



# Honey Preparation for Market and Shows

by Peter O'Reilly

When dealing with this subject it is necessary to outline a few very important facts. Honey is a food and as such must at all stages be handled with due regard to hygiene.

The bees present us with a first class product as taken from the hive. The beekeeper cannot improve on that quality product. He/she can however maintain that quality and improve the presentation for the consumer.

All honey offered for sale should be of the standard required for the Show bench.

## Composition of honey is as follows:-

Water	17-18%
Levulose (Fructose)	39%
Dextrose (Glucose)	34%
Sucrose	1%
Dextrin	0.5%
Plant acids	0.5%
Proteins	2%
Salts	1%
Undetermined Residues	4%

Pollen, which is the male element of the flowering plant, is present when the honey has not been over-filtered. Pollen contains 35% protein and 15-20% amino acids.

The important enzymes in honey are Diastase, Invertase, Lipase etc. all with different jobs to do. Diastase converts starch to sugar. Invertase converts cane sugar into Dextrose and Levulose while Lipase breaks down fats.

These enzymes are also referred to as ferments for food digestion and must be preserved - they are very sensitive to heat. At 50°C (120°F) they are destroyed in about 4 hours. Honey should not be heated above 44°C (112°F) for any length of time.

The value of honey as a quick energy giving food is long recognised by athletes, horse and dog trainers and others to whom energy food is important. Doctors too, recognise honey as a first class food for invalids and **children over one year old** because of its ease of assimilation

## Granulation

Granulation is a perfectly normal progression for all honey types. The rate of granulation varies with

the moisture content and the source of the honey.

Honey produced from brassica crops and in particular oil seed rape, will granulate very rapidly. Hence it must be removed from the hive and extracted as soon as it is sealed. Honey from the raspberry crop will also granulate rapidly while that from white clover and bramble is quite slow. Honey with a high moisture content rarely granulates.

In general, on the Dextrose/Levulose ratio - the higher the Dextrose content in honey the more likely it is to granulate quickly. The ideal temperature for granulation is 14°C (57°F). Under that, the rate of granulation decreases. Naturally granulated honey generally contains coarse granules and is not attractive to the consumer.

## **Fermentation**

Honey with a moisture content in excess of 20% is very liable to ferment while honey with 17-18% moisture will rarely ferment unless it absorbs extra moisture when stored unsealed in a humid atmosphere. Hence the need to take off honey only when it is properly ripened and sealed by the bees.

It should be stored in dry conditions and when extracted, packed and sealed in air tight containers in a cool room, shed or even outdoors. There is no way in which fermented honey can be restored as a food product. Furthermore it should never be fed back to bees, as this would cause dysentery.

## **Heating Honey**

Honey for market or shows must be properly strained and to do this it is necessary to heat the honey. Honey will not normally strain through fine mesh or muslin as it is taken from the extractor, so the beekeeper must devise his/her own system. For general use a warming cabinet with an electric bulb and thermostat to control the temperature at or below 40°C (104°F) is very cheap to construct and very effective.

Otherwise it may be necessary to heat small lots by placing the containers of honey in a larger container of water. Stir the honey gently to avoid over heating. Remember that honey is a poor heat conductor and if left without stirring can overheat around the edges of the container.

## **Extracting Room**

Most small beekeepers have no special extracting room as such and resort to using the kitchen or scullery for the purpose of storing and extracting. It is well to remember that the room for storage and extraction must be absolutely bee proof. At time of extraction, usually in August, bees and wasps are on wing and will very soon take over if an entry is available. The same precautions against robbing are necessary in any room or special honey house.

There should be adequate room for the storage of supers for extraction, the honey extractor, containers for the honey, an uncapping tray and also space for the extracted supers. I recommend that layers of newspapers be placed where the supers are stacked prior to and after extraction. Most important of all is to have a plentiful supply of both hot and cold water to wash hands and the equipment used. Clean towels or cloths are also advisable.

Heat in the extracting room is absolutely essential and a temperature of 30 -32°C (86-90°F) is recommended to ensure efficient extraction. I always advise small beekeepers to remove the number of supers they can extract in the evening and extract them while still warm. Finally the utmost care should be taken to keep the extracting room, equipment and your personal apparel scrupulously clean and

hygienic.

