



# Tell me

## Episode 12: How do bees make honey?

Hello everyone and welcome to *Tell me*, the Alimentarium's mini podcast. My name is Janet and I'm a translator at the Alimentarium. If you've never heard of us before, the Alimentarium is the first museum in the world that looks at all aspects of human food. It's in Vevey, on Lake Geneva in the French-speaking part of Switzerland. We launched this series of podcasts in French a few months ago, to answer children's questions about food and nutrition. This episode is a translation of one of those and we hope that our English-speaking visitors will also find it interesting and that it might encourage you to send us *your* questions by e-mail or via social media. We've all got questions about food, no matter how old or young we are, and there's no such thing as a silly question... unless you already know the answer of course! So please write to us, in English if you prefer, or, better still, send us an audio recording with your questions. We'll give you all the contact details at the end of this episode. In the meantime, sit back and enjoy listening to us answer Zacharie, who is 9 years old and who wanted to know ***how bees make honey.***

Making honey requires teamwork, that's for sure. There's a particular species of bee that makes honey, and we call that species mellifera, which literally means... honeymaker! The female bees do all the hard work... but before we get into that, let's start by explaining how honeybees set up their team. In summer, honeybees generally live for about 5 or 6 weeks and, during that time, they take on various roles in the colony. They start off as cleaners and feeders, looking after the eggs and larvae. That's why they are sometimes called "nurse bees". When a honeybee is 10 days old, it starts making wax to build a honeycomb. This is where the honeybees then store their eggs and honey. These bees then become storekeepers. Forager bees bring the storekeepers nectar from flowers for them to then turn this into honey. I'll explain how this happens a bit later on. After having worked as storekeepers, these bees take their turn at foraging and go out of the hive in search of nectar and pollen. So, you see, bees work hard throughout their lives, so it's hardly surprising they're called worker bees, is it?

As I already mentioned, honeybees take on different jobs in their lifetime. Their last role is as 'gatherers' or 'foragers', and this is when they get to leave the hive several times a day to collect nectar and pollen from various flowers. They lap up the nectar with their tongues, then store it in

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a little pocket inside their tummies. This pouch is called a crop. While the honeybees are foraging for nectar, pollen drops off the flowers and onto their bodies. The bees then pick up that pollen with their front legs and roll it all up into a little ball which they then stick onto their back legs. When they can't carry any more nectar and pollen, they return to the beehive to drop off their load. This is when the honeybees start transforming this raw material into honey. The storekeeper bees welcome the forager bees back home, then the forager bees spit up the nectar which the storekeepers then suck up. This transfer operation has a complicated technical name. It's called trophallaxis! The storekeepers then put the nectar into the hexagonal wax cells of the honeycomb... and then spend several hours sucking it up and spitting it out again! That might not sound very nice, but it's a huge job and a very important one too! That's because, as they are doing this, a chemical process transforms the nectar into honey. Nectar contains sucrose, which is made up of two molecules of sugar, called glucose and fructose. In order to make honey, the bees need to separate these two sugars, and they do this with their saliva. Honeybee saliva contains substances called enzymes. These enzymes work like scissors cutting up the sugars in the nectar. This produces a sort of liquid, but that still isn't honey as it still needs to be dried! The honeybees take care of that by flapping their wings to work like a fan. That's a really tiring job! Just imagine flapping your arms up and down for hours and hours on end! After all their hard work though, once the honey is dry enough, the bees seal the honeycomb with a little wax disk called an operculum.

In summer, honeybees feed on nectar and pollen. The honey they make is their stock of food for the winter. For thousands of years though, we humans have also been eating honey. We started raising bees in Antiquity. Beekeepers provide hives for honeybees, which are like big boxes with several frames inside. The young bees secrete wax to build honeycombs, and stick these onto the frames. These hexagonal cells become the nursery for larvae and the larder for honey. Beekeepers' frames contain prefabricated wax, so the bees have a little less work to do and can spend more time making honey to give beekeepers a bigger harvest!

The nursery is kept right in the middle of the beehive. This is where the queen bee lives for 3 to 5 years, and also where she lays her eggs that have been fertilised by male bees. If you cut a beehive in half, you'd see that the



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nursery is shaped a bit like a ball. All the frames around it are full of honey, which keeps out the cold. As you'll remember, it's also the bees' food for the winter.

Beekeepers take the honeycomb out of the hives in the spring and towards the end of summer. First, they remove the opercula, those little round wax caps. Do you remember those? Then they put the honeycomb in an extractor which spins very very fast so that the honey falls off. All that's left for the beekeepers to do is to collect it all up and put it in jars and it's ready to eat! You might have already noticed that honey comes in different colours. The colour varies according to which flowers the bees have visited to collect nectar and pollen.

You're probably wondering how bees survive without food if we take all their stock of honey. But don't worry! Beekeepers leave them enough honey to last the winter. In the meantime, we also get to enjoy it too! Next time you spread some honey on your toast, think about all those honeybees, and say a little thank you to them for working so hard for us and for making such a great team!

Talking about eating honey, Simon, one of our chefs at the Museum, has a little tip to share. He often uses honey instead of sugar in his recipes. Honey is a natural product, whereas sugar is made industrially. Honey also sweetens things a lot more, so it means we can use much less of it! Honey contains a lot of vitamins, antioxidants, and minerals too. There's the added bonus that you can spread honey on your skin to help it heal or to relieve acne!

So, you see, honey isn't just a tasty treat! It's also a natural antiseptic and it keeps for a long time. Come to think of it, it should keep forever! The oldest honey in the world was found in Tutankhamun's tomb, which makes it over 3000 years old! And it's still good enough to eat! Isn't that incredible? Our Museum collection has an Egyptian cake, made with honey, which was also found in a pharaoh's tomb. Just type in 'Egyptian cake' in the search bar on our website [www.alimentaryum.org/en](http://www.alimentaryum.org/en) and you can then spin that cake around

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and see it from all sides!

While you're having fun doing that, we'll work on another episode of our Tell me podcast. If, like Zacharie, you've got questions about food, please send us an email, or an audio file to [community@alimentarium.org](mailto:community@alimentarium.org). You can also contact us via social media. It'd be good if you could give us your name and age too!

We can't wait to hear from you and look forward to answering you too! Meanwhile, thanks for listening! Take care and join us again soon! Bye for now!



Interactive illustrations and more episodes available on our website:

[www.alimentarium.org/en](http://www.alimentarium.org/en)