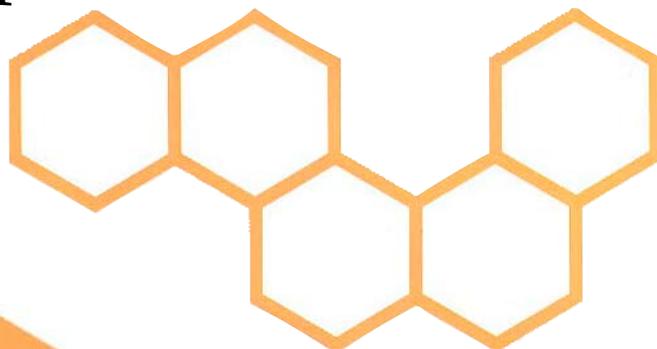


# THE WONDERFUL STORY OF AUSTRALIAN HONEY



Find out how bees make honey  
and how man has learnt their secrets

# THE WONDERFULL STORY OF AUSTRALIAN HONEY

The honeybee is the most amazing creature in the insect world. The bee's body is delicate, her life is short and enemies are many. Yet these daunting drawbacks are shrugged off as the bee goes daily about her task of collecting nectar and pollen to take back to the hive so that future

generations of bees can thrive. And the bee is willing to die to defend the hive.

Even though throughout history man and animals have plundered beehives for a taste of honey, the honeybee has survived and adapted to climates and conditions far removed from that where bees were first recorded.



## *History*

If we journey back 4000 years to ancient Egypt, hieroglyphics show the story of the bee's life. So primitive man had discovered the delight of honey by then — for centuries it was the only sweetener available.

In the 4th century B.C., Aristotle wrote of the bee. Three hundred years later, Virgil the poet and Pliny the naturalist, carried the story further.

In England under Saxon rule, honey was accepted by some landlords as part-payment for rent from tenants. The bee had truly earned a

valuable place in society.

In 1792 a blind naturalist, Huber, published a book in Geneva on bees and honey. The honey industry that we know today began to grow. Sixty years later in Philadelphia, Lorenzo Lorraine Langstroth, a minister and teacher, invented a new kind of beehive. It was a rectangular wooden box in which he stood a row of frames. Each frame provided a place for bees to build the wax cells that form the honeycomb. The frames could be taken out separately so that one honeycomb could be removed without hurting the others. The Langstroth hive is used by all Australian beekeepers today.

### Introducing the bee to Australia

The honeybee is not native to Australia. The colonists who came to Australia in its early days missed so many of the comforts and treats of “home” (England), they tried to introduce many of them to their new country. Plants, trees, animals, birds and many other reminders of home were introduced during those early years.

In the early 1820's the honeybee was brought to Australia aboard the ship Isabella. She arrived in our waters in 1822 and adapted so successfully that other bee species were introduced from Italy, Yugoslavia and North America.

Far Left: A forager collects nectar from a flower usually within 200 metres of a hive.

Left: A bee hive colony. Bees take well to collecting nectar from Australia's gum trees.

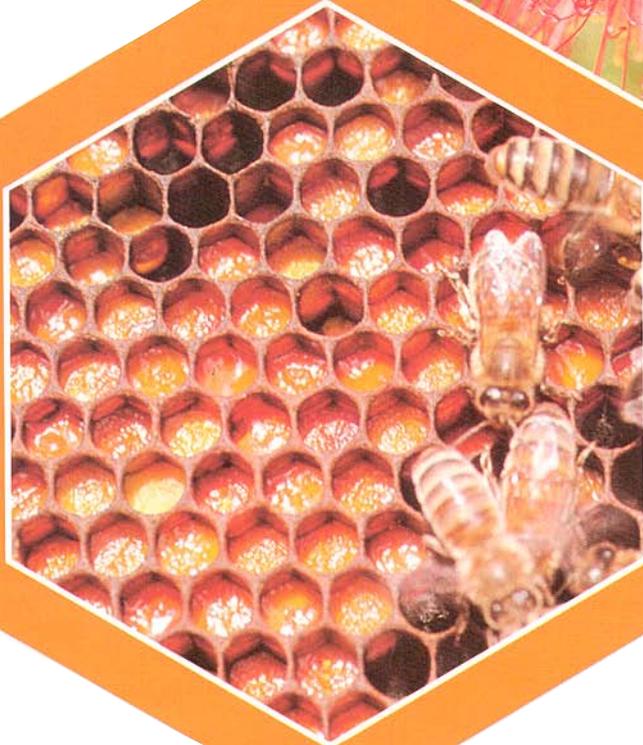
Below left: Hives are specially designed so single trays can be removed when filled.

