Lecture -8-

HIVE PRODUCTS:

In the hive, bees produce a number of products useful to man and to the bees. These products may be used directly or may act as raw materials for making other by-products.

Hive Products

1- Hone y
2- Pollen
3- Royal Jelly
4-Propolis
5- Bee venom
6- Bees wax

1-Honey – Is the nectar or plant sap ingested by bees, concentrated by them and stored in cells of the honeybee comb. Mature (ripe) honey is usually found in sealed combs and can be kept indefinitely; unsealed honey is not mature (unripe) and therefore ferments shortly after it is harvested. Honey is used as food, medicine (constipation, duodenal ulcers, liver problems, burns, etc) and as ingredients in medicine (added in cough syrups), food (confectionary industry), making beverages and cosmetic creams.

2-Pollen: Pollen is the principle food of bees and is collected from the anthers of flowers on the legs of the bees. The hairs on the bee's legs act like a hair comb. As the bees collect the pollen, they moisten it with a little nectar when packing it into pollen loads on their hind legs. Part of the pollen serves to pollinate flowers, and part is brought back to the hive in their pollen baskets. Bees then store pollen in the combs but not in great quantities. Pollen comes in many different colours from red, yellow to brown, depending on the flower source. All are different, some can be bitter while some can be sweet and all these varieties can be mixed together.

3-Royal jelly: Nutritious substance produced by young worker bees to feed the young larvae and queen. Royal Jelly is a whitish fluid, secreted by the young bees and used to feed the queen bee in large amounts. Young bees that have just hatched out produce it just within their first 6 days. Royal jelly does not come from flowers. A queen bee can live between four and five years if she is fed exclusively on royal jelly, lays about 1,500 eggs a day, and has a healthy life protected from bacteria and parasites. Without royal jelly she cannot be a queen bee. It is the rich nutrition in royal jelly that makes the queen fertile and strong.

It contains vitamins and hormones for increasing fertility, which is why she can lay so many eggs over so many years. Other female worker bees that do not feed on royal jelly are sterile and cannot lay eggs.

Royal jelly also has nutritional, energetic and metabolic advantages for humans. It is so special but not many beekeepers collect it. It is rich in proteins and all B vitamins and increases overall mental and physical well-being. It can be taken pure or blended with honey (5 parts royal jelly to 120 parts honey). It is also used as a dietary supplement and fertility stimulant. In skin preparation such as soap it is known to prevent wrinkles.

How royal jelly is collected?

It needs specialized equipment and refrigeration. The method involves removing the queen from the hive so the bees make new queen cells. When the quality and the quantity of the royal jelly are at its peak, the beekeeper extracts the queen bee larvae with tweezers and removes the precious substance by suction. 250-500g can be collected from each hive every year. It must be kept below 4 degrees centigrade from the point of collection as it goes rotten very quickly, if it is to be sold for commercial value. This may be a good income opportunity for beekeepers in Uganda to explore.

4- Propolis: is a sap or resinous materials collected from trees or bud of plants by bees and used to strengthen the comb and to seal cracks; also called as bee glue. They collect it in their mouths, pack it in their legs and use it for making propolis. It is used by bees for repairing the hive and also serves as protection to the hive from bacteria, fungi and viruses. Bees use it as medicine in the hive because it is a powerful natural antibiotic and is both antifungal and antibacterial. Interestingly, if a pest or predator dies in the hive and cannot be removed, the bees will wrap it in propolis so that it does not rot or smell. Humans also use propolis to prevent infection. Propolis is helpful for preventing coughs and colds; and treating stomach ulcers. If eaten in its natural state, it is better to suck a small piece as it sticks to the teeth if you chew it! It also helps to treat wounds and skin disorders. Raw propolis can be taken and stuck over a cut just like sealing plaster! It also helps to stimulate the body's own immune system to fight disease for itself. Propolis can be used in many applications and is used to produce creams, mouthwash, toothpaste, and throat syrup. It is also used in animal feed to treat some disorders and as the basis for fine wood varnishes.

5-Bee venom:

Bee venom is the poisonous, colorless liquid contained in the venom sac of the bee, used to sting predators or enemies. It is an anti-inflammatory and is used by humans to relieve pain. It is effective in treating the symptoms of

rheumatoid arthritis, neuralgia, high blood pressure, high cholesterol and even multiple sclerosis. Bee venom therapy can also help with infertility problems. Applying bee venom medicinally can be easy. This is done by holding both of the bee's wings and applying the tip of the abdomen to the painful area and allowing the bee to sting the area. The bee then dies as the sting is left in the skin. The number of stings and length of treatment required depends on how old and severe the disease is. However it must be remembered that it is dangerous to sting people who are allergic to bee stings. Always ask the person first if they are allergic to bee stings. A small, localized swelling with redness is normal. Itching all over the body and shortness of breath is not. Bee venom is widely used in creams, soaps, liniments and ointments. It may also come in capsule form.

