of 1 should not eat honey.
- Honey should be stored in a clean airtight container. Honey is hygroscopic, which means it draws in moisture. Addition of

moisture to honey can create favorable conditions for mold and yeast growth.

- Honey may crystallize or granulate as it gets older, is refrigerated, or is frozen. This is a natural process and does not harm the honey in any way. To convert crystallized honey to a liquid form, place the opened honey jar in a heat-safe container of approximately 1-2 inches of hot (not boiling) water. Crystals will begin to disappear. Be careful not to overheat honey. Excessive heat can cause honey to change color and flavor. Honey in liquid form makes filling containers easier.

### Using Honey as a Sugar Substitute

- Honey is denser than sugar. One teaspoon of honey has 69 calories and one teaspoon of processed white sugar has 48 calories.
- Begin substitutions by replacing the amount of sugar called for in the recipe with half the amount of honey.  
Example. If the recipe calls for 1 cup of sugar, substitute with ½ cup of honey.
- When making your own substitutions:
  - Cakes – Replace the sugar in a cake recipe with ½ the honey.
  - Cookies – Substitution quantities depend on the type of cookie.
  - Brownies – Replace the sugar with ½ the honey.
  - Fruit bars – Replace the sugar with ⅔ the honey.
  - Ginger snaps – Replace the sugar with ⅓ the honey.
- Honey can be substituted in equal measure for other liquid sweeteners such as sorghum, molasses, or maple syrup.



Example of measurements when substituting sugar with honey.

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## Cooking with Honey

- For baking, start with recipes written specifically for honey instead of sugar.
- For each cup of honey used to replace sugar, decrease the other recipe liquids by ¼ of a cup.
- To make measuring and the pouring of honey easier, coat the inside of a measuring cup with a thin layer of cooking oil or water.
- Honey is acidic (pH 3.70-4.20) and sugar is neutral (pH 7.0). To counteract the acidity of honey, add ½ teaspoon of baking soda for each cup of honey used in the recipe.
- When substituting sugar with honey in baked foods, decrease the oven temperature by 25 degrees. Honey tends to make the product brown (burn) at higher temperatures.



Caramelized nuts with honey & chile piquin.  
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**For a great honey treat that is easy to prepare, try:**

## Caramelized Nuts with Honey & Chile Piquin

### Ingredients

- ¼-cup honey
- 3 cups mixed nuts (plain)
- 1 tbsp. butter
- 1 tsp. sea salt
- 1 tsp. chile piquin or cayenne pepper powdered

**Yield:** Makes 8 servings

### Directions

Combine honey and butter in a pot over low heat, stirring with a spatula until blended. Add the chile piquin and sea salt. For best results, use a thick-based pot so that the heat distributes evenly. Add mixed nuts into the pot, stirring every so often to make sure that the honey & butter coats nuts completely. Place coated nuts on a baking sheet lined with parchment paper. Make sure space is left between nuts, so they do not stick together and cluster. Let stand until cool.

Heat the oven to 250°F and bake the nuts (on the cookie sheet) for 10 - 15 minutes. Remove from oven. Let stand until cool and serve.

*Recipe courtesy of Coral Bosch, Event Planner and Founder of Zikei Event Design.*

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