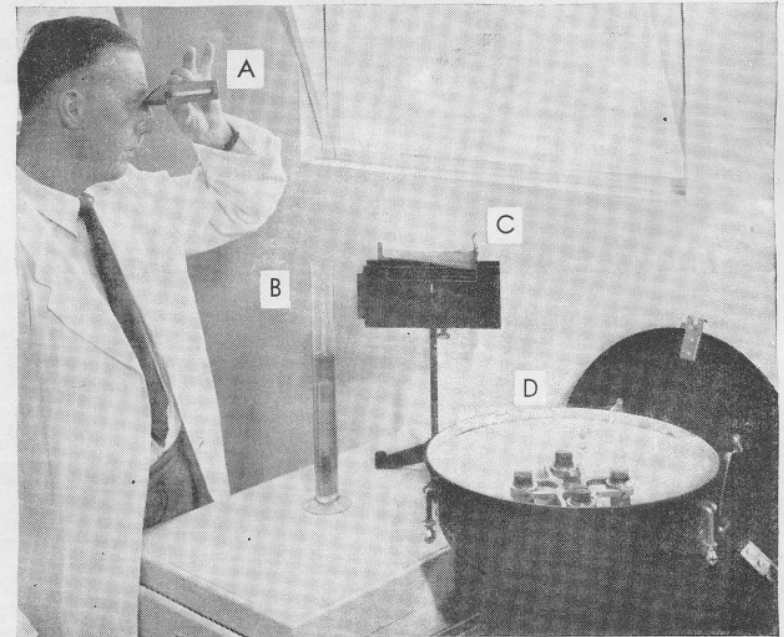


Factors Affecting Honey Quality

NEW ZEALAND beekeepers generally are excellent honey producers and their methods, plant, and equipment are equal to the best in other beekeeping countries. A profound knowledge of honey production does not necessarily provide beekeepers with the technical qualifications required to supply the consumer with packed honey of the highest quality, though there are a number of producers and packers whose honey leaves little to be desired and reaches the market in excellent condition. To protect the quality of honey precautions are necessary even before it is produced. These must be strictly observed in apiary practices and during extracting and packing. More producers are entering the retail trade and are experiencing its problems, and this article by R. S. Walsh, Honey Grader, Department of Agriculture, Auckland, offers such producers some suggestions for preserving and improving the quality of honey from its inception as nectar until it reaches the retailers' shelves as packed honey.

SOURNESS and early fermentation of honey occurring in some districts can be traced to combs of honey stored over winter in the honey house and fed to the bees the following season. A separate and specifically designed part of the honey house, or better still a special building, should be used for storing feed honey. Only the best supers should be used and each stack of supers should stand in metal trays and be well covered.

Feed honey stored under crude conditions is a serious source of contamination. Souring honey fed to bees



[Sparrow

Instruments assist greatly in the preparation of uniform blends during honey grading. Illustrated are: A—Honey refractometer for measuring the water content of honey samples. B—Chataway honey hydrometer for measuring water content in larger volumes of honey. C—Pfund colour classifier for determining accurate colour readings. D—Electric centrifuge for clarifying honey before testing for colour.

will leave a taint in the combs which can be imparted to freshly gathered nectar. Honey tainted in this way is seldom low in specific gravity when it first reaches the market.

Honey houses in which feed honey is annually stored without special provision emit an odour of fermentation and remain a permanent source of contamination to all honey extracted or stored in them.

Wet Combs

Many beekeepers store their extracted combs "wet" over winter. This is not desirable, particularly in the North Island. The honey remaining in the combs absorbs moisture, allowing yeasts to develop which will contaminate the new season's honey stored later in these combs. Over-wintered wet combs can also transmit sour taints and any undesirable flavour from low-quality honey previously gathered. Climate in parts of the South Island is similar to that in the North Island and over-wintered wet combs can be just as unsatisfactory in these areas.

In addition to the danger of tainting and fermentation, coarse crystals are inevitably added to the new season's crop. Heating honey to a temperature of 140 degrees F for 30 minutes will destroy yeasts, but does not melt out all the dextrose crystals carried over in such combs. The larger the crystals are the greater or more prolonged is the

heat required to melt them. This is the reason why some packs of honey develop coarseness of grain, though given the standard treatment successfully applied to the average pack.

Early Extraction Recommended

Nothing is to be gained from leaving honey on the hives any longer than is necessary. As the cooler weather approaches atmospheric moisture increases, pervades the hives, and is absorbed by the honey. Clustered bees and hives weak in bees cannot cope with such excess moisture and strong hives have to cope with additional moisture created by the exhalations of the occupants. Honey that has been extracted while the weather is dry and warm is in the best condition for storing in 60 lb tins for repacking later in the year.

It is not generally known that granulated honey ferments much more readily than liquid honey. When dextrose hydrate crystals are formed the liquid phase has a higher water content than the entire honey had before granulation. Unless honey has a high specific gravity it cannot support an increase in water content, and in most honeys only a slight increase permits the growth of sugar-tolerant yeasts which, unless destroyed by sterilisation, will result in fermentation.

If possible, honey should be stored at temperatures below 55 degrees F.

Temperatures around 60 degrees F should be strictly avoided, as fermentation occurs at this point much more readily than at any other temperature.

