

Honey

Extension Foods and Nutrition Specialists
 The Texas A&M University System

Honey is a sweet, golden fluid made from the nectar of flowers. The flavor and aroma vary according to the predominating kind of flower the bees visit. You can take advantage of this by selecting either a favorite flavor or a variety of flavors of honey for the table.

Honey's role in the diet is like that of sugar—it is a source of energy in readily available form, and a food flavor which has many uses by itself and which adds to the palatability of other foods.

Besides discussing the nature and nutritive value of honey, its place in the diet and related information, this leaflet includes suggestions and recipes for using honey in the home.

Nutritive Value

The primary materials that the honey bees bring to the hive are nectar and pollen. They collect the pollen on the hairs on their bodies, place it in the "pollen baskets" on their legs, and carry it back to the hive to be deposited in the honey cells.

Nectar is the material from which honey is made. The bees suck it out of the flowers with their long tongues and swallow it into the honey sac where it undergoes changes not yet well understood. It consists chiefly of sugar and water, mixed with small quantities of other materials including mineral matters, gums and volatile bodies.

The changes which transform nectar into finished honey are known technically as "ripening." They take place partly in the honey sac of the bee, and partly in the cells of the comb, continuing even after the latter have been capped with wax. These changes consist mainly of removal of part of the water from the nectar, a task which the bees accomplish by warming the air of the hives and also by fanning the nectar in the cells.

Wax is made in and secreted from special glands on the abdomen of the worker bee. Several pounds of honey are used in producing a pound of wax, and the bees must keep a high temperature in the hive while it is being made.

Food Value

Honey is a syrup with a distinctive flavor and aroma, made up of 4 parts sugar to 1 part water. There are several kinds of sugars in honey, including cane sugar (sucrose), glucose and fruit sugar (fructose); the last two together are called invert sugar. Some nitrogenous substances (protein) are included in quantities too small to affect honey's food value for humans. Other substances present in small quantities are volatile oils and other bodies of pronounced odor or flavor from the nectar which influences the flavor and aroma of the honey.

Honey contains a small amount of mineral matter, including magnesium, iron and phosphorous. In this respect it resembles maple syrup and unrefined sugar rather than white sugar, from which the mineral substances originally present in the plant juices have been removed during the refining process. These mineral substances constitute less than 1 part per 100 of the weight of the honey. For this reason, they do not contribute greatly to the total mineral matter of the diet even if honey is used freely. The vitamin content in honey is not enough to be significant in an ordinary mixed diet.

Honey cannot be considered a "complete" food by human nutritional standards. It is useful for raising the blood sugar level and provides "quick" energy for rapid recuperation from fatigue caused by exertion. Glucose and fructose are simple sugars and do not have to be broken down by the body during digestion. They are absorbed directly into the blood-

stream. Sucrose, the common table sugar, must be digested before it can be assimilated.

Table 1. Food values of sugar compared to honey.

| Measure (1 tablespoon) | White Sugar | Honey |
|---------------------------|-------------|-------|
| Weight (grams) | 12 | 21 |
| Calories (Kcal) | 46 | 64 |
| Carbohydrate (gm) | 11.9 | 16.4 |
| Fat (gm) | | |
| Protein (gm) | | 0.1 |
| Sodium (mg) | | 1 |
| Calcium (mg) | trace | 4 |
| Phosphorous (mg) | | 3 |
| Potassium (mg) | | 11 |
| Magnesium (mg) | | 0.6 |
| Iron (mg) | | 0.2 |
| Thiamin (mcg) | | 2 |
| Niacin (mg) | | trace |
| Vitamin A (iu) | | |
| Riboflavin (mcg) | | 14 |
| Ascorbic Acid (mg) | | 1 |
| Vitamin D (iu) | | |

Used with permission from: Bowes and Church, *Food Values of Portions Commonly Used*, Eleventh ed., 1974.

Flavor

Besides having an intense sweet taste, honey retains enough of the perfume of the flowers it comes from to give it a distinctive flavor.

The flavor and aroma of honey depend largely on the blossoms from which the nectar is obtained. The nectar of each kind of flower contains a distinctive combination of oils and other substances which give the blossoms their special fragrance. These substances are retained in the honey made from the nectar.

Various localities naturally produce different kinds of honey. According to the kinds of flowers which abound, different kinds of honey may be produced in one locality through the seasons.

