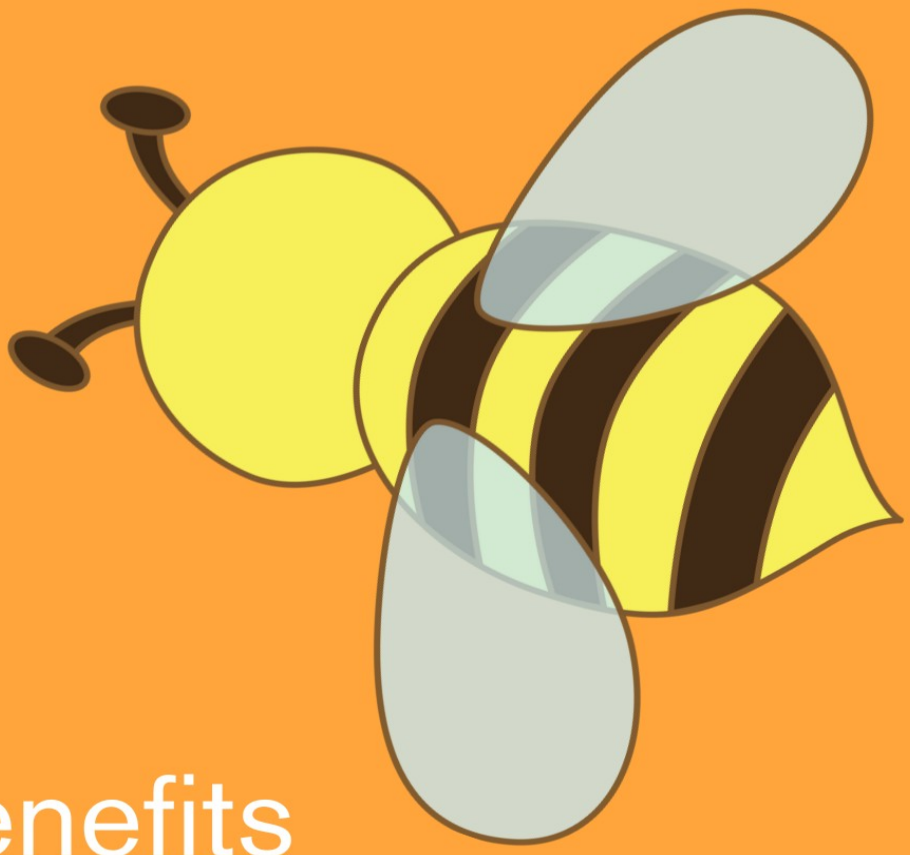
Bees & Honey

The Complete Illustrated Guide



Natural Benefits
Recipes
Protection

Elen Bloom

Bees and Honey
The Complete Illustrated Guide

Natural Benefits, Recipes, and Protection

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Independently published

DISCLAIMER

Please read carefully,

IMPORTANT WARNING

This guide is for **informational** and educational purposes only. The information presented does not constitute **medical advice, diagnosis, or treatment.** The book is not intended to replace the advice of a qualified healthcare professional. Similarly, the pages relating to bees are not intended to replace the expertise of a beekeeper or veterinarian.

Mandatory Consultations

Before using honey or other beehive products for therapeutic or dietary purposes :

- Consult your doctor
- **Special caution** in the case of diabetes, allergies, pregnancy, ongoing treatment, or chronic health problems
- **Prohibited** in cases of declared **allergies** and **for children under one year old!**

Immediate discontinuation and medical attention are required in the case of:

- Allergic reactions (redness, itching, difficulty breathing)
- Worsening of symptoms
- Unexpected adverse effects

In case of medical urgency: 911 (USA and Canada), 112 (European Union: works across all EU countries), 000 Australia, 111 New Zealand, 108 India, 120 China, 119 Japan

- Notify your doctor
- Retain used products for identification by healthcare professionnals
- Contact your regional poison control center in case of accidental ingestion or serious reaction.

For beekeeping practices, beekeeping presents real risks and requires

- **Mandatory** prior training
- Essential protective equipments
- Support from an experienced beekeeper

Use at your own risk

By using this guide, you acknowledge:

- That you assume **full responsibility** for applying the information contained in this book,
- That you have **assessed the risks**,
- That you are required to **consult qualified professionnals**

The **effects** of honey and other beehive products may vary depending on your health, medical history, and sensitivity, as well as the quality and origin of the products used .

Scientific knowledge is constantly evolving; some information may become outdated, be enriched by new studies, and require updates.

This book does not claim to exhaustively cover all aspects of the topics covered.

It is strongly recommended that you further your knowledge using recognized scientific sources, consult recent medical literature, and verify information with qualified professionnals.

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Introduction

Imagine a world devoid of color, fruit, flowers… A silent universe where we no longer hear a buzzing sound during our walks in nature. This sinister world is the one we risk experiencing without these extraordinary little creatures, bees.

Fortunately, we're not at that stage yet! That's why I invite you to explore the captivating world of these little flying geniuses who have been composing nature's melody for millions of years.

Did you know that a bee pollinates up to 5,000 flowers a day? That their dance indicate with GPS precision the direction of the sun and where a flower is located? Or that they are capable of recognizing a human face? These exploits are just a glimpse of the wonders you will discover within these pages.

« **Bees and Honey: The Complete Illustrated Guide**» takes you on an epic journey to the heart of the hive and far beyond. You will understand how these zealous little workers build our biodiversity. You will discover how their meticulous work gives rise to honey, this golden nectar with a thousand virtues, as well as all the treasures of the hive: wax, propolis, pollen, royal jelly, and more.

This book is also practical, revealing recipes from around the world and traditional natural remedies made with honey. It will also help you create a welcoming garden for our pollinators; finally, it will provide you with the tools you need to protect them every day.

Because our bees are going through difficult times. Pesticides, climate change, habitat loss… The challenges are numerous, but hope remains. Every action counts; every flower planted can make a difference.

So, whether you are a honey lover, a budding gardener, a parent eager to share a love of nature, or simply curious to unravel the mysteries of life, this book is for you.

Ready to join the bees' dance? To uncover their age-old secrets and become their ally for the future?

The adventure begins now… Bzzzzzz

Chapter 1 :

The Fascinating World of Bees: Let it Bee!

Imagine for a moment: a space as small as a shoebox, home to up to 60,000 bees; they work 24 hours a day, communicate through dance, and produce one of the world's most precious foods. No, this isn't science fiction… it is the extraordinary daily life of a beehive!

Have you ever wondered what really goes on inside this tiny, buzzing world? In this chapter, we will unveil one of nature's most fascinating mysteries. You will discover how these tiny architects build perfect cities, how they « talk » to each other, and why their disappearance would jeopardize our very survival.

Prepare for an extraordinary journey in the secret world of bees !

1. Bees: Miniature Superheroines

The Miracle of Metamorphosis

Did you know that a bee transforms in a way as spectacular as a butterfly ?

Here is her incredible journey, from egg to super-worker in 21 days :

1. **The mysterious egg** (3 days), smaller than a grain of rice, is led by the queen in a perfect hexagonal cell.
2. **Ravenous larva** (6 days): The hatching egg transforms into a larva that feeds on royal jelly.
3. It builds a shell and becomes the **pupa** (12 days), which will develop the bee's body.

4. **The completed adult** emerges, ready to save the world, but only one flower at a time!

Performances worthy of an Olympic champion

These little athletes have astonishing abilities:

- **Strength**: They can carry up to three times their weight!
- **Speed**: 24 km/h in flight (or 14.9 miles per hour, faster than a cyclist in the city).
- **Endurance**: up to 10 km (6.2 miles from their hive to find the best flowers and back).
- **Vision**: They see the invisible. Their eyes detect ultraviolet rays.

Did you know? Their wings beat 230 times per second, so fast that they create that characteristic melody that catches our attention.

A world of incredible diversity

Forget the idea that there is only one type of bee. Our planet is home to over 20,000 different species! Here are the best known:

- **Bumble bees**

are larger and fuzzier than their cousins.
Best known for the buzzing sound they make when they fly, they are champions of pollination in cold weather.
They are able to make flowers vibrate to release more pollen, using the « buzz pollination » technique.

- **Leafcutter bees**

These tiny architects cut small pieces of leaves and build nests like true works of plant art.

- **Carpenter bees**

These expert borers bore perfect tunnels into the wood to build their nests. Their larvae grow in individual « chambers.»