Below right: Honeycomb is very precise. Each cell fits against its neighbour snugly.

Right: Australia's unique floral sources are an excellent nectar source for honey making.

### Outstanding Engineers

Bees are inspired engineers. Each wax cell in the comb has six sides and all cells have a slight backward tilt so that the honey will not spill out. Wax cells average 140 to the one centimetre in thickness and each cell fits snugly against its neighbour on all sides — a construction so strong and cleverly planned down to the most minute detail that we never cease to find the work of these little creatures truly amazing.



## HOW BEES MAKE HONEY

It has been said that except for man, nowhere in the world is there anything to compare with the incredible efficiency of the industry of the honeybee. Inside the beehive each bee has a special job to do and the whole process runs smoothly.

Bees need two different kinds of food. One is honey made from nectar, the sugary juice that collects in the heart of the flowers. The other comes from the anthers of flowers, which contain numerous small grains called pollen. Just as flowers have different colours, so do their pollen.

Let us go with the honeybee from her flower to the hive and see what happens. Most bees gather only pollen or nectar. As she sucks the nectar from the flower, it is stored in her special honey stomach ready to be transferred to the honey-making bees in the hive. If hungry she opens a valve in the nectar "sac" and a portion of the payload passes through to her own stomach to be converted to energy for her own needs.

The bee is a marvellous flying machine. She can carry a payload of nectar or pollen close to her own weight. Consider that even the most advanced design in aircraft can only take off with a load one-quarter of its own weight and you'll appreciate the miracle that the honeybee can remain airborne with such a load.

When her nectar "sacs" are full, the honeybee returns to the hive. Nectar is delivered to one of the indoor bees and is then passed mouth-to-mouth from bee to bee until its moisture content is reduced from about 70% to 20%. This changes the nectar into honey. Sometimes the nectar is stored at once in cells in the honeycomb before the mouth-to-mouth working because some evaporation is caused by the 32.5°C temperature inside the hive.

Right: Bees manufacture honey by passing collected nectar from mouth to mouth until its water content is reduced. The honey is then stored



Above: Much of the nectar collected by bees is stored in their stomach, but special pollen "baskets" are also on the legs. Bees can carry nearly their own weight in pollen or nectar.



Left: Special “bee bread” — is a mixture of pollen and nectar — is fed to larvae by worker bees.



Above: Bees are tireless workers during their short life. The bees may visit thousands of blossoms during a single day.

Finally, the honey is placed in storage cells and capped with beeswax in readiness for the arrival of newborn baby bees. Pollen is mixed with nectar to make “bee bread” and is fed to the larvae. A baby bee needs food rich in protein if the bee community is to flourish.

Before returning to the flower again for more pollen, the bee combs, cleans and cares for herself - not because she is vain but so she can work more efficiently. Throughout her life cycle, the bee will work tirelessly collecting pollen, bringing it back to the hive, cleaning herself, then setting out for more pollen.

Forager bees start out from the hive for blossom patches when three weeks old. As they live to be only six or seven weeks old they have much work to do and little time in which to do it.

There will be many other bees working at the same time, and the air will be noisy with their droning. It takes 300 bees about three weeks to gather 450 g of honey. On average, a hive contains 40,000 bees.

## THE TYPES OF BEES

### The Queen bee

The Queen is the centre of the hive: She accompanies every swarm that you see. The Queen is also the largest bee and her body is specially formed for egg-laying so that the eggs can be placed a little above the centre of the cells in the honeycomb. Before depositing her eggs, she inspects each cell to be sure it is properly cleaned by the workers. Just think of her effort and industry!

