

HONEY THE WONDER FOOD – IN COSMETIC PREPARATIONS

Dr. Sitaram Dixit, Chairman CGSI.

Pure honey considered as a nature's ambrosia to humans is well known for its healing and soothing powers. One of nature's wonders, pure honey rich in sugars, proteins and mineral salts, is a sweet-smelling viscous liquid, holding a very honored and esteemed position in Ayurvedic medicine and nature cure. Egyptians used honey in their medical formulas and the Greeks used it for curing skin disorders. It is a tradition in China to apply a blend of honey and ground orange seeds to keep skin free of any blemish. Even today by many Chinese men and women follow this ancient beauty treatment.

HISTORICAL FACTS AND USAGE OF HONEY

Egyptian queen Cleopatra regularly took honey and milk baths to keep her skin young and healthy. Madame du Barry used honey as a facial mask to improve her complexion and please her master Louis XV. English Queen Anne, Sarah the duchess of Marlborough, used honey in hair care to maintain their long hair lustrous, thick, strong, and beautiful. Honey that has been in use in beauty preparations since ancient times is just as popular today finding use in an increasing number of skin and hair care cosmetic products. Popular health and beauty products containing honey include bath and shower products, body scrubs, face creams, skin lotions and hair conditioners.

As we grow older, our skin ages reducing its capacity to retain water, making it dry and wrinkled. Additionally, mental stress, solar UV radiation, exposure to chemical agents, polluted environment also contributes in damaging the skin and causing premature aging. The skin's ability to retain moisture and remain hydrated is a very important factor in maintaining softness, suppleness and elasticity of human skin.

NATURAL PROPERTIES

Honey is a natural humectant which means that it has an ability to attract and retain moisture. Honey's natural hydrating property makes it an ideal moisturizer. Pure honey is non-irritant and so is suitable for preparing skin sensitive and baby products. Scientific studies have revealed that honey has significant amounts of antioxidant properties. Human body uses antioxidants to eliminate free radicals or molecules that whiz around in healthy cells and damage them. Use of honey helps in protecting skin from damage, and also aids in skin rejuvenation.

Honey due of its high sugar content, limits the amount of moisture available for bacterial growth. Its low pH and insufficient protein content deprive bacteria of nitrogen vital for its growth. Natural antioxidants and hydrogen peroxide present in honey play a major part in inhibiting growth of bacteria. When honey comes in contact with human skin it releases hydrogen peroxide. Hydrogen peroxide is produced by glucose oxidase an enzyme present in honey and introduced by honey bee.

Natural honey that contains no preservatives or additives and we can use it straight as available from nature without processing or refining. Recent medical research documents claim honey to be an effective antimicrobial agent as it can inhibit growth of certain bacteria's making it a useful ingredient in treating minor acne flare-ups.

HONEY'S PROSPECTS IN SCIENTIFIC RESEARCH.

Alpha hydroxyl acids (AHAs) are important ingredients in many skin care products because of its ability to exfoliate skin. Exfoliation means surface removal of dead skin cells and aiding renewal and growth of new skin cells giving skin a younger more vibrant look. Exfoliation can cause skin irritation in some.

Honey's natural moisturizing property and non-irritant nature makes it a perfect fit for research currently underway in developing a honey based AHA for use in exfoliating skin care cosmetics. Honey works best on skin when used fresh rather than from a ready to use personal care products claiming to do wonders with honey added in it at infinitesimal amounts. Below is a list of some typical traditional beauty recipes.

1. **Skin Cleanser:** Mix 15 gm honey with 30 gm of finely ground almonds and 3 gm of lemon juice. Gently rub this mixture onto face and rinse with warm water.
2. **Skin Clarifier:** Wash the face with warm water containing a little of edible salt. Using a cloth or cotton ball apply salt water to soften any minor acne flare-ups. This might take a few minutes of continuous application. Using a swab apply honey on the affected portion; leave it for about 15 minutes. Rinse with water and pat dry.
3. **Skin Toner:** Mash 15 gm of honey with a peeled cored apple. Apply the paste obtained onto the face and leave it for about 20 minutes. Clean the paste out with cold water.
4. **Skin Conditioner:** Mix 5 gm of honey with 5 gm of vegetable oil and 2 gm of lemon juice. Rub the mixture on dry skin, leave it for 15 minutes and rinse off.
5. **Skin Softening Bath Water:** Add honey directly to bath water and bathe.
6. **Facial Mask:** Mix 15 gm honey, 5 gm glycerin, and 1 egg white with gram flour (Besan) to form a smooth paste. Apply the paste on skin and leave it for about 15 minutes. Wash the paste off with warm water.
7. **Hair Conditioner:** Mix 50 gm honey with 25 gm of vegetable oil. Apply and coat this mix throughout the hair. Leave it on the hair for half an hour, then shampoo well, rinse and dry normally.
8. **Hair Shine:** Mix 6 gm of honey in a liter of warm water. Pour this mixture in a washed and shampooed hair. Without further rinsing dry the hair normally.