Citizens of the world for 130 million years

Bees are survivors. They descend from ancient carnivorous wasps that preyed on other insects in prehistoric times; then they evolved to become vegetarians and even became best friends with flowers.

They are found all over the world except at the poles, as they prefer warm, sunny places. In addition, they prefer places rich in varied flowers for feeding and production.

2. Inside the Kingdom, the World’s Most Perfect Society

Have you ever wondered how a colony is organized?

The queen: more than a monarch, an extraordinary mother

At the heart of each hive reigns an exceptional female: the queen. She doesn’t give orders, as one might think. Her power? She is the mother of all.

She mates with male drones during her queen flight. Then, she produces up to 2,000 eggs per day.

Their lifespan is 2 to 5 years (compared to about six weeks for worker bees).
Their pheromones produce a magical scent that maintains harmony throughout the colony.

The workers: a multitasking elite

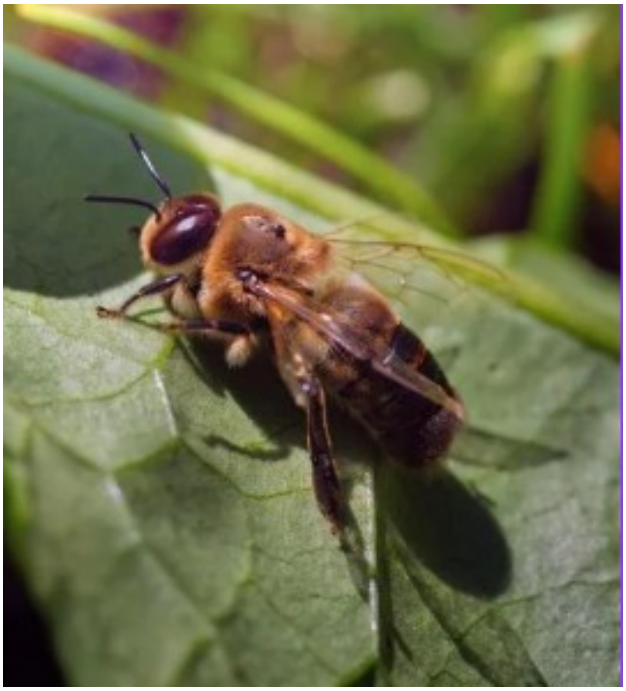
These females represent 98% of the population and change jobs depending on their age. They ensure that the queen is fed, cared for, and kept warm at all times.

Thus, they take turns helping to build the hive, clean the cells, and ventilate it with their wingbeats. They also feed the baby bees.

Then, they set off on their mission, bringing back nectar, pollen, and water.

Males are short-lived.

Drones lead the lives of princes… but a short one. Their sole mission is to mate with the queen during the «nuptial flight».



Wether their mission is accomplished or not, they are expelled from the hive when winter comes.

The secret language of bees

Here's one of nature's most extraordinary mysteries: **the dance of the bees**! When a scout discovers an exceptional field of flowers, she returns to the hive and… dances in figure 8s! This very precise choreography indicates:

- the direction, given by the angle of her dance relative to the sun
- the distance, which corresponds to the duration of the movements
- the quality of the nectar, highlighted by the intensity of her performance

Her colleagues immediately understand her message and head straight to the right place. It is impressively **precise** when you remember that it can fly within a 5 km (3.1 miles) radius...

Defense and survival: a single motto - « Unity is strength!»

When threatened by a predator, they swarm in large groups and collectively defend their hive.
Their alert system consists of the instantaneous spread of warning pheromones.

Then, a coordinated group attack ensues, guided by scent. The workers are equipped with stingers. If she stings, she'll end up dying in the hope of saving the colony.

Key takeaway: A single hive is made up of 60,000 superheroines working together with clockwork precision. Their goal is to provide us with the purest honey and pollinate a third of our food!

Now prepare to glimpse how their industrious and meticulous teamwork helps maintain life on this planet.

Chapter 2: Pollination:

How Bees Save the World.

Try for a moment to imagine what life would be like on a planet without bees. What would happen then?

You'd no longer be able to enjoy chocolate for breakfast. No more coffee either. There would be almost no more fruits and vegetables on the shelves: almonds, apples, strawberries… gone! In fact, one in three meals would disappear from your plate. A real catastrophe!

Is this science fiction? Not at all. This is precisely the risk involved. However, before we panic, let's explore together the miracle that unfolds every day in nature: **the longest friendship on the planet, the one between bees and flowers.**

1. The Miracle of Pollination

A love story that goes on

For 100 million years, plants have been waiting for bees to transport their pollen instead of relying on the wind, which isn't as reliable.

Flowers and bees collaborate: our small winged transporters collect the sweet nectar and protein-rich pollen produced by the different clusters and quickly transport them to the hive. Their lives are naturally closely linked.

The result? **This alliance has created 80% of the plant diversity** we know today.

How is it possible?

Imagine a foraging bee:

Its natural radar allows it to detect the scent of a flower from 3 kilometers away! (i.e., 1.86 miles.) **Their eyes** perceive ultraviolet rays, so they know exactly where to land. They can memorize up to **five different flower paths**.

The collection happens almost accidentally: by diving into the flower for nectar, the bee covers itself with pollen. So, its **electrostatic hairs** capture **100,000 pollen grains** per trip! She then creates small «balls» that she attaches to her legs.

Likewise, **the delivery is providential**: by landing on the next flower, some of the pollen is **automatically deposited**.

And then, fertilization can take place. **The plant can then produce its seeds and fruit**: a miracle of nature...

The numbers are staggering!

- ✓ A bee visits **50 to 100 flowers each time** it visits them
- ✓ A hive makes 2 million flower visits daily
- ✓ **A single colony** can pollinate up to 300 million flowers every day.

Did you know? To produce **1 kg of honey (i.e., 2.2 pounds)**, bees must visit **4 million flowers**! At the same time, they pollinate the equivalent of several hectares of crops.

2. No Bees, No Meals: The Shocking Revelation!

Your plate under the microscope

Let's take a concrete look at what would disappear from your daily life in this sad situation.

Sunday breakfast:

- × Strawberry jam (bees are essential)
- × Orange juice (bees are necessary)
- × Coffee (pollination is done by bees)
- × Chocolate with almonds (it's impossible to get them bees)

yes Grains (they are pollinated by the wind… phew!)

Your favorite summer salad:

- × Tomatoes (bees are essential)
- × Cucumbers (bees are necessary)
- × Zucchini (they are 100% dependent on bees)
- × Avocado (bees take care of that too)

yes Green salad… and that's it.

The global economy depends on these little workers.

The value of the free labor provided by these pollinators worldwide is **$265 billion each year!**

In France, bees save us **€2.9 billion each year**. In fact, we'd have to hire millions of workers to replace them, provide them with a paintbrush, and ask them to pollinate each flower by hand. And it would multiply the price of fruits and vegetables tenfold!

This is not a joke… Indeed, in China, in some regions where bees have disappeared, farmers pay workers €25/day to pollinate pear trees by hand. This is work a beehive would do for free.

Beyond our plate, the entire ecosystem is in question

Bees also feed many species and maintain wildlife.

Wild plants (which are 90% dependent on bees) feed :

- Birds, as they provide them with seeds and fruit.
- Mammals that eat berries and roots.
- Other insects that devour nectar and pollen.
- Our soils, because they require organic matter.

This means that without bees, plants will be rarer, and animals that no longer have enough food will become extinct. **It's an ecosystem that will collapse!**

3. The Little-Known Superpowers of Our Pollinators

They perceive what we cannot see with our eyes

Bees don't visualize the world like we do:

They capture **ultraviolet rays**, the secrets of flowers. In addition, they are able to detect **electric fields**, as well as the static electricity emitted by flowers. They also have the ability to distinguish the **polarization of light**, which allows them to move even on cloudy days.

They communicate the right information

A surprising discovery has revealed that bees gravitate toward the most advantageous flowers.

A forager bee tests the quality of a flower's nectar. If it's exceptional, it dances «figure eights» to indicate the exact address to its fellow bees. So, they also rush to take advantage of the good opportunity.

They adapt their service

In fact, they perform **tailor-made pollination**

- Tomatoes: Bumblebees make the flower vibrate, which is called « buzz pollination.»
- Vanilla: Pollination of this plant is extremely delicate; hence its price!
- Almond trees: They begin an «early awakening» in February for the first flowers.
- Sunflowers: They perform complex navigation by following the movement of the sun.

