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THE BUZZ ABOUT Honey

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Interest in honey has increased as the "Locavore," or eating local, movement has increased. What do you know about honey?

THE HISTORY OF HONEY

Humans have used honey as a food source for thousands of years. Honey is mentioned in the oldest writings in history and has been found pictured in many ancient wall drawings in caves. Sumerian and Babylonian cuneiform writings and the sacred writings of India and Egypt mention it. Historians think Egyptians used honey not only as a sweetener but also as an ingredient in embalming fluid.

The Greeks used honey as food and as a healing medicine. Beekeeping flourished throughout the Roman Empire. With the establishment of Christianity, honey and beeswax production increased greatly to meet the demand for church candles. Prior to the arrival of European settlers to North America, honeybees were unknown, though several other species of bees were considered native. Honeybees were reportedly called "White Man Flies." In fact, there was an association between the westward migration of settlers and the establishment of wild colonies of honeybees. Native Americans were said to have noticed that shortly after colonies of honeybees were discovered, white settlers would not be far behind.

RAISING BEES

Apiculture, the study and keeping of bees, often begins as a hobby and later expands into a small business

because of the demand for local honey. A beekeeper's business can produce marketable honey as well as serve as a pollinator for nearby cultivated crops.

Beekeepers ideally place hives within one or two miles of a succession of spring, summer, and fall nectar sources and in areas that receive full sunlight. There should also be some source of water nearby, such as a dripping hose.

Beekeepers can capture their bees from a swarm, from an established hive, or can purchase them from a commercial bee supplier. Along with the hive and hive parts, a beekeeper also needs a smoker, hive tool, and protective clothing.

An understanding of the life of the honeybee colony is essential to good beekeeping. The bee is fascinating for many reasons, including its ability to live in a cooperative society, which we call the colony. The colony consists of the live bees, including the brood, which is the eggs, larvae, and pupae, but not including the structure they live in. The hive is the bee colony plus the structure around them: the wooden boxes owned by beekeepers, a hollow tree, or any other structure they might find.

A honeybee colony typically consists of three kinds of adult bees: workers, drones, and a queen. Several thousand worker bees cooperate in nest building, food collection, and brood rearing. Each member has a definite task to perform, related to its adult age. But surviving and reproducing take the combined efforts of the entire colony.

The queen is the most important member of the colony. She is the one who gives birth to all the other bees. The workers are sterile females, numbering up to 60,000 per colony. As their name indicates, they do all the work in the hive from tending the larvae to feeding and cleaning duties. They also construct the comb and forage for nectar and pollen. Drones are the hopelessly lazy male bees. They do nothing but fertilize the eggs, eat, and wait for nice afternoons when they will fly off in with hopes of meeting a young queen bee. A drone can be recognized by his enormous black eyes that cover most of his head.

Bees produce honey as food stores for the hive during the winter months when flowers are not in bloom and therefore there is little nectar available. Honeybees collect the nectar from flowers and plants and carry it to the hive or nest and then pass it to worker bees, who prepare it for storing by adding enzymes. As the nectar

is transferred to the wax storage chambers called comb, water is evaporated, and it is this process, combined with the enzyme activity that converts the nectar into honey.

Hives can survive the winter if left with enough honey to meet their feeding demands. Drones are eliminated from the hive to conserve honey. The remaining bees clump together forming a "shell" around the brood, to keep the temperature around the eggs, larvae, and pupae at about 93 F. The hive must have morning sun and be protected from direct contact with the cold winter winds, while still receiving airflow. When the bees sense the days becoming longer and the temperatures rising, they will begin the brood process once again.

PRODUCING HONEY

Honey is considered ripe when the bees cap the cells. Bees build their comb onto supers, the wooden frames beekeepers place above the brood for bees to store the surplus honey in the hive. The unique design of the honeycomb, coupled with constant fanning by the bees' wings, causes evaporation to take place, creating the thick, sweet liquid we know as honey. The supers are pulled from the hive and cleaned once the comb is completely capped over. The yield is about 50 pounds of honey per well-established hive per year. The honey should be processed soon after harvesting and then should be stored in sealed containers in a warm dry place or in a freezer.

