

SECTION 8 – HIVE PRODUCTS

HONEY

Honey production

Probably the two most important factors in the production of honey are:

- The bees
- The beekeeper

Generally the bees do a very good job and it is the beekeeper that spoils the quality of the product with poor harvesting, extracting and marketing techniques. It is essential that the product being sold retains its properties, is of good quality and well presented.

These simple objectives do not need complicated and expensive equipment or great knowledge of management techniques.

Letting honeycombs drip on a wire mesh can give good results. The honey is pure and clean but the process is slow. A press can be used when the combs are too small to go in an extractor. The honey should be stored so that it can allow particles, which will be present even after a first straining, to settle.

Improved extraction techniques will result in improved product quality which in turn will lead to better prices for the honey.

Often development projects invest much of the money available in buildings, vehicles and sophisticated equipment. Ironically, the bigger the structure the more the farmers can feel isolated, and those for whom the help was intended are the ones that benefit least. A village collecting centre can be run by one local person who has had some brief training in the use of simple processing equipment. Such a focal point can, if properly organized, give strength to a group of beekeepers and get them a better deal for their produce.

Similarly, other equipment can often be over-rated. A wooden movable-frame box hive may cost 30 times more than a traditional hive. It is unlikely that it will produce 30 times more honey. It is essential, therefore, that any technology used is appropriate and ultimately fulfils the aim of providing a genuine source of income for the person who has decided to keep bees.

Honey

Bees prepare honey mainly from the nectar of flowers, but other plant saps and honeydew are also used to a minor extent. After visiting a flower, the foraging honey bee flies back to the hive with the collected



FIG. 72. Liquid honey showing a wide range of colours.



FIG. 73. Set honey showing a wide range of colours.

nectar in her honey sac, a modified part of the gut. On arrival at the hive she passes the fluid through her mouth to one or more 'house' bees. These, in turn swallow it and regurgitate it to pass to other house bees and on through a chain of bees before the liquid is finally placed in a cell of honeycomb. As each bee sucks the liquid up through her proboscis and into her honey sac a few proteins become added and water is evaporated. The proteins are enzymes, which convert sugars in the nectar into different types of sugars. After the liquid has been placed in the cell of honeycomb, bees continue to process it, and more water evaporates as they do so. The temperature of the hive near the honey storage area is usually around 35°C (95°F). This temperature and the ventilation produced by fanning bees, causes further evaporation of water from the honey. When the water content is less than 20% the bees seal the cell with a wax capping. The honey is now considered 'ripe' and will not ferment. The bees have prepared for themselves a concentrated energy source, packed in minimal space and free from problems of fermentation during storage.

A very minor, but important component of most honey is pollen. Pollen is carried to the hive and stored inside it quite separately from nectar, but nevertheless a few pollen grains find their way into honey. The pollen in honey can be identified using a microscope, and gives a guide to the plants that bees have been working on.

Beekeepers are often asked about the difference between liquid and set honey. Liquid and set honey are like ice and water: different forms of the same substance. Set honey is also known as granulated or crystallized honey. All honeys are liquid when produced by bees, but most honeys will granulate eventually. The speed with which honeys granulate depends upon which sugars

the particular honey contains. Granulation is a natural process and there is no difference in taste or nutritional value between solid and liquid honey. Some people prefer one type to the other.

To turn a jar of granulated honey to liquid, stand it up to its neck in a container of warm water (60°C, 140°F): it will liquefy after an hour or so.

A jar of liquid honey can be made to granulate by stirring in a small amount of honey that is already granulated. Crystals in the granulated honey serve as 'seed crystals' and after a few days the whole honey will become granulated.

Honey is a delicious food. It is high in carbohydrates and adds useful variety to diets. As most sugars in honey are fructose and glucose, it is more readily digestible than cane sugar. Honey varies in taste, aroma and colour according to its plant source.

