Nyam News
from the Caribbean Food and Nutrition Institute

ISSN 0255-8203
July Nos. 1&2 2006

HONEY

Honey, a natural syrup produced by bees is similar to invert sugar, with a small but variable excess of levulose (fructose). The composition and flavour of honey varies with the plant source of the nectar, processing and storage but a typical composition is 41 per cent fructose, 34 per cent glucose, 18 per cent water, and 2 per cent sucrose with a pH of 3.8 to 4.2. Honey has been described as man's oldest sweetener. Chemically, its composition is the same as sucrose, that is glucose and fructose. The primary difference is that in sucrose, the two monosaccharides are bonded together to form the disaccharide, but in honey some of them are free. Whether the monosaccharides are consumed individually as in honey or linked together as in sucrose, the end result is the same in the body, that is glucose and fructose. Honey also contains oligosaccharides, medium-sized carbohydrates with three simple sugar sub-units, often made of mono- and disaccharides. Examples of oligosaccharides found in honey include *eriose, theanderose and panose*. These sugars are formed when nectar and honeydew are converted to honey. Oligosaccharides are sometimes referred to as "higher sugars."

Honey and Health

Since ancient times, honey has been regarded as a food that promotes good health. It has long been referred to as the "nectar of the gods. Athenaeus, a Greek writer and philosopher, claimed that those who ate honey every day would be free from disease for the rest of their lives. The word "honeymoon" comes from an old Northern European custom for newly-weds encouraging them to eat honey and drink mead (wine made from honey) which were thought to be aphrodisiacs.

Honey appears in so many traditional remedies, that there may well be an element of truth in the claims for its health benefits, despite the lack of documentation in medical journals. Honey is a mild antiseptic, used for over 80 years to treat minor burns and wounds; a cup of hot water with lemon and honey is a traditional remedy for sore throats. The honey soothes and may act as a mild disinfectant. While some people may take hot milk and honey before bed to help them

CFNI Caribbean Food and Nutrition Institute

Pan American Health Organization
Regional Office of the World Health Organization

Caribbean Food and Nutrition Institute
P.O. Box 140, UWI Campus Mona, Kingston 7
Tel:(876) 927-1540-1; 927-1927
Fax: (876) 927-2657
E-mail:e-mail@cfni.paho.org

sleep, others have sometimes used honey for its mild laxative effect, which may be due to its high fructose content, a sugar often in-completely absorbed in the bowel. Conversely, honey has been used to treat diarrhoea. Honey promotes the rehydration of the body and more quickly clears up the diarrhoea and any vomiting and stomach upsets. The anti-bacterial properties of honey, both the peroxide and non-peroxide, are effective in the laboratory against methicillin-resistant Staphyloccous aureus (MRSA) strains of bacteria which are notoriously resistant to antibiotics and are sometimes responsible for the closing of hospital wards.

Honey and Antioxidants

Reaching for a spoonful of honey rather than sugar to sweeten your favorite food and drinks may help boost your body's natural defenses, disease-fighting antioxidants in the blood. This conclusion was reached arising from reports of a study conducted by Gross et al of the University of California-Davis. Twenty-five participants were asked to use about 4-10 tablespoons of buckwheat honey per day depending on their weight, for 29 days in addition to their regular diets. They could eat the honey in almost any form, but it could not be baked or dissolved in tea. Many chose to eat straight from the spoon. Two types of honey containing different amounts of polyphenols were tested. Polyphenols are powerful antioxidants that are thought to reduce the risk of heart disease and cancer. Blood samples taken at the beginning and end of the study showed a direct link between honey consumption and levels of disease-fighting polyphenols. The more polyphenol-containing honey they ate, the higher the levels of antioxidants were in their blood. The darker shades of honey are believed to have more antioxidants. Polyphenols are also found in fruits, vegetables, tea, and olive oil. No weight gain was found among the participants for the month they consumed honey, and some claimed that eating honey for breakfast actually made them feel full and satisfied.

Honey and Wound Healing

During the early part of the 20th century, researchers began to document the wound healing properties of honey. The introduction of antibiotics in the 1940's temporarily suppressed honey's use. Nonetheless, concerns regarding antibiotic resistance and renewed interest in "natural" remedies has promoted a resurgence of interest in the antimicrobial and wound healing properties of honey.

When honey comes into contact with body moisture, the glucose oxidase enzyme introduced to the honey by the bee slowly releases the antiseptic hydrogen peroxide at a sufficient level to be effective against bacteria but not damage tissue. Not only is honey anti-bacterial, it also draws body fluids and nutrients to the area and so assists cell growth and prevents a scar forming by drying out of the wound. The osmotic action of the honey draws out and provides a film of liquid between the tissues and the dressing, allowing the dressing to be removed painlessly, without tearing of the re-growing cells. There are reports in medical journals of large bed sores, otherwise needing skin grafts that have healed without scarring after honey treatment.

Germ-Fighting Properties

Honey is a natural anti-septic. By applying honey to wounds it helps to prevent infection. Honey contains antimicrobial agents, which may prevent infection by killing the bacteria in and around the wound. When using honey it may help to heat it up before putting it on your wound (caution test the heat before you place it on the wound). Many types of bacteria can't survive in honey, so wounds heal, swelling eases, and tissue can grow back.

Honey may also be effective in the treatment of ulcers. In Europe, honey has been used internally to help cure ulcers, particularly stomach ulcers.