## **Sorting Combs**

If honey of a particular colour grade is required for entry at honey shows it is essential to grade the combs prior to extraction. This is done by taking each sealed frame from the super and holding it up against a bright light. Different supers from the same hive or even adjacent combs in a super will be found to contain honey of a different colour.

For normal home use or sale it is not necessary to grade the combs for colour but it is essential to check for any unripe honey in the combs.

## **Uncapping Combs**

Before uncapping or removal of the wax cappings, the timber of each frame should be scrapped clean of wax and propolis. A standard uncapping tray or an improvised one is required for the cappings as they fall from the uncapped comb. With any such tray it is essential to have a nest for the lower lug of the frame while the frame is being uncapped.

Many beekeepers use a clean brood chamber with wire gauze or Queen Excluder attached to the base to hold the cappings as they drop from the combs. Place a suitable receptacle underneath this brood box to collect the honey draining from the cappings.

Using an ordinary serrated-edged hollow-ground carving knife, which is ideal for the small producers, the frames are uncapped. A steam heated or thermostatically controlled electric knife is recommended for the larger operator. Eitherways the frame to be uncapped is held firmly, leaning forward slightly to allow the cappings to fall into the container as the knife is moved upward from the base.

In recent times the uncapping fork is used on a wide scale. It simply breaks or removes the cappings by lifting them off. Of course this will result in much bulkier amounts of cappings. The cappings are allowed to drain for 24 hours or so and they are then given back to the bees in a miller type feeder to clear all the remaining honey. I should point out that heated uncapping trays may darken honey through overheating.

## **Extracting Honey**

Extraction of honey is done by use of a tangential extractor (hand or electrically operated) on a small scale or a radial extractor equipped with an electrical motor for the large operator. Choose frames of about equal weight for each load to prevent imbalance and rocking of the extractor. Be extremely careful with virgin comb as serious damage can be done by excessive speed.

There are many types of extractors on the market to suit all needs. I prefer to use stainless steel or polythene equipment but future hygiene regulations may require only stainless steel types.

The honey is then drawn from the extractor and strained into the settling tank through the standard strainer. This settling tank is often referred to as a ripener, which is a total misnomer because only the bees can ripen honey. The honey is allowed to settle in the settling tank for 24 hours and then drawn off into suitable containers or jars if for home use.

If for disposal to a wholesaler it will suffice to run it off into plastic buckets and skim off the wax on the top later. Store the honey in airtight containers in a cool shed.

Honey for show purposes must be strained through several thicknesses of butter muslin or better still

nylon organza. If extracting with a hand-operated machine do operate at a low speed to avoid a build up of fine air bubbles, which are impossible to eliminate later. Show honey should be extracted only from virgin comb to obtain a good sparkle.

To avoid fine air bubbles some exhibitors simply comb down the selected frames to the mid rib, then put the lot into a large bowl, cover with a clean cloth and place in a warm cupboard for 3-4 days. The honey is then skimmed and strained through a fine filter into jars. The straining cloth would be up to 200-micron mesh size for show purposes.

## **Run Honey in Bulk**

Many beekeepers prefer to extract the honey crop and sell it directly to a wholesaler or fellow beekeeper. This avoids the trouble of extra straining, heating and bottling. However certain standards must be adopted to preserve the quality of the product. Straining through a standard strainer or a double muslin cloth will suffice. The honey is then run into plastic buckets, left for a few days and then skimmed.

Remember honey must not come in contact with iron, galvanised iron or copper as acids in the honey decompose the metal and produce toxic salts.

Honey, if left exposed in containers, will absorb moisture, and taints from diesel oil or other strong smelling products. So always seal the containers and store in a dry cool place, never in heat.

## **Bottled Honey**

To obtain an acceptable product with a reasonable clear shelf life, honey must be heated and properly strained prior to bottling. Overheating must be avoided; otherwise loss of flavour and darkening of the colour will result.

To heat honey effectively an insulated cabinet made from plywood with aeroboard insulation is an essential. Fitted with a 60-watt light bulb and a thermostat, the temperature control is assured. This cabinet should be large enough to accommodate a sixty-pound bucket of honey. Internal measurements should be approximately 28" (71cm) high, 23" (58.5 cm) wide and about 20" (51cm) deep.