When, for any reason the colony needs a new Queen, extra royal jelly is fed to chosen larvae in the cells. The first young Queen to emerge from the pupa destroys all other developing Queens in the cells, then sets out on her mating flight after five to twelve days.

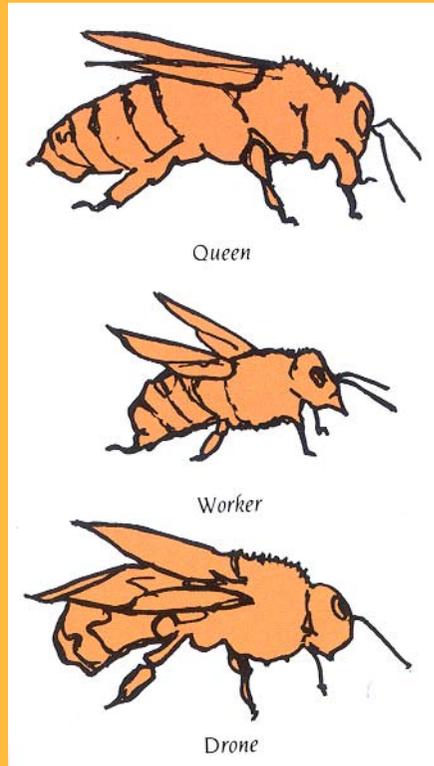
After mating the young Queen has much to do. With her eggs fertile, she must return swiftly to the hive. The old Queen will have left with a swarm beforehand. The new Queen, closely surrounded by worker bees who feed and groom her, can lay up to one egg every minute day and night.

### The Drones

Drones are the future fathers of the bee colony (rather a very small number of them will be). Shorter than the Queen, drones are larger than the workers. They have no accomplishments other than being patient. They cannot make wax, have no proboscis for collecting pollen or nectar, and have no pollen spikes on their legs. They are never called on to defend the hive so they have no need for a sting.

Drones rarely feed themselves - instead, they hold out their tongues and a worker bee places food on it. They are truly gentlemen in waiting. They are waiting for the day when a young Queen will fly from the hive. When a new Queen flies from the hive she joins the drones, who are already circling in drone congregation areas. The swiftest drones will catch and mate with the Queen, but their life is short. After mating, they will float back to earth and be dead by the time they reach the ground: They have helped to bring new life to the colony and their work is finished.

The remaining drones return to the hive either to be driven out or to die there during the winter or when a shortage of food occurs:



### Worker bees

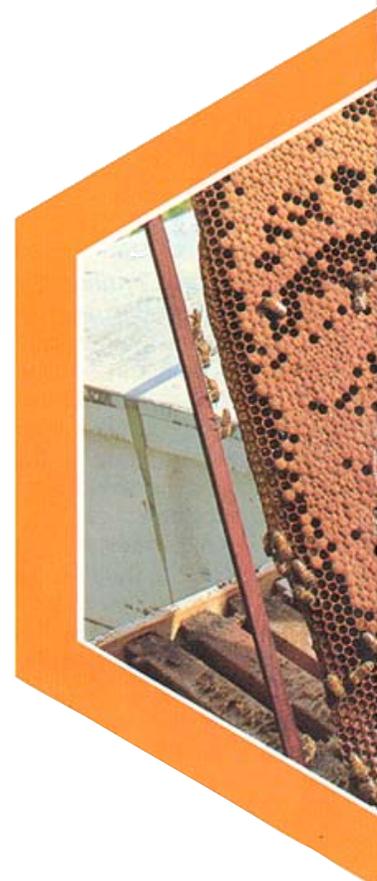
The main section of the hind pair of legs has special spines for holding pollen or propolis (a kind of gum). The centre legs are the bees' main support, but all six legs are variously equipped with brushes, combs and spurs with which to brush pollen from the eyes, clean the antennae, wipe dust from the wings and pack pollen spines.