Under-capped Honey

That honey should be well capped before removal from the hives is well understood by producers, but its importance is such that reiteration is always justified. Recent investigations have shown that up to 80 per cent of water can be held in uncapped portions of a frame of honey, and the moisture entering a tank from 50 to 100 such combs must be considerable. Even fully capped combs frequently contain excess moisture and have been observed actively fermenting. No doubt the light-bodied honey found at times on the surface of tanks that have been well covered could be traced to this source.

It is important that queens should not fail during a honey flow, as this results in a falling off in the efficiency of the house bees and stored nectar is liable to be neglected, leaving the water content much too high.

Starter Honey

Sourness and fermentation in packed honey can be traced in a surprising number of instances to the starter honey used. This may not be generally realised, but starter honey low in specific gravity is a definite source of contamination. Some of the methods used in producing creamed and spreadable honeys require a more than average amount of starter. Starter should be specially prepared for the work it is to do.

Honey set aside as starter should be sterilised and "seeded" with a small quantity of fine-grained honey from the current season's crop and kept in the cool room until required. It is a common practice to leave sufficient honey in the packing tank to "start" the honey with which the tank is re-filled. This would be preferable with new season's honey to using old starter that may be souring or low in specific gravity. It is, however, a poor method if a consistently fine grain is to be maintained.

Every tank of honey requires some fresh starter. If a portion is left in the tank for starting, the only genuine starter the fresh honey entering the tank receives is the small proportion of the original starter contained in the honey left in the tank. Before the honey allowed to remain in the tank in the belief that it is all starter could reach this condition it would need to be placed in the cooler for a minimum of eight days to allow the "seed" to develop.

Agitation

There is a demand for "spreadable" honey and some methods used to produce this class of honey have resulted in too much agitation of the product. Honey so treated loses its flavour and

becomes so impregnated with air that the container cannot always hold the correct weight of honey.

Honey of low moisture content can stand a certain amount of agitation and retain its keeping qualities, but honeys approaching a specific gravity of 17.2 per cent cannot stand excessive stirring and pumping at high speeds. Large quantities of air bubbles containing yeast cells become incorporated in the honey and the agitation breaks down the crystals, releasing the water held in suspension. This provides a suitable medium for the development of yeasts and fermentation quickly follows. Though darker honeys appear lighter in colour, they lack the lustre of normally treated honeys and soon develop a muddy or mottled appearance.

The demand for spreadable honey creates difficulties for producers, as the degree of plasticity in all honey with a normal laevulose/dextrose (L/D) ratio is governed by its water content. Naturally spreadable honey is always high in specific gravity and the phenomenon known as "frosting" does not occur in this type of honey.

Protective Covering

It was once considered correct practice to expose honey in open tanks for ripening. No greater fallacy could be imagined in the light of present knowledge, especially in the New Zealand climate. Honey readily takes up moisture from the atmosphere when the humidity is above 60 per cent. In many areas in the North Island humidity is mostly above this point and even in the South Island it is surprising how frequently humidity is high, especially at night and in the early morning. Humidity is relative to the temperature of the air and hot air can hold a lot more moisture than can cold air. Tanks and other utensils holding honey, extractors, supers of honey, and wet combs should be kept covered to the fullest possible extent.

It is hygienic frequently to sterilise honey house equipment and it also provides protection against dangerous yeast cells.

Blending

The blending of various honeys should result in a pack of uniform colour and flavour if the blender is familiar with the natural characteristics and the various flavours of the honeys used.

In districts producing predominantly clover honeys blending may not be necessary, but provided the blending is confined to clover sources, few problems are likely to be encountered. It is, however, much more complex to prepare a good blend from a variety of honeys.

Overseas firms specialising in honey employ blenders who follow methods similar to those practised by the Honey

Marketing Authority's depot in Auckland. Grading with the help of scientific instruments assists greatly in the preparation of uniform blends. The Pfund honey classifier gives accurate colour readings and a refractometer or hydrometer determines the moisture content of the honey. The grader is also familiar with the various flavours, off-flavours, taints, and distinctive characteristics associated with certain honeys. His written comments covering each line of honey are a valuable guide to the blender in his preparation of a palatable blend of honey uniform in flavour, colour, and moisture that will remain stable for a reasonable period at room temperatures.

It is surprising how narrow are the limits within which a blender must operate to produce a light-coloured blend of mild flavour. A light-coloured blend must consist mainly of light honeys, though a little dark honey can be used if the flavour is sufficiently mild. It is in the flavour that the danger lies. Dark honeys are as a rule strong or pronounced in flavour and a small quantity will impart its characteristic taste to the blend. Even light honeys with a distinctive penetrating flavour such as rata can be used only sparingly with clover honey if the delicate clover flavour is to be retained.

Small quantities of strong-flavoured honey used in a blend, and barely discernible when packed, frequently become more pronounced in time and tend to spoil the pack. Light amber blends should comprise all light amber honeys, as dark honeys are too costly in the quantity of white honey required to raise the colour points to the required standard.

The problem of maintaining a mild flavour has also to be considered. A blend of all dark honeys is not so difficult, as a medium flavour is expected in this type of pack, and when dark honeys are blended flavours even out and the pack is almost invariably superior to the individual honeys used.

Coarse-grained honeys present the blender with yet another problem that was mentioned earlier in this article.

Sometimes blending is made difficult by an unbalance of sugars in honey. Extremely coarse-grained honey is affected in this way and so are non-granulating honeys. Poor granulation in honey high in laevulose can be attributed to the slowness with which dextrose crystallises from solutions of high laevulose content. The application of heat and the addition of honey high in dextrose is the only satisfactory way to deal with these honeys.