Pieces of sealed and undamaged honeycomb can be cut into neat pieces, packaged in plastic wrap or boxes, and sold as honeycomb. Liquid honey can be separated from the combs using professional extraction equipment, or the combs can be broken and honey allowed to drain out through strainers.

Beeswax can be collected after all the honey has been removed from the comb. Most of the beeswax comes from the caps the bees use to close each chamber in the comb. It should be cleaned, melted down, and strained. It stores well at room temperature in large chunks.

Varieties and forms of honey

The color, flavor, and even aroma of honey is dependent upon the source of pollen and nectar. There are as many as 300 different varieties of honey in the United States. Colors run from clear to very dark, and flavors can run from subtle to robust. Normally the lighter the color, the more subtle the taste. Many times the fragrance of the flower is noticeable in the taste of the honey. These characteristics can change from year to year, depending upon temperatures and rainfall.

Some of the more common forms of honey are:

- **Liquid** — Most of the honey produced in the U.S. is in liquid form. It is convenient for cooking and baking. It is extracted from the honeycomb by centrifugal force and contains no visible crystal.
- **Comb Honey** — This honey comes as it was produced in the beeswax honeycomb, both the honey and the comb are edible.
- **Cut Comb** in Liquid Honey or Chunk Honey — This honey is in liquid form with chunks of the comb placed inside the jar.
- **Naturally Crystalized Honey** — This product is in a semi-solid form. It can be returned to a liquid state by placing the jar in warm water and stirring until the crystals dissolve, resulting in liquid honey.
- **Raw Honey** — Has not been heated to high temperatures or filtered.
- **Filtered Honey** — This honey has been filtered to remove most fine particles like pollen grains and air bubbles.
- **Processed Honey** — Has had the bee pollen removed by a filtering process. The honey is heated to high temperature to get the golden appearance.

NUTRITIONAL VALUE

Many consumers want to know the benefits of using honey in place of processed sugar. Both honey and sucrose, commonly known as table sugar, contain the same two basic molecules —fructose and glucose. In table sugar, these two molecules are bonded together as a disaccharide. In honey, these two molecules stay separate as monosaccharides. Digestion of processed sugar does not begin until it reaches the small intestine. However, since honey is made of mono-saccharides and enzymes provided by the bee, it can be absorbed directly into the body.

One tablespoon of honey yields 68 calories and 17.2 grams of carbohydrates. This is more than table sugar, which is only 49 calories and 15 grams of carbohydrates. However, honey is much denser than table sugar, and it tastes sweeter so you may use less. Honey has many health benefits. Honey contains trace amounts of vitamins, minerals, and important enzymes. It can also help the immune system and has antioxidants, and anti-bacterial and anti-tumor properties. It is true that honey consumption does not cause abrupt spikes in blood sugar (glucose), but scientists do not understand this phenomenon completely.

HEALTH WARNING

The American Academy of Pediatrics recommends that you give honey only to babies older than 12 months. Honey may contain Clostridium botulinum spores, which can grow and release toxins in an infant's intestines, causing infant

botulism. Infants younger than 12 months are at risk of being infected by these spores. Once infants reach the age of 1 or older, their intestines have a balance of acids that help destroy and fight off toxins created by the botulism spores. Honey is safe for adults and children ages 1 year and older.

STORAGE OF HONEY

Store honey at room temperature — the kitchen counter or pantry shelf is ideal. Storing honey in the refrigerator actually accelerates the honey's crystallization. Crystallization is the natural process of glucose sugar molecules aligning into orderly arrangements called crystals. It does not indicate spoilage, impurity, age, or quality.

If your honey crystallizes, simply follow these instructions from the National Honey Board:

- Bring a pan of water to a boil.
- Turn off the heat.
- Place the honey container with the lid removed in the water.
- Leave them until both have cooled.
- Repeat as needed.