When the honey has heated for about 2 days at 32°C (90°F) it should be ready for straining through nylon organza into the settling tank and left for 48 hours to settle. It is then ready for transfer to the jars.

All jars should be standard honey jars. They should be washed in warm water to which detergent is added. Then rinse in cold water and stand them upside down to drain. Never attempt to wipe them dry else some of the fibre from the tea cloth may remain in the jars.

When dry, fill from the settling tank holding the jars at an angle to allow the honey flow down the side of the jar and thus avoid air bubbles. Finally, get a clean latex lined cap and screw tightly.

Always make sure that the required weight is in the jar - usually up to the base of the second ring. Jars must then be labeled making sure the weight is expressed in grams and lbs. The name and address of the producer should also be affixed, together with a tamper proof-sealing label produced by the Federation of Irish Beekeepers' Associations which is a guarantee of quality for the consumer.

(\* EAS Honey Show Note: Remember that at EAS, we do not allow any labels on entries, except the small ID # that will be added when you drop off your entries.

## **Preparation of Cut Comb**

Cut comb production has become popular in recent years as an alternative to sections. This is produced from unwired, light, worker based foundation or "starters"  $\frac{3}{4}$ " (2cms.) depth in frames.

When the comb is fully sealed, it is removed, cut out completely around the frame timber and laid on its side, on a queen excluder over a large tray. It is then cut into suitable pieces to fill the plastic container neatly in one piece. Cutting may be done with a sharp pointed knife but preference is for a template obtainable from any bee supplier.

The cut comb sections must be left on a grid to allow any loose honey to drain off. Granulation around the edges of the cut comb will occur quite quickly so the producer should deliver in small lots to ensure a quality product.

I might add that although this is a very lucrative trade, there is a limited local market but it is still a better proposition than Section Production in our variable climate. Preparing cut comb is a messy job, so use light plastic bags or untreated surgical gloves on your hands.

In general, there should be no evidence of granulation, fermentation, propolis or other foreign bodies and certainly no Braula or wax moth markings in any sample offered for sale.

## **Granulated Honey**

Some honey types crystallise slowly with a coarse grain which gives a product lacking the attractive qualities of fine, firm-grained honey which has a smooth texture like that of oil seed rape. Such honeys are best marketed in the clear form after heating to remain liquid for a reasonable period.

## **Natural Crystallisation**

The small time beekeeper is unlikely to bother with processing granulated honey but may wish to sell to the local shops, some crystallised honey, which has granulated naturally. In fact most honey shows specify a class for Naturally Crystallised honey (not soft set/creamed).

To provide specimens for such use it is best to choose honey from Oil Seed Rape or Clover. Such honey should be thoroughly strained through nylon organza and allowed to settle in the tank for 48 hours in a warm room to allow air bubbles to reach the top. It is then run into jars and capped securely.

The jars are then placed on the ledge of a window facing North with a mirror placed behind the jars to reflect the light. Turn the jars every four or five days. Stir with a clean paddle occasionally to help form a fine grain and prevent 'frosting'. When granulation is complete, store the jars in a cool dry room until required.

However if the honey, extracted, strained and stored in suitable containers crystallises rapidly and with a fine grain it is ideal for use as granulation honey for market or the show bench.

In order to get the ideal product proceed as follows. Place the containers of selected naturally granulated honey in a thermostatically controlled heating cabinet at a setting of 32°C (90°F) until the honey nearest the sides of the container has been softened. Stir the contents with a strong wooden paddle to distribute the heat throughout the mass and obtain consistency. Continue heating and stirring gently and make sure the honey does not liquefy.

When the consistency of porridge is reached, while still warm it is slowly poured into the warmed settling tank down along the side to avoid further air bubbles. Finally it is run into warm jars straight away.

The jars should then be allowed to cool slowly to minimise the risk of 'frosting'. Place then in a cool spot where there is no variation in temperature and also ensure that light is excluded. It is generally accepted that the ideal temperature for granulation is 14°C (57°F).

## **Frosting**

This is a condition found in granulated honey. As honey crystallises, any air in it is forced out to the side of the jar where it collects, causing a condition known as frosting. The air accumulates during extracting, as the honey is spun out of the combs by centrifugal force.