HONEY BEES FOOD – NECTAR FOR HUMANS.

All-natural honey comes from honey bees. Many insects gather nectar from plants, but honey bees are the only ones who store it in a form suitable for human consumption. Bees collect nectar, or the sugary solution secreted by special glands (Nectaries) present in the flower blossoms, leaves and stems of flowering plants. Nectar is a thin fluid containing 50 to 80% water.

Honeybees suck the nectar out of the flowers and return to their hives. The worker bees present in the hives then suck the honey out of their stomach and chews the nectar for about half an hour. The chewing process introduces enzymes into the nectar, breaking them into simple sugars that are more digestible converting the nectar into honey that contains 16 to 18% water by the honey bees, stored and sealed in honeycombs of their hives to tide them over the lean patches during their life cycle. A colony of bees can collect and carry into their hive as much as 450 kg of nectar in a year. Bees achieve this by visiting some 2 million flowers to collect nectar putting a large amount of labor to produce honey a food source for their personal use. Ironically, humans eventually reap the benefits of their effort.

QUALITY TYPES

Honey sold in the open market as natural is more likely to be impure and adulterated with cheaper substitutes. Adulteration is rampant because of its demand and due to the fact that it is difficult to differentiate between pure honey and its impure varieties. The difficulty with honey quality is that the beekeeper does not have an absolute control over the variables encountered. Different species

of flowering plants have differing types and amounts of floral secretions.

Sometimes nectar from a single plant species may also differ due to differences in soil, climatic conditions, season and other environmental factors. Cambodia cotton honey during December and January months is reddish because of meagre nectar flow, but as the season advances the color changes to a rich, golden yellow color.

Honey bees are not very particular in collecting nectar from flowers alone. They gather sweet juices from any available source giving undue preference to attractive smell. Some plant species like cotton (*Gossypium hirsutum*) and castor beans (*Ricinus species*) also have glands secreting sweet liquids located outside the flower petals.

Alternative source of sweet juice for the bees is the excretion of some insects like plant lice, scale insects, leaf hoppers, white flies, tree hoppers, etc. which suck the juices of the various plant species. The unutilized plant juices excreted by these insects' deposits on leaves, stems of plants and sometimes also on the ground. Bees gather this sweet "honeydew" in a similar fashion as they gather honey. Honeydew honey is rich in starchy gums but is a poor food supplement for the bees during winter.

HONEY AND ADULTERATION

As discussed earlier testing the purity of honey is not easy. Various colors and different flavors only make the process more difficult. Some tips do help but it is safest to purchase supplies in sealed containers from reliable suppliers that confirm to the standards laid down by the "Food Safety Act" & "FSSAI".

In case of open purchase, if the honey is thin, has a weak flavor, and has a comparatively cheaper price, it is most likely to be impure and adulterated. One reliable test is to look for pieces of sealed or capped honey comb dipped in honey at the bottom of the container. Unscrupulous dishonest beekeepers however have found a way to get around this normally reliable test. Humans cannot make honey combs with capped cell, but filling empty combs with sugar syrup before or during the honey season and keeping it in the beehives by unscrupulous bee keepers is possible. Since the bees are busy during the season, they do not consume the syrup readily, but seal the comb nevertheless. Such sealed comb when present in the adulterated stuff lends it a deceptive look of fresh natural honey.

IS THE HONEY GENUINE?

Simpler test methods in deciding the quality of honey is by judging the color, taste and aroma. Lighter the color, milder the honey, although it starts darkening with age. Dark varieties especially those derived from barberry have good medicinal value. The consistency of honey is also very important in judging quality. Superior grades of honey are viscous in nature, having lower water content. Unripe honey contains high amounts of water along with yeast. High amounts of water in honey are favorable for yeast to ferment the sugars present to produce alcohol, carbon dioxide, acetic acid and water. Fermented honey becomes sour with a foamy layer on top.