6-Beeswax: It is a wax produced by honey bees by special glands on the underside of the abdomen. It is used to build comb, where honey and pollen are stored. Beeswax is not a plant product but a bee secretion and bees do not collect it from outside of the hive. Worker bees make regular hexagonal wax cells and capping in the hive to store new honey. These honeycombs are made from beeswax produced by wax glands on the underside of the abdomen of a worker bee between 12 and 15 days old. Tiny scales of wax are secreted and knead (softened) and then use their legs to construct the cells of the honeycomb.

Note:

Bees eat between 8 and 22 kgs of honey to produce 1 kg of wax.

Quality Honey Harvesting:

What do bees make honey from?

Honey is the primary product of the hive. Bees make honey from nectar which is a sugary secretion of flowers. Nectar contains 70-80% water. To make honey the bees add enzymes and reduce the water content of the nectar to that of honey (good honey contains less than 19% water). Bees transfer nectar from their stomachs to other bees that in turn pass it on to other bees. As it is transferred, the water content is reduced and the bees add enzymes from their honey sacks, which prevent fermentation of the nectar. The bees then place this into the cells of the honeycomb and continue to reduce the water content further by warming the honey to about 35 degrees centigrade (the temperature of human blood). The bees fan their wings to take any warm damp air out of the hive and to allow cooler dry air in. This evaporation process eventually reduces

the water content to 19% and the bees then cap the honey. This process helps the honey to be kept for a long periods in the hive.

Why do different honeys have different tastes and smells?

The different tastes, aromas and colours of honey are a result of the different flowers that the bees have collected nectar from. Colour is also affected by the age of the combs – old combs give darker honey than new combs. Honey mostly contains different kinds of natural fruit sugars (80-85%) that are easily and immediately absorbed by the body, are high in carbohydrates and give the body energy. The sugar in honey is not the same as refined granules (sucrose), which can have a negative effect on the health. Refined sugar is more difficult for the body to break down and can lead to diabetes in later life. Honey also contains many vitamins and minerals from the pollen. Honey has medicinal properties and is used to help cure coughs, ulcers, wounds and sore throats. Generally bees do a very good job of making honey and it is the beekeeper that tends to spoil the quality of the honey with poor harvesting, processing and marketing techniques. It is essential that the product being sold retains its properties, is of good quality and well presented.

What affects the good quality of a honey product?

1-Honey must be clean and clear - no dirt, dead bees, wax and dust, splinters of wood or ashes.

2- Honey must have a good taste. It should not be too smoky or have a fermented taste. Chemicals and insecticides can affect the smell and taste of honey.

3-Honey must have a good smell. Harvesting old dark combs and brood combs can affect the smell and colour of the honey. Over smoking the combs can also affect its smell.

4- Honey must have a good colour – this depends upon the nectar source and age of the combs. Usually dark honey has stronger flavour and light coloured honey a more delicate flavour.

5-The Presence of pollen can make the honey appear muddy or cloudy but is in fact highly nutritious and good for the body.

Honey must be ripe and have a low water content – moisture should not be greater than 19% or the honey is likely to ferment. Harvesting incompletely sealed combs can result in excessive water content in honey. This is measured using a refractometer . Honey buyers and traders often use a refractometer to check the water content of honey samples from hunters and beekeepers. They will avoid buying honey with high water content, as it is likely to ferment.

They will select only honey with a water content of around 19%, as honey with a water content of over 20% must be used too quickly for marketing in other regions or countries. However they will not be wary of honey with very low water content. If it is too low then they know the honey has probably been heated to evaporate off more water or may have even been adulterated with sugar water. There are some very simple methods that you can try to check the water content without a refractometer.

1-Put a matchstick in the honey and if the water content is too high then the head will be damp and will not burn.

2- Drop a droplet of honey on dry soil. If the honey spreads into the soil and disperses then the water content is too high. The honey should sit on the soil as a globule.

Forms of honey and how they are made:

Liquid Honey: Some honey remains in liquid state naturally if they have glucose to water ratio of less than 1:8.

Chunk honey: This is where 1 or 2 strips of cut comb are placed in a transparent wide mouthed jar, which is then filled with light-coloured liquid honey.

Creamed honey: Homogeneously stable crystallized honey with a pleasant creamy appearance obtained by the addition of a small quantity of already crystallized honey to liquid honey.

Comb honey: Small section of completely sealed comb built of virgin (new/white) bees wax, preferably with light coloured honey.

Crude honey: Combination of honey, pollen, bee broods and other impurities like sticks, tree leaves …etc.

Semi-refined honey: Skimmed honey after removal of comb after several days of settling. It needs to be further sieved to remove impurities.

Granulated honey: Honey is a super saturated solution i.e. it contains more dissolved substance than the solvent can normally retain in solution at any specific temperature. Such a solution is unstable and will in time revert to the stable saturated condition by crystallizing the excess solute.