4. The Silent Threat: When Pollinators disappear

Warning signs

For the past 20 years, bee populations have been collapsing:

- ➔ **30% of beehives** disappear each winter
- ➔ **75% of flying insects** have disappeared in Europe in 30 years
- ➔ **200 species of wild bees** are threatened with extinction

The culprits were identified.

(see chapter 7)

1. **Pesticides** disrupt their nervous system. Furthermore, the massive use of herbicides, in particular, kills «**weeds,**» which are often **melliferous**, meaning they are useful to bees.
2. **Monoculture** means that there's only one flower species at one time of year, when food is abundant, but the rest of the time, the bees have nothing to eat! They are

starving because there are no varied flowers to feed them in the long term. **Diversity** is therefore **necessary**.

3. **Climate change** is causing a time lag between the flowering of various plants and the emergence of bees from their hives.
4. **Diseases** such as varroa mites, nosema, and viruses are also aggravating factors.

The Utmost Urgency

As we continue with our modern lifestyles, pesticides, and habitat destruction, we risk losing these precious pollinators. The consequences of such a loss would be disastrous: food shortages, desertification, and collapse of entire ecosystems.

Remember: Every time a bee visits a flower, it performs an act that sustains life on earth. And she does it 10 times a minute, 12 hours a day, her whole life! Total respect! 🥇

Simple action to help bees: Plant honey-producing flowers on your balcony. A single gardener can feed up to 100 bees per jour.

(See: chapter 7).

The good news? We will now discover all the treasures that these little workers make for us, starting with the most precious: the liquid gold that is honey!

Chapter 3:

The Science of Honey: How to Make This Liquid Gold

Imagine for a moment adding a spoonful of honey to your tea: this golden liquid, flowing slowly, is actually the result of a process so complex that even our best laboratories can't reproduce it. This honey, made from the **nectar of 2 million flowers**, required the labor **of 550 bees.**

Welcome to the Hive: the most sophisticated factory in the world. Let's discover how our little chemists transform a simple nectar into the most perfect food.

1. The Secret Revealed

Step 1: Harvesting the nectar (dangerous mission !)

It all begins at dawn, when the foragers set off on their mission, like elite pilotes.

The perfect forager's equipment:

- A 6 mm (0.24 in) long pipette-like tongue to suck nectar from the bottom of flowers.
- A honey crop, its special 70 mg (0.0025 oz) stomach representing about 40% of its weight.
- Pollen-storing legs that carry pollen.

- A built-in GPS that allows them to find their hive after a 10 km (6.21 miles) flight.

The bee is very **efficient**. During one outing, she **visits 50 to 100 flowers**. To fill her crop, she must suck **nectar from 1,000 flowers**! A true marathon.

Step 2: The First Transformation in Flight

During the return flight, something magical happens in the crop:

The enzymes kick in:

- **Invertase** breaks down complex sugars into simple sugars.
- **Glucose oxidase** generates gluconic acid and hydrogen peroxide (a natural antiseptic).
- **Catalase** eliminates the toxins present.

This enzymatic process initiates the conversion of the collected nectar.

Step 3: Teamwork

Back in the hive, the forager bee doesn’t stock up her nectar directly.
She immediately expels it into the mouth of a worker bee inside.

Then, the worker bees flap their wings to evaporate the water.

Result: The nectar, initially composed of 80% water, becomes honey that now contains only **18% water**.

Why this relay?

- The forager bee then immediately sets off on other floral adventures.
- The indoor worker bee will add her own enzymes.
- This double operation results in higher-quality honey.

The process: The worker bee chews nectar for 20 minutes and adds saliva and enzymes. This is the step that gives honey its unique **antibacterial properties**!

Step 4: Strategic storage

The pre-processed nectar is then placed in **hexagonal wax cells**, the famous «honeycomb» structure. But this is only the beginning of its journey to ripe honey!

The **hexagonal architecture** is brilliant, because:

- It's the **perfect shape** for maximum nectar storage with minimal wax.
- This solid structure supports 25 times its weight.
- Air circulation is optimal for evaporation.

Step 5: Dehydration, a secret technique

Here is the secret to honey: it's eliminating water!

Bees work to ventilate:

- They position themselves in coordinated lines. Then, they create wind, beating their tiny wings more than **11,000 times per minute!**
- They create a current of hot air (around 35°C (or 95°F) constantly) that causes the water to evaporate.
- Thus, the nectar thickens until it reaches a **maximum humidity of 18 %**.

Why 18%? Below this level, **no bacteria can survive**. This is what makes honey almost... «immortal.»

Step 6: Sealing

When the honey reaches perfection, the bees seal it with a wax cap. This is their **quality mark**!

Step 7: Harvesting

When the cells are well sealed, the beekeeper knows the honey is ripe.

He then takes the wax frames filled with honey and:

- gently removes the cappings,
- places the frames in the extractor, which, by centrifugal force, releases the honey,
- filters and jars.

From flower to jar, the nectar’s journey becomes a true alchemy of the hive.

How do you know if honey is perfect?

Its viscosity is ideal; it flows like gold.
Its **pH is perfect, between 3.2 and 4.5**, which gives it its antiseptic properties.
Its **concentration** is perfect, containing 82% sugar.

2. Honey World Tour: Discover 7 treasures

Each honey tells the story of its region. Here are the world’s stars:

- **Manuka Honey (New Zealand), the best honey**

It owes **its superpower** to the methylglyoxal it contains. This antibacterial is 100 times more powerful than other honeys.

Its color is intense caramel brown. Its taste is complex, with notes of caramel and bitterness. It is the most expensive, ranging from €80 to €200/kg. (€36 to €91/lb)

It is used for wound healing, infections, and immunity.

Secret: The manuka bush only flowers for six weeks a year.

◆ Acacia Honey (Europe) – Absolute purity

The most transparent of all honeys, it remains liquid for years.

With a golden crystal color, its taste is delicate, vanilla-flavored without bitterness. Its unique feature is that it never crystallizes.

It’s perfect for children and fine pastries.

◆ Lavender Honey (Provence), French elegance

This aristocrat of honeys has a captivating fragrance.

Pearly white with a hint of purple, it has an intense floral and minty flavor.
It goes deliciously with goat cheese and also with herbal teas.
Its properties are antiseptic, relaxing, and healing.

🔸 Buckwheat Honey, powerful character

The antioxidant champion.

Deep black in color, its flavor is powerful, malty, and even licorice-like.
It is mainly used for coughs, colds, and marinades.

🔸 Eucalyptus Honey (Australia), the natural medicine

The favorite natural decongestant *of* koalas… and humans.

Its color is dark amber, and its taste is minty and slightly medicinal.

It has powerful antibacterial properties. It is perfect for sore throats and bronchitis.

🔶 Clover Honey, the most popular

This is **the most popular honey** in the world.
Light golden, it has a sweet vanilla-like flavor, unsurprisingly. Its price is also affordable. It is particularly used for breakfast and in pastries.

◆ Honeycomb, the ultimate experience

The honey is presented ***in its natural container***. You bite into the wax, and the honey bursts in your mouth.
Its freshness is at its peak, as it has never left its cell. Its texture is unique in the world. And its premium price makes it really a rare product.

3. A Booming Market

Impressive figures:

- **Global production in 2024** :
  - **1.9 million tons** (2.09 million short tons) produced annually
  - Valued at €265 billion (including pollination)
  - **100 million beehives** worldwide

- **Top 5 producers** :
  1. **China**: 500,000 tons (551,150 short tons), or 26% of global production
  2. **Turkey**: 120,000 tons (132,276 short tons)
  3. **Argentina**: 75,000 tons (82,672 short tons)
  4. **Ukraine**: 70,000 tons (77,161 short tons)
  5. **Mexico**: 65,000 tons (71,649 short tons)

The explosion in premium demand

Trends for 2024:

- **+15%** per year for single-origin honeys
- **+25%** per year for organic honeys
- **+40%** per year for rare honeys (Manuka, Lavander)

Why this boom?

In the post-covid period, we are clearly seeing a return to natural products. Consumers have become aware of the virtues of honey. They are looking for authentic honey. And they have become very wary of any form of industrial sugar!

Beekeeping, a valuable… but fragile activity

Beekeepers have an average net income of €30 to €50 per hive per year. But **the costs** associated with equipment, treatments, and bee mortality **continue to rise**.