A clean dry stick dipped in honey when burnt will give a typical spluttering sound similar to that of water when spilled on a pan of burning oil if it is having sugar or jaggery syrup as adulterants. A tea spoon of unadulterated honey mixes uniformly in a glass of water. When we take a tea spoon of honey and a pinch of lime on our palm and mix it produces heat. The heat generated during mixing is an indication on the genuinity of honey. Lesser the heat generated lesser the purity of honey tested.

| FSSAI Specification of Honey (2020) | |
|--|------------------------|
| Specific gravity | 1.35 Min. |
| Moisture (%) | 20 Max. |
| Total reducing sugars (%) | 65 Min. |
| Sucrose (%) | 5 Max. |
| F/G Ratio | 0.95-1.50 |
| Total Ash (%) | 0.5 Max. |
| Acidity expressed as formic acid (%) | 0.2 Max. |
| Free acidity milliequivalents acid/1000 g | 50 Max. |
| Hydroxy Methyl Furfural (HMF) mg/kg | 80Max. |
| Diastase activity, Schade units | 3 Min. |
| Water insoluble matters (%) | 0.1 Max. |
| Pollen & plant matter count/g | 5000 Min. |
| Proline, mg/kg | 180 Min. |
| Electrical Conductivity mS/cm | 0.8 Max. |
| C4 sugar (%) | 7% Max. |
| $\Delta\delta_{13}C$ p-h (‰) | ≥ -1.0 |
| $\Delta\delta_{13}C$ Fru - Glu (‰) | ± 1.0 |
| $\Delta\delta_{13}C$ Max. (‰) | ± 2.1 |
| Foreign oligosaccharides (% peak area) | 0.7 |
| 2-AFGP as specific marker for rice syrup (mg/kg) | Absent* (MRPL-1 mg/kg) |
| TMR (ppbw) | LoQ:15 ppbw |
| NMR indicates adulteration / addition of sugar syrup | |
| Please note that Trace Marker for Rice syrup (TMR) and Nuclear Magnetic Resonance (NMR) profiling tests are not part of the current FSSAI standards. NMR is an advanced test to check for adulteration and confirmation of origin of honey. | |
| LoQ is limit of quantification. | |
| 'ppbw' is parts per billion by weight. | |
| MRPL is Maximum required performance level. | |
| $\Delta\delta_{13}C$ Max (‰) is Maximum difference between all measured $\delta_{13}C$ values; per mil. | |
| $\Delta\delta_{13}C$ p-h (‰) is the difference in $^{13}C/^{12}C$ between honey and its associated protein extract; per mil. | |
| $\Delta\delta_{13}C$ Fru-Glu (‰) is the difference in $^{13}C/^{12}C$ ratio between fructose and glucose; per mil. | |

Honey granulates and assumes a dark color. Homogeneous granulation is a sign of purity. One can restore to its sparkling liquid form by simply keeping the honey jar in a bowl containing warm water and stir until the crystals dissolve. Store honey at room temperature (Never in a refrigerator) and away from heat to prevent deterioration of its taste and for preserving its aroma and flavor. Honey obtained from the nectar of citrus, acacia, or linden flowers often have an unpleasant odor and so an unpleasant odor need not necessarily indicate adulteration.

When honey is, left standing in a container for a long time, then the heavy sugars components settle at the bottom. The lighter water laden portion that rises on the top tends to ferment giving out an unpleasant odor. To prevent this from happening it is advisable to stir, stored honey intermittently. Honey stirred frequently and stored properly will remain odorless and consumable for a very long time. Store honey preferably in glass containers. Avoid metal containers and covers as honey tends to react with metals producing dark impurities.

Beekeepers cannot direct the bees to specific flowers to collect nectar, however their experience aid them to identify the plants from where bees gather nectar and so decide the varieties. Moreover, the honey obtained has a fruity aroma of the predominant flower species from where the bee collects the nectar.

TYPICAL TYPES OF HONEY

1. **Comb honey:** is honey in the absolute natural form. Honey filled in beeswax comb as stored by the bees in the honey comb. It is the only unprocessed form of honey.
2. **Liquid honey or Extracted honey:** When we cut off the natural wax caps and the comb and centrifuge it in a honey extractor forces out the honey stored in the comb and we get liquid honey.
3. **Granulated creamy honey:** Mixing one part pure finely granulated honey with nine parts of liquid honey and storing it at around 57 degrees centigrade until it becomes firm and creamy.
4. **Chunk Honey:** Comb honey surrounded by liquid honey and stored in a jar is chunk honey.