Tips for cooking with honey
For the best results, use recipes developed for using honey.
When you substitute honey for granulated sugar in recipes, begin by substituting honey for up to half of the sugar called for in the recipes. With experimentation, honey can be substituted for all the sugar in some recipes.

When substituting honey for sugar in baked goods:

- Reduce the liquid in the recipe by a ¼ cup for each cup of honey used.
- Add about a ½ teaspoon of baking soda for each cup of honey used.
- Reduce the oven temperature by 25 degrees to prevent over-browning.

For easy measuring and cleanup, coat the measuring cup or spoon with cooking spray or oil before adding the honey.

RECIPES

Honey Raisin Muffins

½ cup + 2 tablespoons all-purpose flour
½ cup + 2 tablespoons whole wheat flour
¾ teaspoon baking powder
¼ teaspoon baking soda
1 teaspoon ground cinnamon
¼ teaspoon salt
2 cups bran flake cereal with raisins
1 cup skim milk
½ cup honey
2 egg whites
3 tablespoons unsweetened applesauce
2 tablespoons canola oil

Combine flours, baking powder, baking soda, cinnamon and salt in a bowl and set aside.

In a large mixing bowl, combine cereal, milk, and honey. Let stand for 2 minutes to soften. Stir in egg whites, applesauce, and oil. Mix well.

Add dry ingredients and stir until moistened. Fill each cup of a greased or paper-lined muffin pan 2/3 full.

Bake at 400°F for 15-18 minutes. Cool 10 minutes before removing from pan.

Yield: 12 muffins
Nutritional Analysis: 150 calories; 3 g fat; 0 mg cholesterol; 170 mg sodium; 30 g carbohydrate; 2 g fiber; 15 g sugar; 4 g protein

Source: Plate It Up Kentucky Proud.

Honey Butter
½ cup softened butter
⅓ cup honey
2 tablespoons fresh orange or lemon juice (optional)
1 teaspoon grated citrus peel (optional)
1 teaspoon cinnamon (optional)

Blend softened butter with honey. Refrigerate and use as desired. For variation, add the fresh orange or lemon juice and the grated citrus peel, or add the cinnamon to make cinnamon honey butter.

Recipe Source: https://extension2.missouri.edu/gh1120

Apricot Honey Oat Bar Cookies
1 ½ cups old-fashioned rolled oats, uncooked
½ cup finely chopped dried apricots
½ cup honey
¼ cup nonfat plain yogurt
2 egg whites
2 tablespoons wheat germ
2 tablespoons all-purpose flour
3 tablespoons butter or margarine, melted
½ teaspoon ground cinnamon
½ teaspoon vanilla
¼ teaspoon salt

Spray an 8-inch square baking pan with nonstick cooking spray. Combine all ingredients in a large bowl; mix well. Spread mixture evenly into prepared pan. Bake at 325 F about 25 minutes or until center is firm and edges are lightly browned. Cool and cut into 2-inch squares.

Yield: 8 servings, 2 cookies each
Nutritional Analysis: 260 calories; 7 g fat; 12 mg cholesterol; 132 mg sodium; 45 g carbohydrate; 5 g dietary fiber; 7 g protein.
Recipe used with permission of National Honey Board.

Cheese Dip with Fresh Fruit
1 (8 oz.) package cream cheese
¼ cup honey
1 ½ teaspoons vanilla
¼ teaspoon cinnamon
1 tablespoon fresh lemon juice
¼ cup diced, toasted almonds

In a medium mixer bowl, beat cream cheese until light and fluffy. Add honey, vanilla, cinnamon, and lemon juice. Mix well. Spoon into a small bowl and top with almonds. To serve, place bowl on a plate and surround with assorted fruits such as banana slices, grapes, apple slices, strawberries, peaches, or nectarines.

Recipe used with permission of National Honey Board.

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