The tongue and mandibles are used to lick and collect pollen grains from the anthers of flowers, with the result that the pollen grains are moistened with honey and stick together. The pollen is then transferred to the hind legs and held firmly until the forager enters the hive, when it is then packed in cells in the honeycomb.

Worker bees have two heavy spoon-shaped jaws which work sideways. The jaws are used for collecting pollen and chewing wax. The abdomen has two important organs - the wax glands and the sting. Wax glands are special cells on the under side of the last four segments of the body. Wax is discharged through these special cells in tiny scales, which are then moulded and used in comb building, capping and the cells.

Right: When a bee larvae hatches, they are immediately fed royal jelly by nurse bees.

Below: The Queen bee lays her eggs a little above the centre of the cell in a circular pattern.

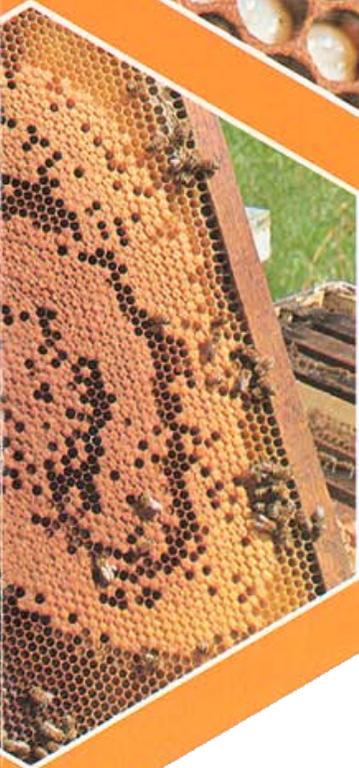
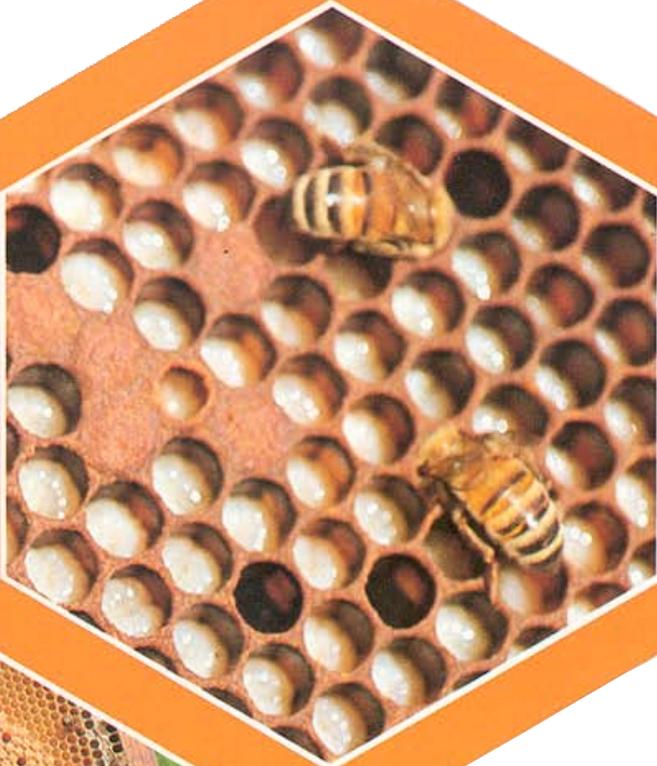


### The language of the bees

Bees cannot talk. Their language is one of vibration. To indicate distance, the scout bee uses an audible code of buzzes, on a 200 cycle per second note

with a pulse rate of 35 to the second. The length of time on a wagtail run and the number of pulses of sound in each buzz indicate distance.

Below: Young bees emerge from their "nursery" cells.



### Life in the hive

In her lifetime, the Queen can produce more than one million eggs. At first, after the eggs are hatched, all the larvae are fed on royal jelly - a milky white fluid made by a gland in the nurse bees' head. This rich food helps larvae to grow strongly. After three days, the workers' diet is changed mainly to pollen and nectar, while the Queens continue to be fed on royal jelly.