Again when straining, more air is trapped as the honey flows through the filter into the settling tank. Most of the air comes to the top when honey is allowed to settle but some remains trapped. When bottled honey crystallises the frosting appears in the form of irregular streaks or patches along the side of the jar.

Frosting spoils the appearance of an otherwise perfectly good jar of honey. This is less likely to happen if the honey is first let granulate in the containers. Then it is slightly heated and bottled after it becomes soft but not liquid. With individual jars, if a watch is kept on granulation, a light stirring with a clean wooden spatula before it sets will disperse the pockets of air and allow it to come to the top.

## **Creamed Honey**

There is an increasing demand for creamed or soft set honey in preference to granulated honey. This is mainly due to the fact that this type of honey has the consistency of margarine, has a very fine grain, is pleasant to taste and easily spread. To prepare creamed honey it is necessary to allow the honey to granulate naturally and then soften it by heat and 'seed' it with a fine-grained product.

## **Seeding Honey**

Take your bucket of coarsely crystallised honey and heat it to 43°C (112°F), until it is liquid again. This should be done slowly over a couple of days. When the honey is clear it should be allowed to cool to 18°C (64°F).

You should then prepare a sample of fine-grained honey (approx. 10%) and this should be heated at approx. 21°C (70°F) until it has softened. It should then be stirred with a wooden stick or wooden paddle until it has a consistency of porridge. This is the 'seed'.

It is then poured into the bucket of liquid honey, stirring to evenly distribute the fine-grained honey. Maintain an even but not too quick stirring motion until the seed is well distributed. Set aside for a few days to crystallise. Heat your bucket of honey again, this time to about 30°C (86°F).

When the honey has softened, stir it until it is again quite mobile, something like porridge. The honey is then ready for bottling.

When the honey has been bottled it should be placed in a cool place 12°C (53°F) for a few days, during which time it will set to a consistency of firm butter. This is known as 'set' or 'soft set' or 'creamed honey' and can easily be spread.

Soft set/creamed honey does not have the same keeping qualities as naturally crystallised honey unless retained in a controlled temperature of around 12°C (53°F). If your honey granulates naturally to a fine-grained texture then 'seeding' is unnecessary. To produce soft set honey from it, simply heat to 30°C (86°F) until the honey has softened. Then stir until it can be poured and bottle.

The secret to getting a good sample of either natural crystallised or soft set honey is to prevent frosting. This ugly pattern forms on the inside of the jars, mainly under the shoulders of the jar. It is caused by air in the honey being squeezed out as the honey crystallises. It occurs more in naturally crystallised honey than in soft set honey

## **Exhibiting Creamed Honey**

Only light or medium honey produces a satisfactory show honey in this class as dark honey crystallises to a brown muddy colour.

- ^ Both honey and jar must be spotlessly clean, the telltale specks usually appear at the base of the jar.
- ^ Naturally set honey should have no wetness on the surface. It should be dry and firm and free of fermentation and solidified froth.
- ^ The jar should be free of frosting.
- ^ A fine-grain texture rather than a coarse grain with a light creamy colour is preferable.

Soft set/creamed honey should have all the points outlined above. It should have a good texture, be slightly smoother on the tongue than naturally set honey and have a good taste and a pleasant aroma. Its main difference from naturally set honey should be that it can be easily spread. It should have the mobility of butter.

## **Chunk Honey**

Chunk honey is prepared for a specialised market and consists of putting one or more (preferably one) neatly cut slabs of comb honey into the glass jar and filling the vacant space with clear honey.

As with cut-comb the selected pieces are cut from well sealed, shallow combs drawn from thin unwired foundation and placed on a grid for some hours to drain. This slab of comb should be placed in the jar which should then be filled with light honey which has been previously heated to 49°C (120°F) and allowed to cool as in the preparation of clear honey. This will ensure that the honey will stay liquid for a reasonable time.

The comb honey should have all the qualities as specified for cut comb and the liquid honey should be of the same colour and flavour as the piece of comb.

In order to ensure that granulation of the liquid honey does not take place, make regular small deliveries to your outlet rather than large deliveries which may be on the sales bench for a considerable period.