They are now facing new challenges: climate, pesticides, and even bee diseases. (See chapter 7.)

New opportunities

We are now seeing the development of new activities:

- **Api-tourism,** where nature lovers come to visit apiaries.

- The creation of **products derived** from honey and other treasures of the hive is increasing in cosmetology and natural medicine.
- **Superior quality traceability** is being implemented for local honeys.

What will the honey of tomorrow be like?

Many innovations are underway:

- Blockchain traceability, which will provide precise information on every detail from the apiary to the consumer.
- Connected hives to facilitate real-time monitoring.
- Genetic selection to produce disease-resistant bees
- Urban beekeeping to make urban spaces (rooftops, balconies) productive.

Key takeaway: One spoonful of honey = 2 million flowers visited + 550 bees at work + a process more complex than our best factories. Again, total respect for these little chemists!

Ready for more? Now let's see why honey is considered the healthiest food on the planet.

Chapter 4:

The Superpowers of Honey: Science and Natural Benefits

Scientific revelation: In 2019 (*), researchers discovered molecules in honey so powerful that they resist the toughest bacteria… some of which defy our most modern antibiotics! However, this is only the tip of the iceberg.

Honey isn't just a sweetener. It is a true **concentrate of natural medicine** that our ancestors were already using 8,000 years ago.

Today, modern science confirms what our grandmothers knew: honey is truly a health treasure.

Let's discover together why a simple spoonful of honey contains more benefits than many dietary supplements!

(* See *Honey: another alternative in the fight against antibiotic-resistant bacteria by P. Combarros Fuertes.)*

1. Honey: A Natural Laboratory

The formula is deciphered.

Nature has thought of everything: the honey formula is unique and precious. Honey is composed on average of:

- 80% carbohydrates (fructose, glucose, and a little sucrose)
- 18% water is the minimum percentage for a very long shelf life.

- **2% extra**: enzymes, vitamins, minerals, antioxidants...

This 2% makes all the difference: it represents **more than 180 different active substances.**

Enzymes : these invisible workers

The 3 star enzymes of honey:

1) **Invertase** breaks down complex carbohydrates into simple sugars (glucose and fructose), to facilitate their digestion and absorption. **Energy** is then immediately released and available.
2) **Glucose oxidase** - produces gluconic acid and hydrogen peroxide (or natural oxygenated water), which gives honey powerful **antibacterial properties**. It is even more effective than some disinfectants.
3) **Diastase** indicates the freshness of the honey. The higher its level, the purer and more unheated the honey. Beekeepers measure this percentage to certify their honey: it's a **guarantee of quality**!

Antioxidants: guardians of youth

Polyphenols in honey:

- **Flavonoids** act as natural anti-inflammatories.
- **Phenolic acids** protect cells from aging.

The concentration varies depending on the flower. Most often, we notice that it has more antioxidants when it's dark.

Surprising fact: 100 g (3.53 oz) of buckwheat honey contains as many antioxidants as 100 g (3.53 oz) of blueberries.

Vitamins and minerals: the nutritional bonus

Honey is a true vitamin cocktail, containing:

- L-ascorbic acid (**vitamin C)** for immunity,
- **B vitamins** (B1, B2, B3, B6), which support energy and the nervous system,
- **Amino acids**: proline, lysine, phenylalanine.

And, precious **minerals**:

- **Potassium**, for water balance
- **Calcium** for bones and teeth
- **Magnesium,** a natural stress reliever
- **Iron** for oxygen transport.

In short, honey is much more than sugar: it’s a natural source of energy, protection, and vitality.

2. Raw Honey vs. Industrial Honey: The Truth

Industrial Honey: The Disillusionment

The industrial honey production **process** is **harmful**.
Heating to 70°C (158°F) destroys enzymes. Furthermore, **ultrafiltration** removes pollen and nutrients. And **adding syrup** to the compound further dilutes its properties. Finally, the **international blend** also makes it lose its traceability.

It is now just **nutritionally «dead» honey;** only the sweet taste remains.

Artisanal Raw Honey: The True treasure

The manufacturing process here respects nature.

It is **not heated**, with a maximum temperature of 40°C (104°F). The **filtration** is intentionally coarse to **retain the pollen and propolis**! And, its **local origin** is traceable.

Thus, **crystallization** is natural, which is a **sign of purity**.

Tip : How to **recognize real honey**?

- ✓ It **crystallizes naturally** (except acacia honey)
- ✓ its rich **flavor** with **floral notes**

- ✓ Its color varies depending on the season,
- ✓ Its fair price ranges from €15 to €25/kg (€7 to €12/lb) at a minimum.

3. Scientifically Proven Benefits

Disclaimer : *The following information is presented for informational and historical purposes only. This is not medical advice. Always consult a healthcare professional before any therapeutic use.*

Immune boost

The **scientific evidence** is there if we refer to

- The 2008 study published in *ResearchGate, «Effect of honey on the human lymphocyte culture,»* showed that honey could activate human white blood cells in cell culture, stimulating their proliferation and activity. This suggests **immunostimulant** potential.
- The 2025 review *«Honey as a Natural Antimicrobial» by M. Chidozie Ogwu and S. Chibueze Izah*: Honey is effective **against antibiotic-resistant bacteria.**

How is this explained?

Its **antioxidants** neutralize free radicals and protect cells. Its **prebiotics** nourish beneficial intestinal bacteria. Finally, its **antibacterial properties** strengthen the body's natural defenses.

- ➢ *Traditional use: A spoonful of honey in a ginger tea with freshly squeezed lemon juice remains a classic to get through the winter.*

Soothing throat: the ancient remedy is validated

Science confirms that its ingredients are effective:

- Natural hydrogen peroxide (H_2O_2) fights bacteria.
- Its syrupy texture forms a protective film.
- Its anti-inflammatory action reduces irritation.

How does it work?

Honey coats the mucous membranes, creates a barrier against irritants, and gradually releases its active ingredients. The WHO considers honey an effective treatment for coughs (children aged **2 years and over**.) A study published in *Pediatrics in 2014* suggests that administering 2.5 ml (0.085 fl oz) of honey before bedtime reduces the frequency and duration of coughs in children **over 2 years old**.

What are the known traditional uses ?

For the respiratory tract:

- *A teaspoon of honey in a thyme tea, to soothe the throat.*
- *Inhalation: a few drops of eucalyptus honey in a bowl of hot water*
- *Homemade syrup: honey, lemon juice, and ginger in equal proportions.*

For general well-being:

- *Energy drink: acacia honey in warm water and lemon juice (morning wake-up call)*
- *Relaxation: warm milk and linden honey (evening relaxation)*

➢ *Sports recovery: honey and coconut water (natural rehydration)*

Anti-inflammatory Properties: A Soothing Effect

Recent research shows that it leads to a significant reduction of inflammatory markers (see*: International Journal of Biological Macromolecules in 2021*), and its mechanism is that flavonoids block pro-inflammatory enzymes.

Traditional uses:

- Mild digestive inflammations
- Minor skin irritations
- Joint discomfort (external use)

Digestion: Your stomach's friend

Honey also has digestive benefits. Its **enzymes** help initiate the breakdown of sugars and food. Its natural **prebiotics** promote the growth of beneficial intestinal flora. And its **slightly acidic pH** (3.5-4) optimizes digestion.

✓ *Traditional use: One teaspoon of honey in a glass of warm water in the morning is an ancestral practice that is still used today. (1 week maximum)*

✓ *Chamomile infusion cooled to 40°C (104°F) and a teaspoon of acacia honey after meals in case of digestive discomfort. (3 to 5 days maximum)*

* Known contraindications: diabetes and severe digestive disorders require a medical diagnosis. Prohibited if allergic to bee products and for children under one year old.

Joint discomfort

Observed external practices :

- *Traditional poultice: Apply a homogeneous mixture of 2 tablespoons of green clay, 1 tablespoon of honey, and warm water to the affected area. Cover with a cloth and leave on for 20-30 minutes. (2-3 times per week)*
- *Massage: Traditional blend of liquid honey and arnica oil (1:3). Gently massage in circular motions for 10-15 minutes, then rinse with warm water. Supposedly warming and anti-inflammatory effect.*

Precautions: It can be used as a mild supplement, but never in cases of intense pain or acute inflammation. Consult a doctor if symptoms persist. It is not a substitute for appropriate medical treatment.