Burns, too, heal better with honey. The advantage of honey is that it not only prevents

infections from occurring, it actually accelerates skin healing. Since the sugar in honey absorbs water, it helps to trap some of the moisture so that bacteria and other microbes do not grow as easily as in other food.

Honey and Allergies

The use of honey in treatment of seasonal allergies may be beneficial provided that the honey is local to the area. Bees use the pollen from local plants and eventually it ends up in the honey. The effect has something to do with the pollen and other substances in the raw honey helping the patient to build up some immunity to whatever the individual is allergic to. However, other reports indicate the contrary. In a comparison where participants ate either local non-filtered honey, pasteurized honey and used corn syrup with honey flavor as the control group. Ten different allergy symptoms were measured and they found no differences between the two groups that ate the honey and the group eating the placebo honey.

Other Reported Benefits of Honey

Easily digested: Because sugar molecules in honey can convert into other sugars (e.g. fructose to glucose), honey is easily digested by the most sensitive stomachs, despite its high acid content. It helps kidneys and intestines to function better.

Rapidly diffuses through the blood: When accompanied by water, honey diffuses into the bloodstream in 7 minutes. Its free sugar molecules make the brain function better since the brain is the largest consumer of sugar and may reduce fatigue.

Supports blood formation: Honey provides an important part of the energy needed by the body for blood formation. In addition, it helps in cleansing the blood. It has some positive effects in regulating and facilitating blood circulation. It also functions as a protection against capillary problems and arteriosclerosis.

Does not accommodate bacteria: The bactericide (bacteria-killing) property of honey is named "the inhibition effect". Experiments conducted on honey show that its bactericide properties increase twofold when diluted with water. It is very interesting to note that newly born bees in the colony are nourished with diluted honey by the bees responsible for their supervision, as if they know this feature of the honey.

Nutritive Value

Honey is considered by some to be more than a sweetener and a "healthier" alternative for sugar because it contributes some minerals like magnesium, potassium, calcium, sodium chlorine, sulphur, iron and phosphate. It also contains vitamins B_1 (thiamin), B_2 (riboflavin), C (ascorbic acid), B_6, (pyridoxine), B_5 (pantothenic acid) and B_3 (nicotinic acid). However the contribution differs according to the qualities of the nectar and pollen. Additionally, honey contains small quantities of copper, iodine, and zinc. It should be noted that honey is denser than sugar thus providing more kilocalories per spoon. The sugars in honey are the same as those found in fruits which have greater nutritional value. In fruits, the sugars are diluted in water, packaged in fibre and mixed with valuable minerals and vitamins.

In most honeys, fructose predominates and tends to make honey taste slightly sweeter than sugar but there are a few types of honeys which contain more glucose than fructose. Some honeys are very rich in fructose and thus tend to taste very sweet. Generally, the sweetness of honey is 1 to 1.5 times sweeter (on a dry weight basis) than sugar. Liquid honey is about as sweet as sugar but it contains only 82.4 g carbohydrate per 100 grams versus 100 g carbohydrate for the same amount of sucrose and provides 304 kcal/100 g versus 400 kcal for sucrose. One tablespoon of honey weighs 21 grams, of which approximately 17 grams are carbohydrates. The sugar content is the sum of all the mono, di- and oligo-saccharides. This 40% lower caloric value and sweetness level of honey makes it a choice for some persons who are complying with a calorie-controlled diet.

Dietary Uses

The main uses of honey are in cooking, baking, spreading on bread or toast, and as an addition to various beverages such as tea. It can also be used as a sweetener for fruits as well. It also can be used in any food that is sweetened, including frozen desserts, baked products, meat glazes, custards, frostings, pie fillings, cobblers, puddings, candied vegetables and salad dressings. Because honey is hygroscopic (drawing moisture from the air), a small quantity of honey added to a pastry recipe will retard the staling process. Raw honey also contains enzymes that help in its digestion, several vitamins and antioxidants. Most vegans consider honey to be an animal product and avoid using it, instead choosing sweetening alternatives such as golden syrup. Some recipes use honey as the main sweetener; others use sugar. Honey can be used to replace some of the sugar called for in many recipes, drinks and food but for a child under twelve months of age, there is a risk of botulism from eating honey and products made with honey. These should be avoided. The spores of the *Clostridium botulinum* bacteria can be found in honey, and when ingested by an infant, get into the intestinal tract, grow, reproduce and release a toxin that causes *infantile botulism.*

Although many parents know not to give their infants under twelve months of age plain honey, they often over-look other foods that contain honey in them, such as Honey Graham Crackers, Honey Nut Cheerios, Honey Wheat Bread, etc. Although the honey in these foods may be processed, it may not be pasteurized, and so may still contain botulism spores and should be avoided. Spores of the bacteria that cause botulism are, present in honey and can cause serious illness and death. These spores in the honey are not destroyed by regular cooking or baking methods.

How to Select and Store

Honey is sold in individual containers or in bulk. It is usually pasteurized, although often 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 colour, the deeper the flavour.

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 micro-organism 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 flavour. ◆

For further information contact:

Caribbean Food and Nutrition Institute
UWI Campus, P.O. Box 140, Kingston 7
Jamaica, W.I.

Caribbean Food and Nutrition Institute
UWI Campus, St. Augustine
Trinidad, W.I.

Visit us at our website: http://www.paho.org/cfni