Choosing between honey from various flowers is mainly a matter of taste. Taste in honey depends more on what you are accustomed to than on any real superiority.

Preservation

After extracting honey from the honeycomb, strain it through sugar sack toweling. If the cloth is first dampened and thoroughly wrung out, the

honey will strain more easily. To prevent granulation or crystallization, heat it after straining in a water bath and stir to ensure uniform and quick heating to 150 or 160 degrees F. Then strain it and place it in containers while hot. Cool quickly.

Some honeys will darken upon heating. This will make the flavor too strong. Remove foreign particles before heating to decrease chances of the color changing. Any foreign particles in the honey, including air bubbles, will rise to the surface upon standing. If the honey is allowed to settle in this manner, and foreign particles appear on the surface, remove them by covering the surface with a damp cloth, then roll it up to remove the particles.

Keeping Honey

Liquid or extracted honey and comb honey keep best in covered containers at room temperatures (70 to 80 degrees F). Uncovered honey stored in a damp place absorbs moisture and odors, thus losing aroma and flavor. The moisture can dilute the honey enough for it to ferment or mold. To remove excess water, place container (not plastic) in a pan of warm (not hot) water. For the microwave use glass only, 1 to 1 1/2 minutes, uncovered. Let stand 5 minutes. To protect its delicate color and flavor, do not overheat. You can store honey in your freezer and it will remain liquid and unharmed.

Uses

In its natural state honey is often served as jelly, jam and conserves are because of its delicate flavor and sweet taste. This is only one of its many uses. It can be combined with other foods to form many attractive dishes. For this reason it ranks as a staple food.

Honey can be used in place of sugar for some kinds of jams or jellies. Honey can replace up to half of the sugar in recipes where no added pectin is used. In most recipes made with added pectin, 2 cups of honey can replace 2 cups of sugar. Only 3/4 to 1 cup of sugar can be replaced with honey in small recipes yielding 5 to 6 glasses. Products made with honey will have a darker color than those made with sugar, and the flavor is somewhat different.

Honey can be used in other types of food preparation with adjustments in the recipes. Table 2 lists recommendations for substituting honey for corn syrup or sugar.

Table 2. Substituting honey for corn syrup or sugar.

| Product | Substitution | Comments |
|--|--|--|
| Yeast breads | Measure for measure | |
| Muffins | Measure for measure | |
| Fruit breads (leavened with baking powder or soda) | Half of the sugar may be replaced with honey or corn syrup. | |
| Cookies (crisp type) | A third of the sugar may be replaced with honey or corn syrup. | When using honey, reduce oven temperature by 25 degrees. |
| Brownies | Half of the sugar may be replaced with honey or corn syrup. | When using honey, reduce oven temperature by 25 degrees. |
| Puddings or custards | Measure for measure | The flavor of puddings or custards made with honey may be unacceptable. |
| Cakes (yellow, chiffon) | A third of the sugar may be replaced with honey. | When using honey, reduce oven temperature by 25 degrees. Reduce liquid by $\frac{1}{4}$ cup for each cup of honey. When using honey, add $\frac{1}{4}$ teaspoon baking soda per cup of honey. In cake recipes containing soda, it is not necessary to add additional soda. |
| Cakes | A third of the sugar may be replaced with honey. | Reduce liquid by $\frac{1}{4}$ cup for each cup of honey used. When using honey, add $\frac{1}{4}$ teaspoon baking soda per cup of honey. In cake recipes containing soda, it is not necessary to add additional soda. |

Frequently Asked Questions

Is honey really a natural product?

All honey is a natural sweet made up mainly of sugars. It provides the body with energy.

Does honey have additives?

All honey is pure with no additives or preservatives and no sodium.

How many cups of honey are in 1 pound?

One pound of honey equals $1 \frac{1}{3}$ cups.

Are there fewer calories in honey than in table sugar?

Although the caloric value of honey is slightly higher, the fructose provides more sweetening per measure, reducing the amount required.

What is tupelo honey?

Tupelo honey comes from the blossoms of the tupelo tree. Some nutritional claims about this honey suggest that it can be tolerated by diabetics. No type of honey should be used by a diabetic because, like sugar, it will cause a rapid rise in the blood sugar level.

What is royal jelly?