On the eighth day, the larva spins itself a silken cocoon and during the next week or two makes the great change from pupa to adult. It gnaws its way out of its cocoon and, as it gains strength, joins the workers in their task of foraging or engineering, nursing the young, converting nectar into honey, cleaning the hive and waiting on the Queen. So the life cycle goes on!

Above: Bees cap cells full of honey with wax (beeswax)

Right: When hives are filled with honey, they are loaded on to a transporter with a mechanical hoist.

Centre: The wax cap is removed from the cells with a heated knife.

Far right: Uncapped frame is then placed in an extractor to collect honey.



## HARVESTING THE HONEY

As soon as the honeycomb in the hive is filled with honey and capped with beeswax they are ready to be harvested. Beekeepers regularly inspect their hives to see when the honeycomb can be removed.

Honeycomb is removed from the hive and taken to a mobile extracting van or central extracting plant called a "honey house". The wax cappings are removed with a steam heated knife or special revolving blade before the honeycomb is placed in the extractor. The honeycomb is then placed in revolving baskets where the spinning movement throws out the honey by centrifugal force.

Little or no damage is done to the delicate honeycomb by this process and when it is returned to the hive, the bees immediately set about removing any left-over honey plus repairing and polishing each cell in readiness for a new load of honey.

Honey collected from the extractor is then strained and left to stand until air bubbles rise. Bubbles and any left-over wax particles are skimmed from the surface and the honey is ready for bottling.

It truly is straight from Nature's storehouse! Most apiarists (beekeepers) send their honey in bulk to city and country packing houses. Some have their own bottling equipment and sell the honey to retail and wholesale stores.

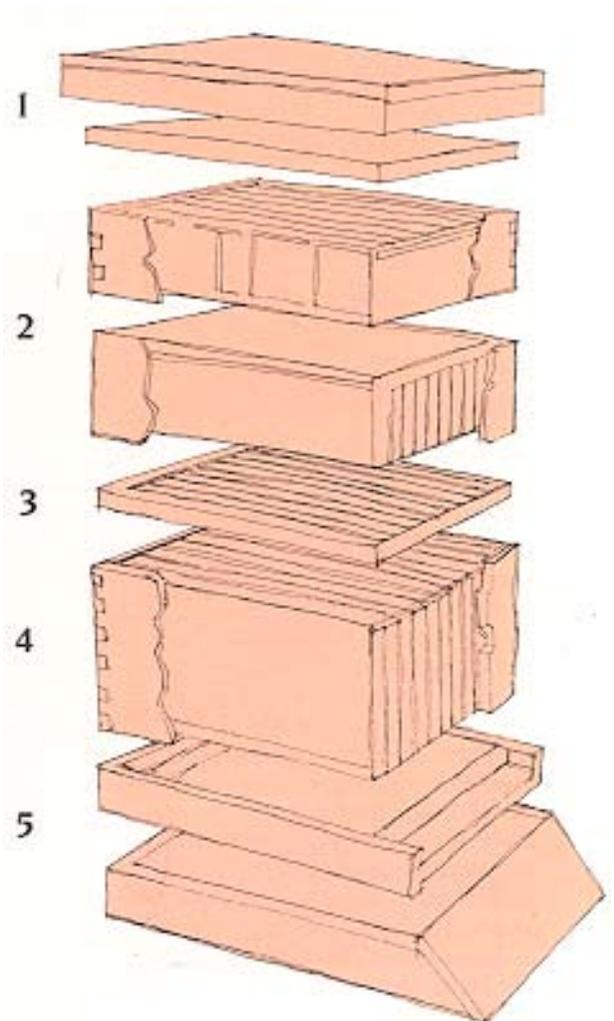


### How does a bee find pollen?

Honeybees prefer to work close to their hive. Beekeepers move hives occasionally to give the bees access to a good floral source. Bees tend to work less than 200 metres from the hive, but can range up to more than 1.5 km away if necessary. Scout bees have the task of finding new nectar sources and head out to check all nearby vegetation. If they find nectar, they return to the hive and pass on the exact location with a remarkably intricate dance routine.