In many societies honey has an important place in traditional food preparation, and is also viewed as a source of special nutrition for children although it should not be fed to young babies. Honey is widely used as a medicine and is highly prized for this reason. It is often regarded as a special tonic food to be eaten at times of illness. Honey has three biological factors which account for its antibiotic activity. These are:

- Honey absorbs water and so is capable of killing bacteria by dehydrating them. It also means that honey is sterile as most micro-organisms cannot survive in it.
- There are enzymes in honey which produce hydrogen peroxide which kills bacteria.
- Honey is acidic.

Therefore, honey has long been associated with healing. It is used not only to treat coughs and stomach ailments but applied

externally to burns, ulcers and wounds. Honey is a food and a medicine but in many parts of the world it is used primarily to produce an alcoholic drink – honey beer.

Honeycombs from top-bar hives or traditional hives

● Cut-comb honey

Honey in the comb is untouched and is readily seen to be pure. Therefore, honey presented in this way always fetches a good price. Honey which has not been open to the air has a finer flavour than honey which has been subjected to processing in any way. Only sealed and undamaged comb should be selected. The pieces cut neatly and packaged wrapped in clear film or placed in jars that are topped up with clear, well-filtered honey.



FIG. 74. Cut comb.

● Strained honey

To prepare strained honey, remove the wax cappings of the honeycomb with a knife and break the combs completely into pieces. Make sure that you do not use unsealed combs containing unripe honey or pollen. Use a cotton cloth to strain the honey from the pieces of honeycomb. Collect the honey that strains through in a clean and dry container. Finally squeeze the combs inside a bag made from the cloth to remove as much honey as possible. Hands should be washed before, and frequently during this work. All



FIG. 75. Combs collected, crushed and then strained to remove the honey.



FIG. 76. Straining honey through cotton into a plastic bucket which can be fitted with a lid.

cloths and containers must be perfectly clean.

Honeycombs from frame hives

● Cut-comb honey

If using foundation, then it should not contain strengthening wires. The wax foundation should also be thinner than that normally used in wired frames. Portions of cut comb can be prepared for sale in the same way as those from a top-bar hive.

● Strained honey

Remove the wax cappings from the honeycombs with a long, sharp knife which



FIG. 77. Uncapping frame comb.

has been standing in warm water. Hold one end of the top of the frame and rest the other end on a piece of wood placed across a dish – the frame is therefore held at right angles to the dish. Start cutting at the bottom of the frame and with a zig-zag movement of the knife, cut off the thin layer of wax cappings and allow it to fall into the dish below the frame. Turn the frame around and cut off the cappings on the other side, and then place the frame in the extractor. Some honey will stick to the wax cappings; do not waste this, but strain it out of the dish. Honey drains very slowly from cappings and this process may take over 24 hours.

Honey quality

The aroma and taste of honey are its most important features, but honey is often judged according to its colour. The colour of honey depends mainly upon the source of the nectar, plant sap or honeydew that the bees have gathered. Usually dark-coloured honeys have a strong flavour while pale honeys have a more delicate flavour. The popularity of dark and light coloured honey varies from country to country, but generally light

coloured honeys are more highly valued than dark. Colour can sometimes be a useful indicator of quality because honey becomes darker during storage, and heating will also darken honey. However, some perfectly fresh, unheated and uncontaminated honeys can be very dark.

It is impossible to give a comparable value to the flavour and aroma of a honey, but the following methods are used to measure honey quality.

Colour

Colour is very important, for it is this that does more than anything else to determine its commercial use and value. Darker honeys are more often put to industrial use, while lighter coloured honeys are marketed directly for consumption. Colour descriptions range from water white through shades of amber to dark.

Water content

If the water content of honey is greater than 19% then the honey is likely to ferment. A low water content is therefore most important. Water content can be measured using a honey refractometer, a small instrument which measures the refraction of light as it passes through a glass prism on which a few drops of honey have been smeared. In areas with a very high humidity it can be difficult to produce honey of sufficiently low water content.