Royal jelly, a milky-white substance, is the food of the queen bee throughout her life. Since queen bees live 3 to 7 years while the workers live only weeks or months, it is thought that consumption of this food juice may prolong the queen bees' life. By artificial queen breeding, this royal jelly can be obtained in large amounts and preserved by a special method. It is available at a high price, but whether it has special powers or healing action is not known. Scientists are testing its therapeutic value. Royal jelly is rich in protein, pantothenic acid and vitamins.

What types of honey are available?

There are five types of honey on the market today—liquid, comb, solid (sometimes called granulated or crystallized), chunk and cut comb. Here is a brief description of each:

- Liquid honey. This honey is free of visible crystals. It is obtained by uncapping the combs and forcing the honey from the cells by centrifugal, or outward, motion and differs from comb honey only in the absence of the comb.

- **Granulated or solid honey.** Most honeys crystallize or granulate. Honey in this state is partially or wholly solidified or “sugared.” It is often referred to as candied, creamed or spread.
- **Comb honey.** As its name indicates, comb honey is in the comb as stored by the bees. Usually comb honey is served in its original size or cut into individual portions. This can be done by cutting the comb honey into 1-inch squares with a knife dipped in boiling water. Chill 30 minutes before serving to prevent loss of honey from the comb. Serve the individual pieces with a small fork.
- **Cut comb honey.** Recently, little chunks of sealed comb honey about 4 inches long and 1 1/2 inches wide have been wrapped in cellophane and packed in individual cartons. These are known as cut comb or honey chunk-style.
- **Chunk honey.** This is available in the southern states. The combs are built in shallow extracting frames and are cut in various sized chunks that will slip into tin pails or glass jars. The spaces between the combs are filled with liquid honey.

Can I prepare creamed honey at home?

Yes, the secret of the creaming process is based on the fact that the first crystals developing in honey determine the smoothness and creaminess of the ultimate lot of granulated honey. Obtain a small carton of creamed honey from a grocer for a starter “seed.”

The honey to be creamed must be completely in liquid form or else heated to 160 degrees F to dissolve all crystals. Cool rapidly to room temperature, or about 80 degrees F. Add 1 part of creamed “seed” honey to 20 parts of liquified honey. Mix with a large spoon or electric mixer at slow speed to avoid whipping air into the honey and causing a foamy mass to form on the surface.

When the mixture is of uniform consistency, pour into small cartons such as those used for ice cream or cottage cheese. Store in refrigerator at 57 degrees F or below. The creaming will be complete in about 2 weeks, although some honeys cream more rapidly and some more slowly.

Is there any harm in using honey to prepare infants’ formulas?

Yes, there is a possibility of botulism, a type of food poisoning. Botulinum bacteria and spores are commonly found in raw agricultural products. Adults and older children can eat such food without danger. Only infants younger than 26 weeks

of age have developed “in-body” toxin production. The Food and Drug Administration and health agencies recommend that honey not be fed to infants under 1 year of age. There is no evidence to suggest that honey poses any risk of botulism for older children or adults.

Honey Recipes

Honey and Nut Bran Muffins

| | |
|--------------------------|--------------------------------|
| 1/2 cup honey | 1 tablespoon melted butter |
| 1 cup flour | 1 1/2 cups milk |
| 1/4 to 1/2 teaspoon soda | 3/4 cup finely chopped walnuts |
| 2 cups bran | |

Sift together the flour, soda and salt. Mix them with the bran. Add the other ingredients and bake for 25 or 30 minutes in a hot oven. Yield is 16 large muffins.

Honey Pound Cake

| | |
|--------------------|-------------------------------------|
| 1 cup sugar | 1/2 teaspoon powdered cardamom seed |
| 3/4 cup honey | 1/2 teaspoon soda |
| 1 cup butter | 1/2 teaspoon orange-flower water |
| 4 eggs (separated) | 2 cups pastry flour |

Rub together the butter and sugar, and add the honey. Add the well-beaten yolks of the eggs. Finally, add the whites of the eggs, beaten to a stiff froth, and the orange-flower water. Add gradually the flour sifted with the soda and cardamom seed. Beat the mixture for 10 minutes. Put the dough into a warm tin with high sides, and bake in a slow oven for 1 hour.