Although we can use honey in its unprocessed form straight as available from bees, processing improves its keeping quality. Unprocessed honey has better taste but is susceptible to fermentation due to the presence of yeast. Honey processing takes place generally at a temperature above 160 degree centigrade. Processing and filtration reduce its natural tendency to granulate and improves its looks. However high temperature processing and filtration eliminates natural enzymes present.

CAN HONEY BE POISONOUS?

Pure honey is ambrosial however some can also be downright poisonous. Indiscriminate collection of nectar from poisonous plants species can make the honey gathered poisonous and unfit for human consumption. Plants like Mountain laurel (*Kalmia latifolia*), Tobacco (*Nicotiana tobaccum*), Yellow jasmine (*Gelsemium simper virens*), Soapberry (*Sapindus marginatus*) and Rhododendron species, produce poisonous nectar.

Honey obtained from central and northern Japan often causes indisposition and minor illness tracing it to the nectar obtained from the plant "hotsutsayi" plant belonging to the heather family. Similarly, honey produced in far-eastern Russia that is yellowish in color, rather bitter; easily crystallizing is poisonous. Use of this honey produces cold sweat, shivering, nausea, vomiting and violent

headache. 100 to 200 gm of honey if consumed can render a person either delirious or unconscious. Studies trace the poisonous effect to the nectar of bog heather (*Chamoedaphne calyculate*).

We can render poisonous or heady honey as harmless if we subject the honey to heat for three hours between 80 to 90 degrees centigrade, stirring continuously taking care that it does not boil. An alternate method is to heat the heady honey is to heat it at 46 degree centigrade under low pressure (67 mm Hg). This prolonged but controlled heating can breakdown the poisonous substances and make the honey harmless keeping the flavor intact.

However, the point to note is the toxins in such heady honeys are not stable. The toxicity can decrease as the honey ages over time even under ordinary storage conditions.

CONCLUSION

Lord Shri. Krishna in the "Bhagavat Gita" states that "We are what we eat" and urges us to eat only "Yukta Saatvik Aahaar", i.e., eat sensibly, simple, pure and healthy food.

यदन्नं भक्षयेन्नित्यं जायते तादृशी प्रजा ॥
- चाणक्य
What food one eats daily, so will one produce.
- Chanakya.

Morden research has revealed that honey has the necessary qualities to be classified as a health food. Regular consumption of honey provides a wide array of vitamins, minerals, and natural antioxidants protecting skin from damage and destruction.

In addition, honey continues to be an easily available beauty product for external application with a sure potential to become the basic raw material for scientific research in the creation of speciality ingredients for cosmetic preparations.

Did I hear someone say? Wow! "Honey, you are looking beautiful".

| HONEY TYPES BASED ON THEIR COLOUR | | | | |
|-----------------------------------|--------------|---|---------------------|----------------|
| COLOUR OF HONEY | PLANT | BOTANICAL NAME | TIME OF FLOWERING | AROMA |
| WATERY WHITE | Acacia | <i>Acacia sp</i> | October | Fine |
| | Shain | <i>Plectranthus rugosus</i> | August to October | Mild |
| | White colver | <i>Trifolium alexandrium</i> | May to June | Excellent |
| | Raspberry | <i>Rubus idasus</i> | April to July | Pleasant |
| GOLDEN | Toon | <i>Cedrela toona</i> | March to April | Distinct |
| | Cotton | <i>Gossypium sp.</i> | August to September | Mild |
| | Lavender | <i>Lavandula vera</i> | Spring | Delicate |
| | Sage | <i>Salvia officinale</i> | April to July | Astringent |
| LIGHT GOLDEN | Sunflower | <i>Helianthus annus</i> | September | Sharp |
| | Soapnut | <i>Sapindus detergens</i> | April to May | Excellent |
| | Dandelion | <i>Taraxacum officinale</i> | April | Pleasant |
| | Maple | <i>Acer platenoides</i> | Spring | Pleasant |
| AMBER | Eucalyptus | <i>Eucalyptus sp.</i> | November to April | Strong |
| | Peppermint | <i>Menthe piperita</i> | Perennial | Pleasant |
| | Shisham | <i>Dalbergia sp.</i> | March to April | Characteristic |
| | Puna | <i>Ehreti acuminata</i> | April | Pungent |
| DEEP RED | Arjan | <i>Terminalia arjuna</i> | May to June | Molasses |
| | Barberry | <i>Berberis lycium</i> | February to June | Strong |
| | Buckwheat | <i>Fagopyrum esculentum</i> | June to September | Strong |
| LIGHT GREEN | Phacelia | <i>Phacelia tanacetifolia</i> | Perennial | Pleasant |
| | Willow herb | <i>Chaemaenerion angustifolium</i> | July to February | Delicate |
| | Sweet clover | <i>Melilotus alba</i> | June to September | Strong |
| BLACKISH | Honey dew | <i>Through insects and leaf hoppers</i> | May to June | Unpleasant |