HMF

HMF stands for hydroxymethylfurfural. This is a break-down product of fructose (one of the main sugars in honey) formed slowly during the storage of honey, but formed very quickly when honey is heated. The amount of HMF present in honey is therefore used as a guide to the amount of heating which has taken place: the higher the HMF value, the lower the quality of the honey is

considered to be. HMF is measured by various laboratory tests.

Enzymes

The levels of enzymes present in honey are sometimes assayed and used as a guide to honey quality. These tests are also carried out in a laboratory.

Other constituents

Some honeys have a very high pollen content which makes them appear cloudy; honey extracted from combs by squeezing often contains a relatively high level of pollen. Such honey is considered to be of low quality. The presence of any other contaminants in honey

Beekeeping methods which may have negative effects on the quality of the honey

Beekeeping method

Location of hives in densely urbanized or industrialized zones or areas of strong environmental pollution, including agricultural pesticide use

Inappropriate use of antibiotics and other drugs or chemicals to treat or prevent honey bee diseases or control pests

Use of organic chemicals like naphthalene, ethylene dibromide or paradichlorobenzol for comb protection during storage and treatment against wax moths

Use of chemical repellents during honey harvesting

Excessive use of smoke or poor choice of combustion material

Use of old and dark combs and/or brood combs

Use of combs with residual honey from a previous year

Harvesting of incompletely sealed combs, particularly during the nectar flow

Possible damage to honey

Contamination of honey with noxious or toxic residues, possibly damaging to human health, or with sugars not of nectar or honeydew origin

Contamination of honey with the same substances

Contamination of honey with the same substances

Contamination of honey with the same substances

The honey has a smoky odour, odd taste and contamination with microscopic soot

Honey of darker colour, comb odour, higher acidity and faster ageing

Honey high in yeasts and possibly faster fermentation; premature crystallization of susceptible liquid honeys; a contamination of unifloral honeys

Excessive water content in honey

After Krell from the Food and Agriculture Organization of the United Nations Bulletin 124, Value-added products from beekeeping (Rome 1996).

(e.g. particles of wax, bees, splinters of wood, dust) will make the honey of very low value indeed. If colonies of bees are located in industrial or urban areas which have a high degree of pollution then hive products can be affected as heavy metals and other pollutants can accumulate in them – particularly in pollen but also in honey. Contamination can also result from dirty water sources.

Problems arise from honey bee diseases. Some may be prevalent in an area, others may be brought in if bees are introduced to an area from elsewhere. Where bees lack a resistance to new infections they may need help from the beekeeper. There is then a danger that untried chemicals may be used or even approved products used in excess or at inappropriate times, leading to contamination of the honey and/or beeswax crop.

Preparing honey for market

- Process honey as soon as possible after removal from the hive. Honey-processing is a sticky operation, in which time and patience are required to achieve the best results.
- Honey is a food, and it must therefore be handled hygienically. Always wash your hands and your equipment thoroughly at all phases of the process.
- Honey is hygroscopic and will absorb moisture. All honey-processing equipment must be perfectly dry. Too much water in honey causes it to ferment.
- Some dishonest people add cane sugar syrup or corn syrup to their honey. This is a corrupt practice and should always be discouraged.

Containers for marketing honey must be lightweight, of low cost and preferably see-through so that customers can see the

product. Glass is often used as a container for selling honey but glass jars are heavy, breakable and cannot be stacked together when empty. Plastic containers are much lighter and stack well, but in many countries they are difficult to obtain. Recycling containers that have held other products is possible. Honey is a food and any container used should have been used for food in the first place.

Labels for your honey

In addition to attracting customers to your product, the label you put on your honey should give the following information:

- Contents: Pure honey.
- Source of the honey: e.g. sunflower, mixed blossom, tree honey etc.
- The country and district it was produced in.
- Your name and address.
- The weight of honey in the container.

You may wish to add other information for the consumer. For example, if you are packing comb honey, you could remind the purchaser that the whole comb including the wax is completely edible, or if you are selling strained honey, you may wish to provide an explanation of granulation.