Honey Energy Freeze

| | |
|---|-----------------------------|
| 1 6-ounce can frozen orange juice concentrate | 1/2 cup mild-flavored honey |
| 1 3/4 cups milk | 1 teaspoon vanilla |
| | 8 ice cubes |

Place all ingredients except ice in blender container. Blend. Increase speed and add ice cubes through feeder cap. Process until ice is liquified and mixture is smooth and thick. Makes about 4 cups.

Honey Coleslaw Dressing

| | |
|-----------------------|---------------------------|
| 1/2 cup mayonnaise | 1/2 teaspoon salt |
| 2 tablespoons vinegar | 1/4 teaspoon onion powder |
| 2 tablespoons honey | 1/4 teaspoon celery seed |

Combine and pour over shredded cabbage. Mix well. Chill. Makes 3/4 cup.

Skillet Squash

| | |
|-----------------------------|-----------------------|
| 2 small yellow squash | 1 teaspoon butter |
| 2 medium zucchini | 1 teaspoon dry French |
| 1/4 cup mild-flavored honey | salad dressing mix |
| 2 tablespoons water | 1 large tomato |

Wash squash and zucchini; cut off ends. Cut into quarters lengthwise. In skillet, combine honey, water, butter and salad dressing mix. Arrange squash and zucchini, cut side down, in honey mixture. Bring to boil, reduce heat and simmer about 20 minutes or until tender. Cut tomato into eighths. Add tomato wedges to mixture and cook several minutes longer, turning once. Serves 4.

Turkey with Rice

| | |
|--------------------------------|-----------------------------|
| 3/4 cup honey | 1 chicken bouillon cube |
| 6 tablespoons prepared mustard | 6 tablespoons hot water |
| 1/2 teaspoon salt | 6 cups cooked, diced turkey |
| 1 1/2 teaspoons curry powder | 3 cups cooked rice |

Mix honey, mustard, salt and curry powder with bouillon cube that has been dissolved in hot water. Combine lightly with diced turkey and heat, stirring lightly. Serve over hot, cooked rice. Serves 8.

Honey Butter “Delicious Spread”

Whip together 1 part mild-flavored honey and 2 parts of soft butter. Store in refrigerator.

Oven-Barbecued Chicken

| | |
|------------------------|--------------------------|
| 1 3-pound cut up fryer | 1 tablespoon lemon juice |
| 1/4 cup melted butter | 1 tablespoon paprika |
| 2 tablespoons honey | 1/2 cup mayonnaise |
| 1/2 cup hot catsup | |

Season chicken as desired. Combine remaining ingredients in baking pan. Arrange chicken in a single layer. Turn once to coat. Bake at 350 degrees F for 45 minutes to 1 hour or until tender, basting every 15 minutes. Serves 5 to 6.

No Need to Knead Bran Bread “Makes One Nutritious Loaf”

| | |
|----------------------------|--|
| 3 1/2 cups flour | 1 egg |
| 1 1/2 teaspoons salt | 1/2 cup instant non-fat dry milk |
| 1/2 cup honey | 2 packages active dry yeast |
| 2 cups bran cereal or buds | 1 1/4 cups warm water (105 to 115 degrees) |
| OR 3 cups bran flakes | 1/4 cup butter or margarine |

In large bowl, stir together 3 cups flour, dry milk and salt. Set aside. Combine yeast, honey and warm water in large mixer bowl. Stir in bran cereal. Let stand 2 to 3 minutes or until cereal is softened. Add butter, egg and about half of the flour mixture. Beat at medium speed 2 minutes, scraping sides of bowl occasionally. Stir in remaining flour mixture by hand. Add the remaining 1/2 cup flour, if necessary, to form a stiff, sticky dough. Cover. Let rise in warm place, free from draft, until double in size (about 1 hour). Stir dough down. Place in 9x5x3-inch loaf pan greased, or sprayed with pan coating. Bake at 375 degrees F about 30 minutes or until done. Remove from pan. Brush top of loaf with warm honey to glaze, if desired. Serve plain or toasted with butter and honey.

Texas A&M AgriLife Extension Service

AgriLifeExtension.tamu.edu

More Extension publications can be found at *AgriLifeBookstore.org*

Educational programs of the Texas A&M AgriLife Extension Service are open to all people without regard to race, color, sex, disability, religion, age, or national origin.

The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Produced by Texas A&M AgriLife Communications