## **Heather Honey**

Ling Heather (*Calluna Vulgaris*) honey is quite different from other honey types. It is thrixatropic i.e. it sets like jelly and as such it is not possible to extract or strain it in the normal way. Instead, it is forced out of the comb by means of a heather press. This press consists of a bed and a screw-operated pressure plate mounted over a trough.

The combs, cut from the frames, are wrapped in four thicknesses of butter muslin or special linen scrim, (available from your dealer), and placed in the press. The screw is then turned very slowly to apply pressure by the upper heavy plate on the mass of comb in the cloth. The honey is forced out by pressure into a container underneath the heather press.

An alternative to cutting out the comb from the frame is to use a special Smith cutter/scrapper. Insert the

tensioned wire into the comb at one end of the frame and draw downwards. Then reverse the tool and scrape off the honey comb down to the midrib. This honey is then pressed out in the heather press.

It is very important to ensure that in pressing heather honey for sale or show, it should not be heated beyond hive temperature at best. Preferably it can be stirred vigorously instead of heating to ensure liquidity sufficient for efficient pressing. As with liquid honey always ensure a temperature of 32°C (90°F) in the operating room.

The combs, which are scraped down, may be used again and the bees will readily draw them out. If cutting out of the comb is the normal procedure then it is necessary to use only starters of comb 1" (2.5cm) deep in the frames instead of full sheets of wired foundation.

Never use comb in which brood was reared. Once pressed through the linen scrim no further straining is required. To obtain a good sample of heather honey use only full sealed combs for extraction.

Remember the honey obtained from the lowland bog heather is less likely to be as pure as the mountain heather due to the many flowering plants adjacent to bogs such as Willow Herb, Knapweed, etc.

Pure heather honey will not readily granulate. It should be gelatinous, with a rich, dark to light amber colour with a slight bittersweet flavour and a pungent aromatic odour. The large air globules imprisoned in pressing the honey from the comb do not rise to the top as in liquid honey. Their presence in the jar gives a pleasing appearance to the honey by reflecting light. The larger the bubbles the more attractive is the specimen.

Once the heather honey is extracted by pressure it can be bottled right away without further treatment or heating. If jars of heather honey show signs of slight granulation, it is best to empty the lot into a container, 'warm' it slightly and rebottle.

When rebottling, make sure the jars are spotlessly clean and fill to near the brim because heather honey takes up more space than liquid honey. Then inspect for small black spots or particles of wax that may have passed through the straining mesh. These are easily removed with a thin piece of clean wire. Screw lids on firmly and store in a dry reasonably warm place.

## **Treatment and Storage of Extracted Combs**

When the combs of honey are extracted, they are placed in the supers. The supers are then stored wet in a bee proof room which is dry and cool - otherwise the residue of honey in the combs will ferment. Stack the supers, with sheets of newspaper between each super. On top of the stack place a queen excluder and a crown board to prevent mice gaining entry.

I have stored supers of comb in this manner for years with great success. When added to the hives the following spring bees will use the residue of honey and work the supers with vigour.

An alternative to this method is to return the supers of extracted combs to the hives and let the bees clean them out. The supers should be placed on the hives in the evening, when bees have ceased flying. Stack two or three supers on each hive over the crown board with the feed hole open and with a bee-tight roof on top. Reduce the entrance to prevent robbing. Make sure bees have no point of entry from outside. The bees will clean out the honey in the combs and store it in the brood chamber.

After two or three days the dry supers can easily be cleared of bees by use of the porter bee-escapes. The supers are then stored in a dry cool room till required again in spring, placing sheets of newspaper between them and a queen excluder or hive roof on top to keep mice out.

Damage from wax-moth larvae can be extensive in combs that are stored dry or have had brood reared in them but such damage rarely if ever occurs with combs stored wet. This damage can be prevented by



the use of Paradichlorobenzene (P. D. B.) crystals but I am extremely conscious of the danger of residue in the combs later. Hence I prefer to store the combs wet and not have to resort to chemicals.

I strongly advise against the system of putting wet supers out loose in the apiary for bees to clean them. It encourages robbing by both bees and wasps and results in the combs, especially fresh ones being torn asunder and ruined by fighting bees boring through the midrib of the cells. Furthermore, it provides food for wasps and neighbours' bees and is about the best way I know of spreading disease in the apiary.