### A PLAN OF THE HIVE

1. Metal covers help to insulate bees from heat and cold.
2. The “supers” or larder. Upper structure shows beeswax comb in individual boxes for surplus honey . lower shows full frames for storage honey which may be extracted from the comb or cut from it in chunks.
3. Special frame or “Queen excluder” to keep the Queen in the brood chamber below.
4. Deep “super” for the brood chamber or nursery.
5. Upper picture shows the bees’ doorway, a small wooden bar that can be arranged so as to make the entrance small or larger. Lower picture is a stand to keep the hive from the ground.



### The dance of the bee

Once pollen, nectar or water is found, the scout bee returns to the hive and dances on the honeycomb to indicate where the source may be found. Many factors indicate to the worker bee the precise position.

Wings vibrating swiftly as the scout bee dances in a circle indicates that the find is within 100 metres of the hive. If the source is further away,

the dance will be a “wagtail” roughly in a figure eight with a straight centre section. The direction in which she runs the centre and the speed of her movements tell how far to fly and in which direction.



## ALL ABOUT HONEY

How many honey types do you know? Look along the shelves of your grocer, super-market or health food shop. The larger the store the more types of honey you will see.

See just how wide is the range of honey that you can choose from. There will be blends of golden liquid honey ranging from pale yellow to deep rich amber, jellied, creamed or candied honey.

You may even be able to buy honey in the comb — a favourite “sweet” for many as it has a good chewy quality. It’s tasty and it’s fun, and you can eat the wax, too.



### Flavours and colour

All around Australia bees are busy visiting flowers to collect nectar and pollen. The flowers visited give honey its flavour and colour. Should the honeybee visit a mixed patch of flowers, a special perfume left by the scout bee tells the workers to take the nectar from only one source so that honey in the hive is but one honey type.

Honeybees have an excellent sense of smell to distinguish between the different perfumes of the flowers and also have a “perfume dispenser” to tell other bees the types of flowers that have been chosen. The bee can also distinguish colours in the blue/green end of the spectrum - and has a time sense, too.

There are more floral sources ideal for honey-making in Australia than any other country - so we have the widest range of tastes and colours. The best loved Australian honey flavours come from:

#### Blue gum:

A light amber. Choice forest honey from the south.

#### Karri:

An amber honey from the forests of Western Australia.

#### Leatherwood:

A unique honey from the west coast of Tasmania, quick to candy and extra light in colour.

#### Lucerne:

A mild-tasting honey.

#### Yellow box:

Pale and sweet. From New South Wales, Victoria and Queensland.

#### Stringy bark:

Strong flavoured, medium amber honey from the Great Dividing Range. Ti-tree  
A very strong flavour used mainly in manufacturing. From the north and south.

#### White clover:

An extra white honey that candies smoothly. See how many flavours and types of honey you can find. Taste as many as you can, for honey keeps you healthy. It can be used with many foods and in many ways.

When you know all the flavours, not only will you be able to use it to its best advantage, but you’ll be a honey connoisseur as well!

### Export honey

About 40 per cent of the Australian honey production is exported. The main markets are United Kingdom, Germany and USA., with the remainder going to more than 30 countries.

#### Composition of honey

Honey contains many vitamins and trace minerals. It is a tonic food and a tasty one at that.

Honey is made up from:

Natural sugars  
(levulose, dextrose and sucrose) just over 80%

Moisture content  
just under 20%

Mineral traces

In short, honey is a natural energy-giver, with anti-bacterial properties that make it safe and wholesome.

### The way we use honey

Apart from the products in shops that use honey, there are hundreds of recipes and "taste tempters" that owe their special flavour to honey. You can experiment with these:

- Sweeten fruit salad with honey
- Twirl it over icecream
- Pour it over breakfast cereals
- Put a spoonful in a malted milk
- Add it to tea and coffee
- Take it in warm milk as a night cap.

In fact, if you try, there are more than 100 different ways in which honey can add goodness and flavour to your diet. Sportsmen and women even take it by the spoonful to give themselves extra energy.