4. Honey in Natural Cosmetics: Beauty from the Hive

The science of honey beauty

Its proven cosmetic properties are:

- A **natural hydrating** agent, it captures and retains moisture.
- an **antimicrobial,** as it purifies the skin without drying it out.
- an **antioxidant** that protects against premature aging.

Skin care

- ✓ *Purifying face mask (traditional recipe): one tablespoon of pure honey and one tablespoon of plain yogurt (a pinch of turmeric is optional). Apply, leave on for 15 to 20 minutes, then rinse with warm water.*
- ✓ *Soothing mask: raw lavender or thyme honey (soothing properties) and a few drops of rose water. Leave it on your skin for 15 to 20 minutes, then rinse with warm water.*
- ✓ *Chapped lip treatment: As observed, apply a thin layer of pure acacia honey for 10 minutes. Traditional alternative: Blend honey and sweet almond oil (50/50) in the evening before bed.*

* Never use on deep or infected wounds. Stop immediately if redness or itching occurs. Consult a dermatologist for any persistent problems.

Nourishing hair mask

- ✓ *Traditional blend of two tablespoons of honey and one tablespoon of coconut oil with one egg yolk. You can leave this mask on for 30 minutes on the lengths and ends.*

5. Precautions and Proper Use: Wisdom Above All

⚠ Important contraindications *(see chapter 8)*

Absolutely prohibited:

- **for children under 1 year old** (risk of infant botulism)
- If you are allergic to bee products

Special precautions should be taken in case of:

- Diabetes where medical advice is required.
- Pregnancy or breastfeeding, during which medical advice is recommended.
- Drug interactions: check with your pharmacist.

Responsible consumption

Generally, recommended doses are 1 to 2 tablespoons/day maximum for a healthy adult and 1 to 2 teaspoons/day maximum for a child over two years old.

It is prudent to perform a preliminary allergy test for cosmetic use.

Eating a tablespoon of honey ingests 17 g (0.595 oz) of natural sugar, or 64 calories.

Medical precautionary principle

It is important to keep in mind that honey is a dietary supplement; this is not medicine. The properties described are traditional and preventative.

Always consult a healthcare professional for any medical problem, and never delay or replace a medical treatment.

6. Choosing and Storing Your Honey

Smart buying guide *(see chapter 8)*

The signs of quality to check are:

- ✓ **Precise origin** indicated
- ✓ **Beekeeper's name** visible
- ✓ **natural crystallization** (except for some varieties)
- ✓ **consistent price** (avoid too cheap)
- ✓ **Color varies** according to the seasons.

Optimal storage

The golden rules to follow:

Always store honey at **room temperature** (15-25°C) (59-77°F) and not in the refrigerator, as it accelerates crystallization. Store it in the original airtight container (if possible) away from light.

Important reminder: this *information reflects documented traditional uses and is not medical advice. Its effectiveness and safety may vary from person to person. In case of health problems, always consult a doctor who can offer you appropriate, scientifically validated treatment.*

Remember:

1) Honey is not magic, but its unique composition makes it a remarkable health and beauty ally. The key? Choose real artisanal honey and use it wisely and in moderation.
2) A daily habit to adopt: **gradually replace white sugar** with a spoonful of honey in your hot drinks. Your body will thank you.

While the benefits of honey have been long recognized in many natural remedies, it also helps enhance the flavors of many dishes enjoyed around the world.

Chapter 5:

Cooking and Recipes with Honey

Honey: Star of Global Gastronomy

Honey transcends culinary boundaries and has established itself as one of the world's most versatile ingredients. Much more than a simple sweetener, it brings aromatic complexity and unique texture to an infinite number of dishes, whether sweet or savory.

Gastronomy thus reveals its many possibilities throughout the world while enhancing flavors.

This chapter invites you on a journey through a selection of authentic recipes from the four corners of the world.

1. The Culinary Secrets of Honey

Unique culinary properties

Honey has a **sweetening power** 1.3 times greater than white sugar. It keeps dishes moist a long time because it **retains moisture**. It develops complex aromas when cooked because it **caramelizes naturally**. It also improves the texture of sauces and marinades thanks to its **binding properties**.

Cooking tips with honey

- Avoid high temperatures, which destroy flavors.
- Reduce other liquids in recipes by 20%
- It pairs perfectly with spices, citrus fruits, and nuts
- You can substitute 200 g (7 oz) of sugar with 150 g (5.25 oz) of honey, reducing the quantity of liquid.

2. Savory Recipes

■ Honey and Garlic Chicken Stir-Fry *(Chinese cuisine)*

Ingredients (serves 4):

- 600 g (21 oz) chicken breast, cut into strips
- 4 cloves garlic, minced
- 3 tbsp. soy sauce
- 3 tbsp. Acacia honey
- 1 tbsp. sesame oil
- 1 tablespoon cornstarch
- 1 teaspoon fresh, grated ginger
- 2 tablespoons sunflower oil
- 1 red bell pepper, sliced
- 100 g (3.5 oz) snow peas
- Sesame seeds for garnish

Preparation:

1. Prepare a marinade with soy sauce, garlic, honey, sesame oil, and cornstarch; then coat the chicken and let it marinate for 30 minutes.
2. Heat the oil in a wok over high heat
3. Sear the chicken for 3 to 4 minutes until golden brown
4. Add the vegetables and ginger and sauté for 2-3 minutes.
5. Pour in the remaining marinade and let it caramelize for 2 minutes
6. Serve over jasmine rice and sprinkle with sesame seeds.

Honey and Soil Glazed Salmon *(Asian touch)*

Ingredients for 4 people:

- 4 salmon fillets, 150 g (5.25 oz) each
- 2 tbsp olive oil
- Salt and freshly ground pepper

For the marinade:

- 4 tablespoons of acacia honey
- 3 tablespoons of soy sauce
- 2 tablespoons of rice vinegar
- 1 tablespoon of sesame oil
- 2 garlic cloves, finely chopped
- a piece of freshly grated ginger
- The juice of half a lime

For the garnish:

- 2 sliced green onions
- 1 tablespoon of sesame seeds
- A few fresh cilantro leaves

Preparation :

1. In a bowl, combine the marinade ingredients
2. Mix until smooth
3. Pour half of the marinade over the salmon fillets in a shallow dish
4. Turn them over to coat well and let marinate for 30 minutes.
5. Preheat the oven to 200°C (392°F)

6. Brown the salmon in a pan, skin-side down, for 2 minutes before turning it over.
7. Bake for 8 à 10 minutes, depending on the thickness of the fillets.

Finishing:
Meanwhile, reduce the remaining marinade in a small saucepan (3 to 4 minutes).
Remove the salmon from the oven and coat it with the reduced marinade.
Sprinkle with green onions, sesame seeds, and cilantro.
Serve with fragrant jasmine rice, sautéed vegetables (broccoli, zucchini, peppers), or sweet potato mash.

*** Conversion formulas used in this book:**

1 tonne (t)	= 2,204.62 lb = 1.1023 short tons (US)	*(= 0.9842 long ton (UK))*
1 kg	= 2.2046 pounds (lb)	
1 g	= 0.03527 ounces (oz)	
1 mg (0.001g)	= 0.01543 grains	
1 liter (l)	= 1.057 quart (qt) = 0.264 gal = 4.227 cup = 33.81 fl oz US *(0.880 qt = 0.220 gal = 3.52 cup = 35.20 fl oz UK)*	
100 ml	= 0.423 cup = 3.38 fl oz US	*(0.352 cup = 3.52 fl oz UK)*
1 ml	= 0.034 fl oz	*(0.035 fl oz UK)*
1 km	= 0.6214 miles (mi)	
1mm	= 0.03937 in	
T° F	= (T°C * 1.8) + 32	

- **Lamb Chops with Honey and Herbs of Provence** *(Mediterranean cuisine)*

Ingredients (Serves 4):

- 8 lamb chops
- 4 tbsp of lavender honey
- 2 tbsp of olive oil
- 2 tbsp balsamic vinegar
- 2 tsp herbes de Provence
- 2 crushed garlic cloves
- Salt and freshly ground pepper

Preparation:

1. Mix honey, oil, vinegar, herbs, and garlic
2. Marinate the lamb for 2 hours in this mixture
3. Sear the ribs for 2 minutes on each side in a pan
4. Bake at 200°C (392°F) for 8 to 10 minutes, depending on the desired doneness
5. Let stand for 5 minutes before serving

Honey and Spice Glazed Duck Breast *(France – Southwest)*

Ingredients (Serves 4):

- 2 duck breasts
- 3 tbsp of chestnut honey
- 1 tsp Chinese five-spice powder
- 1 tbsp soy sauce
- 1 tsp vinegar (sherry)
- salt and pepper

Preparation :

1. Make cross-shaped incisions in the skin of the duck breasts
2. Mix honey, spices, soy sauce, and vinegar
3. Simmer the duck over medium heat, skin-side down, for 6 minutes
4. Turn over, brush on the honey mixture, and cook for 4 minutes
5. Let stand for 5 minutes, slice, and serve.