| | | | | |
|----------------------|---------------|--------------------------------|---------------------|------------|
| DARK BROWNISH | Tobacco | <i>Nicotiana tabacum</i> | August to September | Bitter |
| | Heather | <i>Celluna vulgaris</i> | Frost | Astringent |
| LIGHT YELLOW | Cruciferous | <i>Brassica sp.</i> | December to march | Pleasant |
| | Carrot | <i>Dacus carota</i> | October to January | Pleasant |
| LIGHT RED | Rowan | <i>Sorbus aucuparia</i> | Perennial | Pleasant |
| | Yellow poplar | <i>Liriodendron tulipifera</i> | May to June | Pleasant |
| | Leatherwood | <i>Cyrilla racemiflora</i> | May to July | Pleasant |

| WELL KNOWN HONEY'S OF THE WORLD | |
|--|--------------------------------------|
| OBTAINED FROM PLANT TYPES | COUNTRY OF ORIGIN |
| Acacia | Bulgaria / Hungary / Romania |
| Apple blossom, Cherry blossom, Heather | United Kingdom |
| Clover | Canada / New Zealand / North America |
| Eucalyptus | Australia |
| Lavender, Orange blossom, Sunflower | France / Spain |
| Lime blossom | China / Poland |
| Thyme | France / Greece / New Zealand |

| MAJOR FLOWERING PLANTS OF INDIA SECRETING NECTAR FOR HONEY PRODUCTION | | | | |
|--|---|-------------------------|---------------------------------|--------------------|
| LOCATION | PLANT SPECIES | FLOWERING PERIOD | COLOUR OF HONEY | AROMA |
| BIHAR | Litchi (<i>Nephelium litchi</i>) | March | Amber | Good |
| KARNATAKA | Naval (<i>Syzygium spp</i>) | April – May | Light yellow | Fair |
| | Coffee (<i>Coffee Arabica</i>) | February – March | Amber | Fair |
| KERALA | Rubber (<i>Herea brasiliensis</i>) | February | Glycerin white to Golden Yellow | Distinct |
| KODAIKANAL (TAMIL NADU) | Kumil (<i>Gmeline arborea</i>) | April | Amber | Attractive |
| | Pungalam (<i>Ligustrum walkeri</i>) | May – June | Amber | Fair |
| | Murukku (<i>Erythrina mysorensis</i>) | August – September | Light | Distinct |
| | Naval (<i>Syzygium cumini</i>) | April – May | Light | Fair |
| KASHMIR UTTRAKHAND HIMACHAL | Kikar (<i>Robinia pseudo acacia</i>) | April – May | White | Distinct |
| | Solekanth (<i>Plectranthus rugosus</i>) | September | Water white | Good |
| | Teole gogul (<i>Brassica juncea</i>) | March – April | Light yellow | Fair |
| | Saffron Kung (<i>Crocus sativus</i>) | Late October | Light | Medicinal sweet |
| MAHABALESHWAR (MAHARASTRA) | Karvi (<i>Carvia callosa</i>) | September – October | Dark Amber | Fair |
| | Whyati (<i>Strobilanthes ixiocephalus</i>) | November – January | Light yellow | Good |
| | Kharwar (<i>Strobilanthes reticulates</i>) | October – November | Light yellow | Good |
| | Pisa (<i>Actinodaphne hookeri</i>) | December | Dark Black | Molasses like odor |
| | Burambi (<i>Leucas stelligera</i>) | November – December | Light yellow | Fair |
| | Akhra (<i>Strobilanthes heyneanus</i>) | January – February | Yellow | Distinct |
| | Jambul (<i>Eugenia jambolana</i>) | March | Amber | Distinct |
| | Gela (<i>Randia dimetorum</i>) | April- May | Light yellow | Good |
| | Hirda (<i>Terminalia chebula</i>) | May | Light yellow | Fair |

A minister gave a talk to the Lions Club on sex. Getting home, he couldn't tell his wife what he had spoken, so he said he had discussed horseback riding. A few days later, she met some club members and they complimented her on the brilliant speech her husband had made. She said, "Yes, I was surprised about the subject matter, as he's only tried it twice. The first time he got so sore he could hardly walk, and the second time he fell off!"