### The busy bee

Each year, Australia's bees produce between 16,000 and 23,000 tonnes of honey. From an ordinary hive, there may be from 10,000 to 15,000 bees flying from blossom to blossom all day long, from sunrise to sunset. Each bee may visit thousands of blossoms in a single day.

Also, should the hive become overheated, the bees will fan their wings across the water collected and deposited in the honeycomb. The water then evaporates and the temperature falls.

The Australian record for honey production is held by a Western Australian beekeeper who harvested an average of 357 kg of honey from each of 400 hives in 12 months! So that lazy droning of a bee in flight is actually the sound of one of the hardest workers in Nature's domain.

### The bonus of the bee

The value of the honeybee to man does not end with the making of honey. She has far, far more to give than providing an important food.

Honeybees mean an abundance of fruit in orchards and vegetables in market gardens. When the forager bee gathers nectar her body becomes dusted with pollen and, as she moves from flower to flower, the pollen passes from male flower to female flower and cross-pollination takes place.

Without the bee, the blossoms may not bear fruit and without the floral sources there could be no honey - it's a perfect partnership. Fruit growers and market gardeners are delighted when beekeepers set colonies on their property - many invite them to do so.



### Remarkable beeswax

Beeswax is a remarkable substance. It has the highest melting point of any known wax -- approximately 60 C. This ensures that the combs will not melt when the hive reaches 43.5 C during summer heat. Because of its high melting point, beeswax forms the basis of many beauty creams, lipsticks and hand lotions.

### Sports lovers .

A dessertspoon of honey produces a quick energy boost for boxers, footballers, runners, swimmers and other sports participants. Taken three times a day, honey will give you an even energy output.

### Bee stings

If a bee lands on you, you may shake it off if you are quick enough. Bees only sting if approached or harmed. If you receive a sting, remove it by gently scraping it out with a fingernail. Never squeeze a bee stinger - it forces poison down the hollow tube into your flesh.

### Buzz, buzz

Overseas production

Main honey producing countries include U.S.S.R., U.S.A., Argentina, Mexico, Canada, China, West Germany, Hungary, Greece, Rumania, and of course, Australia.

### Pesticides

Man, with his pesticides, has harmed the honeybee greatly, at times killing thousands of bees through spraying indiscriminately.

### Books

Hundreds of books have been written about honey as a regular addition to your diet.





### MOCHA HONEY CHEESECAKE

#### *MOCHA HONEY PASTRY:*

- 2 cups plain flour
- 2 tablespoons cocoa powder
- 1 tablespoon of instant coffee
- 125 g butter
- 1/2 cup honey
- 1 small egg

#### *FILLING:*

- 500 g cream cheese
- 1/2 cup honey
- 3 large eggs, seperated
- 1/4 cup custard powder
- 2 tablespoons coffee-flavoured liqueur (e.g. Kahlua) (optional)
- 300 g sour cream, whipped
- 125 g dark cooking chocolate, melted

Freshlywhippedcreamandgrated chocolate, for serving

1. Make pastry by sifting dry ingredients into a bowl. Rub in butter thenworkinbeatenhoneyandegg mixture to form a firm dough.
2. Wrap mixture in plastic wrap and refrigerate for 1 hour. Roll pastry out and line the lightly buttered base and sides of a deep 25 cm loose-bottom flan pan.
3. Bake pastry shell blind at 200°C for 10 minutes, remove blind weights, pierce base with a skewer then continue baking at 190°C for a further 10 minutes. Allow pastry to cool before filling.

4. To make filling, beat cream cheese and honey together until smooth and creamy, then beat in egg yolks, custard powder and liqueur (if used).
  5. Fold in whipped sour cream and stifflybeateneggwhites, thenpour mixture into cool pastry shell and swirl melted chocolate through.
  - b. Place cheesecake on a baking tray and bake at 170°C for 45 minutes.
  7. Allow to cool and set before removing from flan pan. Serve topped with whipped cream and chocolate shavings.
- Serves 8 to 10.



For Further Information:  
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