3. Gourmet Side Dishes

- **Vegetable Tagine with Honey and Almonds** *(Moroccan cuisine)*

Ingredients (Serves 6):

- 2 eggplants, cubed
- 4 carrots, sliced
- 2 zucchini, sliced
- 1 large onion, chopped
- 400 g (0.88 lb) chopped tomatoes
- 3 tbsp orange blossom honey
- 1 tsp cinnamon
- 1 tsp ground ginger
- 100 g (3.5 oz) toasted slivered almonds
- Fresh cilantro
- Olive oil, salt, pepper

Preparation :

1. Sauté the onion in olive oil
2. Add the hard vegetables, then the others.
3. Stir in the tomatoes, spices, and honey.
4. Simmer for 30 minutes over low heat.
5. Add the almonds and coriander before serving

■ Roasted Carrots Glazed with Honey and Thyme *(Italy)*

Ingredients :

- 1 kg (2.2 lb) carrot tops, cut into sticks
- Thyme honey: 3 tablespoons
- 2 tbsp olive oil
- 4 sprigs fresh thyme
- salt, pepper, and fleur de sel

Preparation :

1. Preheat the oven to 200°C (392°F)
2. Mix carrots, oil, salt, and pepper
3. Roast for 25 minutes, drizzle with honey, and add the thyme
4. Continue roasting for 10 minutes until caramelized
5. Finish with fleur de sel

Honey and Balsamic Vinegar Pickled Onions *(Mediterranean cuisine)*

Ingredients :

- 6 large red onions, sliced
- 4 tbsp sunflower honey
- 3 tbsp balsamic vinegar
- 2 tbsp olive oil
- 1 sprig of rosemary
- salt, pepper

Preparation :

1. Sauté the onions in oil over low heat for 15 minutes
2. Add honey, vinegar, and rosemary
3. Cook for 20 minutes until softened
4. Perfect with cheeses and charcuterie.

4. Signature Sauces and Marinades

■ Honey Bourbon Barbecue Sauce *(USA)*

Ingredients:

- 200 ml (6.8 fl oz) ketchup
- 4 tablespoons floral honey
- 3 tbsp bourbon
- 2 tbsp cider vinegar
- 1 tbsp Dijon mustard
- 1 tsp smoked paprika
- Cayenne pepper

Preparation :

1. Combine all ingredients in a saucepan.
2. Simmer for 10 minutes over low heat
3. Let cool before using

- **Old-fashioned Vinaigrette** *(France – Bourgogne)*

Ingredients :

- 2 tbsp rapeseed honey
- 1 tbsp wholegrain mustard
- 3 tbsp white wine vinegar
- 6 tbsp walnut oil
- salt, white pepper

Preparation :

1. Emulsify the honey and mustard
2. Add the vinegar and oil. Season and refrigerate.

5. Honey-Flavored Desserts from Around the World

Honey is often used as a finishing touch to top crepes, ice cream, and cakes or to add a sweet note to certain drinks. Here are some dessert ideas to enjoy.

Traditional Honey Cake *(USA)*

Ingredients:

- 300 g (10.5 oz) of flour
- 2 tsp baking powder
- 1 tsp baking soda
- 1 tsp cinnamon
- 1/2 tsp muscade
- 1/2 tsp cloves
- 250 ml (8.5 fl oz) forest honey
- 300 g (10.5 oz) brown sugar
- 3 eggs
- 250 ml (8.5 fl oz) strong, cooled coffee

Preparation:

1. Preheat the oven to 175°C (347°F)
2. Mix the dry ingredients
3. Beat together the oil, honey, sugar, and eggs.
4. Stir in the powders, then the coffee.
5. Bake for 50 to 60 minutes in a buttered pan
6. Let cool before removing from the pan

Honey and Pistachio Baklava *(Greek pastry)*

Ingredients :

- 500 g (17.5 oz) filo pastry
- 250 g (8.75 oz) melted butter
- 300 g (10.5 oz) chopped pistachios
- 100 g (3.5 oz) sugar
- 1 tsp cinnamon
- Syrup: 300 ml (10.2 fl oz) honey, 200 ml (6.8 fl oz) water, juice of one lemon

Preparation :

1. Mix pistachios, sugar, and cinnamon
2. Layer 8 sheets of filo pastry, buttering each one
3. Spread with the pistachio mixture
4. Cover with the remaining buttered leaves
5. Cut into diamond shapes, and bake for 45 minutes at 175°C (347°F)
6. Drizzle with hot syrup as soon as it comes out of the oven

Honey and Greek Yogurt Icecream

Ingredients:

- 500 ml (17 fl oz) single cream
- 400 g (14 oz) Greek yogurt
- 150 ml (5.1 fl oz) thyme honey
- 4 egg yolks
- 1 pinch of salt

Preparation:

1. Heat the cream with the honey
2. Beat the egg yolks, and pour in the hot cream.
3. Cook over low heat until coated (85°C) (185°F)
4. Cool, stir in the yogurt
5. Churn in an ice cream maker according to the instructions.

■ Caramelized Pears with Honey and Nuts *(Mediterranean and Savoy)*

Ingredients :

Serves 4 :

- 4 ripe but firm pears
- 3 tbsp honey (acacia or orange blossom)
- 40 g (1.4 oz) chopped walnuts (or almonds/hazelnuts)
- 20 g (0.7 oz) butter
- 1/2 tsp cinnamon
- A little lemon juice

Preparation:

1. Preheat the oven to 180°C (356°F).
2. Halve the pears, remove the cores, and drizzle with lemon juice.
3. Place them in a dish, and dot with small knobs of butter.
4. Drizzle with honey, sprinkle with cinnamon, and add chopped walnuts.
5. Bake for 20 to 25 minutes, until the pears are tender and caramelized.
6. Serve warm with a scoop of vanilla ice cream.

■ Soft Honey and Almond Cookies *(Mediterranean)*

Ingredients :
Approximately 20 biscuits,

- 100 g (3.5 oz) unsalted butter
- 80 g (2.8 oz) honey (flowers or lavender for a delicate flavor)
- 50 g (1.75 oz) brown sugar
- 1 egg
- 200 g (7 oz) flour
- 80 g (2.8 oz) ground almonds (or hazelnuts)
- 1/2 tsp baking powder
- grated zest of one lemon

Preparation :

1. Melt the butter and honey over low heat, then let it cool.
2. Add the brown sugar, beaten egg, and lemon zest and mix thoroughly.
3. Add the flour, baking powder, and almond powder.
4. Shape them into small balls and place them on a baking sheet lined with baking paper.
5. Flatten them slightly, then bake in the oven at 180°C (356°F) for 12 to 15 minutes, until golden brown.
6. Optional: brush them with a drizzle of warm honey as soon as they come out of the oven for extra shine.

6. Honey Drinks

- **Honey and Cinnamon Latte** *(Italy)*

Ingredients :

- 1 espresso
- 150 ml (5.1 fl oz) milk
- 1 tbsp acacia honey
- 1/2 tsp cinnamon
- Milk froth

Preparation :

1. Mix honey and cinnamon into the coffee
2. Froth the hot milk
3. Pour gently over the coffee
4. Sprinkle with cinnamon

Honey and Spice Tea *(India)*

Ingredients :

For 4 cups:

- 4 black or green tea bags
- 4 tsp chestnut honey
- 1 cinnamon stick
- 3 cloves
- 1 star anise
- a few orange slices

Preparation:

1. Let the tea steep with the spices for 5 minutes.
2. Strain, add the honey, and orange slices.
3. Serve piping hot with an extra teaspoon of honey on the side.