## **Shallow Frame for Extraction**

(\*) EAS Honey Show Note: This is our 'frame of honey' class H11, any size, plastic or wood.

In order to produce and prepare a frame of honey suitable for extraction, it is best to consider the essential characteristics which judges look for. The most suitable frame must be the one, which contains the maximum honey and is well and evenly drawn out to assist in uncapping. It should also be free from granulation, pollen, propolis, Braula tunnels and wax moth damage. Finally, it should be clean in appearance and have uniformity of honey colour.

The selected frames should be of the Manley type. The foundation should, if possible, be drone-based which is easier to extract and unlikely to contain pollen because bees rarely if ever place pollen in drone cells. The woodwork of the frame should be free of stains and propolis. Finally, it is essential that wired foundation only be used otherwise the frame could not be regarded as suitable for extraction.

## **Preparation of Sections for Sale and Market**

Section honey production is one that requires great skill in management of the colonies and the preparation of the section material for the bees. Bees may well work supers for run honey production but are often slow to do a similar job in the confined space of the section crate. Naturally the weather during the term of the 'honey flow' and the available flora is also vital.

To obtain good sections, there must be an uninterrupted flow for at least a week or more. A broken period will result in uneven capping, mixed honey types and poorly drawn comb. The colony must be at its peak to provide the maximum number of foragers during this short period and there must not be any preparations for swarming. The strain of bee is also important as some strains produce only dull, flat, concave cappings, which are not attractive. The best source of nectar for section production is Hawthorn, Wild White Clover or Fuschia.

Various methods of obtaining suitably strong colonies at the critical time include:

1. uniting two good swarms;
2. having a strong swarm in a shallow super, placing a Waldron Queen excluder on top and then placing the section crate in position;
3. having a strong colony with a shallow super in position.

When the flow occurs take off the super, brush the bees into the brood chamber and replace the super with a crate of specially prepared sections.

## **Preparation of Section Crates**

There are two types of sections in use

1. the standard Basswood, with three split sides and

2. the round plastic type, which bees seem to prefer because there are no corners to fill and the queen will rarely lay in them

In preparing the square sections for show purposes, paint the inside of the section prior to assembly, with a coat of molten bees' wax using a small paintbrush. Warm the sections prior to painting with wax but do not paint the corner joints else when folding, the joints will crack. Always use fresh foundation. Bees often refuse to work stale material. It is always advisable to use a special section-folding block to prevent breakages. When inserting the worker cell based foundation, ensure that the point of the arch of the cell is towards the top. Also insert the foundation only to within ¼" (6mm) of the base of the section to prevent sagging. Dividers should always be used and I prefer straight ones without any cut at the top or bottom.

If there is a prolonged flow, add further crates as required. Always place the new crate under the partially filled one to avoid travel stain. When fully sealed the crates should be removed very carefully using the clearer board and porter bee escape. Use the minimum of smoke and take indoors the following day. Remove any burr comb and store crates in a warm bee proof room with layers of clean newspapers between them. Remove the sections from the crates very carefully to minimise risk of damage. Scrape each section free of propolis and wax, including the edges of the timber or plastic and store in sealed biscuit tins in a warm room, making sure each section is placed upright as it was in the crate.

In general, good sections should weigh about 16ozs. (454g), and have even cappings with an absence of weeping or granulation. Cleanliness of the wood or plastic is absolute while there must not be any evidence of Braula or wax moth damage. When offered for sale or entered in a show, sections should be covered with cellophane wraps (available from your local bee-keeping stockist) to protect against dust and insects. Never glaze sections in storage as contraction of the wrap may cause squeezing and resultant weeping in the sections. Apply the wrap before sales.

Finally, potential customers or worse still, curious shoppers, lifting the sections by pressing the comb and causing cell breakages and leaking honey, can easily damage sections.

Traders should be advised how to handle sections - gripping by the wood, or with round sections, by the plastic. They should advise shop assistants to put sections on display out of reach of the shoppers. I personally have seen a dozen lovely sections ruined in one day by curious shoppers handling them by pressing the comb.