Lavender Honey Lemonade *(Provence)*

Ingredients :
For 1.5 liters (1.58 qt):

- 6 juicy lemons
- 5 tablespoons of lavender honey
- 1.2 liters (1.27 qt) of fresh water
- a few sprigs of lavender (optional)
- ice cubes

Preparation:

1. Start by dissolving the honey in a little warm water,
2. Squeeze the lemons, stir in the honey and their juice, and then the fresh water.
3. Add the lavender, let it macerate for 1 hour in a cool place, filter, and serve with ice cubes.

Honey Energie Smoothie *(USA)*

Ingredients :

For 2 glasses,

- 2 ripe bananas
- 250 ml (8.5 fl oz) almond milk
- 2 tbsp linden honey
- 1 tbsp chia seeds (optional)
- 1 pinch of cinnamon
- a few ice cubs

Preparation :

1. Blend all the ingredients until creamy
2. Serve immediately, ideal for breakfast or after exercise.

7. Chef’s Tips for Cooking with Honey

Honey selection according to the dish:

- Acacia honey: mild flavor, perfect for the delicate desserts
- Chestnut honey: full-bodied, ideal for red meats
- Lavender honey: floral, excellent with lamb and cheese
- Linden honey: fruity, perfect for fish
- Fir honey: woody, enhances game

Gourmet pairings:

- Cheeses: fresh goat cheese, Roquefort, Camembert
- Fruits: figs, pears, apples, berries
- Spices: cinnamon, ginger, thyme
- Nuts: almonds, walnuts, pistachios, hazelnuts

The Art of Cooking with Honey

Honey can transform many dishes. Its aromatic richness and culinary versatility make it an exceptional ingredient that deserves a place in every kitchen.

Don’t hesitate to experiment, combine honey varieties with different ingredients, and create your own recipes.

Beyond the honey we can enjoy in our cooking, the hive contains many other little-known treasures. Let us now review this natural pharmacy that bees generously offer us, each product having its own virtues and uses.

Chapter 6:

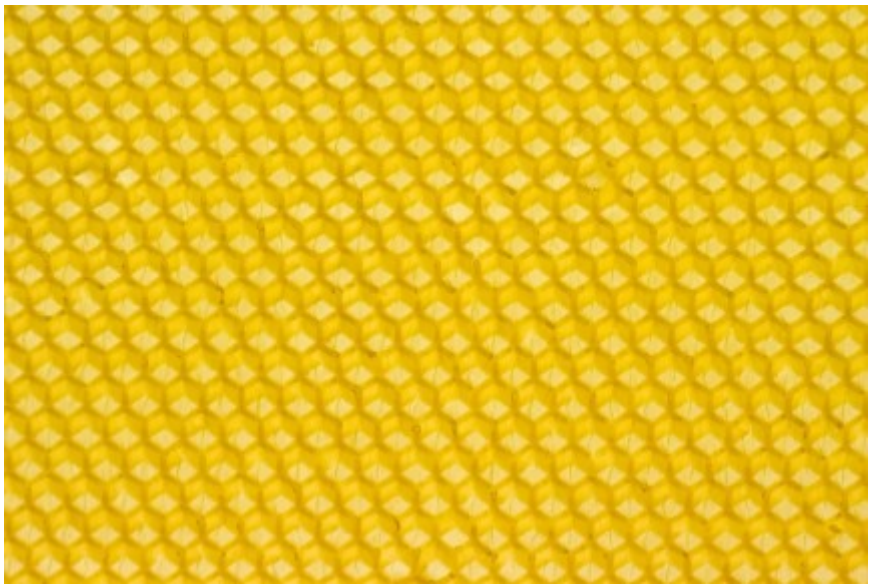
All the treasures of the hive

The Bees' Natural Pharmacy

Beyond honey, the undisputed star of the hive, bees offer us many other substances with remarkable properties. Their production further illustrates the talent of these exceptional little workers and their ability to transform natural elements into compounds of unparalleled value.

Let's explore together these wonders that bees have been performing with meticulous precision for millennia, for our benefit.

1. Beeswax: The Architecture of the Hive



An exceptional material

Beeswax is one of the few biological materials produced by an animal to build its habitat. Secreted by the wax glands of 12- to 18-day-old worker bees, this remarkable substance requires considerable energy: it takes 8 kg of honey to produce 1 kg of wax!

It is composed of esters (70-80%), free fatty acids (13-15%), hydrocarbons (12-16%), and over 300 identified compounds.

Traditional and modern applications

The Art of Lighting: Beeswax candles represent the pinnacle of natural lighting. Unlike petroleum paraffin candles, they:

- burn 3 times longer
- Emit no toxic fumes
- Purify the air by emitting negative ions.
- Diffuse a naturally sweet fragrance

Cosmetics and wellness: Beeswax is a choice ingredient for:

- **Lip balms**, because they provide protection (a protective wax film) and prevent dehydratation.
- **Facial creams** for their firming and nourishing effects.
- **Hair pomades capillaires** that provide natural shine and hold.
- **Superfatted soaps,** which give it softness and emollient properties.

Technological innovations have emerged:

- **Reusable food packaging** is a zero-waste alternative to plastic.
- **Waterproof textiles** with a natural treatment for outdoor fabrics.
- **Eco-friendly shoe polish** that cares for leather without chemicals.
- The **artistic medium** in encaustic painting for fine art.

Extraction and processing

Beekeepers harvest cappings and old combs using traditional methods. These are melted in a bain-marie at a maximum of 63°C (145°F), filtered to remove impurities, and poured into blocks for storage.
The color of the wax varies from white to brown depending on its age. Shelf life is unlimited if stored properly. Organic certification is possible for capping wax (new and not reused) depending on the origin.

2. Royal Jelly: The Elixir of Longevity

The queen's secret

Royal jelly embodies the mystery of social differentiation among bees. This iridescent food, produced only by nurse bees, transforms an ordinary worker bee larva into a queen with remarkable reproductive abilities and a longevity 40 times greater.

Exceptional nutritional composition:

- **Protein:** 12-15% (including royalisin, a unique protein)
- **Carbohydrates**: 10-16% (fructose, glucose, sucrose)
- **Lipids**: 3-6% (unique fatty acids)
- **B vitamins**: record concentrations, especially B5
- **Minerals**: potassium, calcium, phosphorus, iron
- **Essential amino acids**: present, including the 8 essential amino acids

Properties and applications

It's a **nutrient-dense nutritional supplement** that:

- Stimulates the immune system *(some studies suggest activation of lymphocytes)*

- Improves stress resistance and energy (*effects reported mainly in animal studies)*
- Regulates metabolism naturally *(some improvements, but research remains exploratory)*

It's used for its **anti-aging cosmetic properties,** which:

- Stimulates collagen production
- Regenerates cells faster
- Deeply hydrates the skin
- Reduces wrinkles and fine lines.

Hair application helps to:

- Strengthen hair follicles
- Improve natural shine

Harvesting and storage

The beekeeper raises young royal larvae and carefully collects them after 3 days. Filtration and packaging are immediate; storage at -18°C (-0.4°F) is essential.

In stores, you can find different forms: fresh royal jelly (the most active but fragile and requires a cold chain), freeze-dried capsules (practical), liquid ampoules (precise dosage), and enriched cosmetics (external use, especially for hydration and skin/hair nutrition).

3. Propolis: The Antimicrobial Shield

The hive pharmacy

Propolis is a true natural «antiseptic.» Bees use this material to **disinfect and protect their environment and to seal** the hive. Collected from tree burrs and bark, then enriched with salivary enzymes, it becomes a **remarkably effective antimicrobial agent.**

Botanical sources are varied:

- **Poplar** for classic European brown propolis,
- **Birch** for Nordic propolis with its unique properties,
- **Baccharis** for Brazilian green propolis, very rich in artepillin C, a sought-after antioxydant.
- **Dalbergia** for its rare and exceptionally active red propolis.

It contains **active ingredients**: **flavonoids** (quercetin, galangin, pinocembrin) , **phenolic acids** (caffeic, ferulic, coumaric), **essential oils** with antiseptic properties, **resins, and balms** (over 300 identified compounds).

Its therapeutic applications

It strengthens the **immune system:**

- It stimulates natural defenses
- It has an antiviral and antibacterial action and powerful anti-inflammatory properties.
- It supports ENT infection.

It contributes to **oral care** and is used for:

- preventing cavities and gingivitis,
- healing canker sores,
- cleansing the oral flora,

In **natural dermatology**, it is used for

- accelerated wound healing
- the treatment of eczema and psoriasis
- its antifungal properties
- tissue regeneration.

Forms and uses

Propolis is available in the form of **dietary supplements:** mother tincture (internal use), standardized capsules, chewing gum, syrups, and lozenges.

For external applications, it is found in dermatological ointments, some natural toothpastes, mouth sprays, or healing balms.

4. Bee Pollen: The Complete Superfood

Nature’s magic powder

Bee pollen, often referred to as a «superfood», represents one of nature’s most complete nutritional sources. Collected by foraging bees, it is enriched with enzymes that increase its biological value.

It has an exceptional nutritional profile composed of:

- **Complete proteins**: 20 to 35% with all essential amino acids,
- **Vitamins**: complete B complex, C, E, and beta-carotene
- **Minerals** (iron, zinc, magnesium, potassium)
- **Digestive enzymes** (to improve absorption)
- **Antioxidants**: flavonoids, carotenoids, polyphenols.

Proven benefits

For **athletic performance:**

Pollen provides nutritional support. *Studies (on small samples)* suggest that it increases endurance and muscle recovery.

For **nutritional balance:**

It is an ideal supplement for vegetarians and supports nutritional deficiencies. It improves digestion and regulates appetite.

For **vitality and well-being**:
It increases resistance to stress, improves concentration, supports the immune system, and produces a natural anti-fatigue effect.

Consumption and precautions

It can be consumed in the form of **fresh pollen** (one teaspoon in the morning on an empty stomach), **dried pollen** (more concentrated, easier to store), **personalized blends** (honey + pollen + royal jelly), or enriched smoothies (integrated into a modern diet).

It is recommended to introduce it gradually (possible allergies) and to **avoid it in case of airborne pollen allergies**.

Fresh pollen should be kept refrigerated. Choose sources certified as pesticide-free.

5. Bee Bread: Ancestral Fermented Food

The miraculous transformation

Bee bread is the final product of pollen within the hive. Transformed by lactic fermentation and enriched with honey and enzymes, it becomes a «predigested» food with increased nutritional properties.

Thus, it follows a **natural manufacturing process**:

Fresh pollen is brought back to the hive for **collection**. It is then **packed** into the cells, where it undergoes **fermentation** and develops unique properties as it **matures**.

Its nutritional power is superior. Its bioavailability is higher than raw pollen; it is easily digestible thanks to active lactic acid bacteria (it contains natural probiotics). Its nutrients are concentrated by evaporation.

Nutritional applications

In modern cuisine, it adds a tangy note, is sprinkled on yogurts and cereals, incorporated into certain desserts, or is fermented into beverages (fortified kombucha and kefir).

Its traditional use of supplementation is mainly aimed at high-level athletes, convalescents in the recovery phase, seniors to maintain vitality, and growing children (after 3 years).

6. Honeycomb: Edible Architecture

The hexagonal masterpiece

Here we can contemplate the art of these industrious architects at its peak. This perfect hexagonal structure, the result of millions of years of evolution, optimizes space and strength with remarkable material savings.

The **architectural genius** is evident in:

- The **hexagonal shape**: maximum surface area for minimum material
- **The perfect** 13° angle to prevent honey from dripping
- **The optimal thickness** of 0,073 mm (0.0029 in) for maximum strength
- **Storage capacity of** up to 3 kg (6.6 lb) of honey per comb.

Comb honey: the ultimate taste experience

Its **nutritional benefits** are clear: it is an **unfiltered honey** that preserves all its micronutrients. Its **wax is edible**, containing lipids and a small amount of fat-soluble vitamins A and D. Its **enzymes are active** (preserved in the comb, but activity can decrease over time or with heat). **Residual pollen** gives it a unique aromatic complexity.

It is best eaten cut into individual portions of 50-100 g (1.75-3.5 oz). Chewing gradually releases its aroma. It should be stored at room temperature, away from moisture.

It is sold in delicatessens or used in fine dining for premium cheese platters, desserts created by top chefs, exceptional breakfasts, or personalized gourmet gifts.

Contraindications

⚠ Allergies and sensitivities to bee products *(see chapter 8)*

People **allergic** to bee stings, propolis, or pollen, and children under **12 months of age should not consume honey** and **its derivatives. Pregnant women** should seek medical advice before consuming it (royal jelly).

Signs of allergy includes:

- hives, itching
- breathing difficulties
- facial swelling
- digestive reactions
- even anaphylaxis (rare, but documented)

Special precautions to take

- **Coagulants**: Medical supervision with propolis

- **Diabetes**: Blood sugar control with sugar products
- **Hypertension**: Possible hypotensive effect with royal jelly
- **Immunosuppressants**: Medical advice required

Note: The responsible use of beehive products requires following the recommended doses, consulting a doctor if in doubt, and choosing ethical and sustainable producers. They are not a substitute for medical treatment.

A natural heritage to preserve...

Beehive products are much more than consumer goods: they embody millions of years of evolution and natural perfection. Every substance produced by bees is proof of their biological genius and their irreplaceable role in the balance of ecosystems.

By choosing quality beehive products, you not only support your health and well-being but also the preservation of these architects of biodiversity. And moreover, you are safeguarding our invaluable natural heritage for generations to come.

So, what more can be done to save them? Because without bees, there is no more honey, no more pollination… it is high time to take concrete actions to protect them!

Chapter 7:

How to Protect Our Bees

«A world without bees would be a world without color, without fragrance, without fruit...»

Since the late 1990s, a disturbing reality has become apparent: our bees are disappearing. Beekeepers around the world are witnessing a dramatic decline in their colonies, a phenomenon that far exceeds normal natural loss. This silent crisis threatens not only biodiversity but also our food security and the global economy.

Yet, all is not lost. Understanding the threats facing our precious pollinators is the first step toward their protection. And each of us, at our own level, can become a guardian of these marvelous insects.

1. Bee Enemies: Understanding to Better Protect

Colony collapse disorder: a modern mystery

Crisis situation in the hive: imagine it suddenly and mysteriously becoming devoid of all life. Worker bees are disappearing en masse, abandoning their queen, their brood, and honey reserves. This disturbing phenomenon, called colony collapse disorder (CCD), has particularly affected North America since the 2000s but is now affecting all of Europe.

Scientists have identified a deadly cocktail of factors: pesticides, parasites, viruses, environmental stress...It’s often their combination that proves fatal for colonies.

Natural predators: constant pressure

In the countryside, bees encounter **many predators** that seek out colonies.

Badgers, raccoons, and **other small mammals** can cause significant damage. These animals don’t hesitate to dig their way into the underground hives of wild bees, sometimes destroying entire colonies to feed on their brood and honey. Even **mice** can infiltrate weakened hives and devour the combs.

Predatory insects pose a particularly formidable threat. **Wasps** and **hornets** act like birds of prey on hives, especially in the fall. The dreaded **Asian hornet**, which is particularly prevalent in the south of France, can literally paralyze a bee colony with its mere presence. In Mediterranean regions, the European bee-eater directly attacks queens during their nuptial flights.

Ants, more discreet but just as dangerous, infiltrate hives to steal honey and brood, gradually weakening colonies.

The **Varroa destructor**, a small mite, clings to bees like a leech. This little vampire feeds on their hemolymph, which is the equivalent of our blood, and transmits fatal viruses. An infestation of varroa mites can decimate an entire colony in a few months.

Birds such as **blue jays** and **woodpeckers** can also consume bees, although their impact is generally limited. However, some birds can damage hives while searching for protein to eat.

Pesticides: an invisible poison

The **massive use of pesticides**, particularly **neonicotinoids**, poses one of the most **serious threats** to our bees. These substances act like a subtle neurological poison: even at low doses, they disrupt the orientation and memory of foragers. *(See numerous scientific studies published in Science and Nature.)*

A poisoned bee can lose its way to its hive, condemning its colony to the loss of a valuable worker bee. Even more seriously, these pesticides weaken the bees' immune systems, making them vulnerable to diseases and parasites.

Neonicotinoids accumulate in the pollen and nectar of treated plants, transforming flowers into death traps for all pollinators.

Exposed colonies are at **increased risk of colony collapse disorder (CCD)**. This is why the European Union banned the use of the 3 main neonicotinoids in open fields in 2018, but some countries continue to request exemptions...

Habitat destruction: floral deserts

Rampant **urbanization** and **intensive agriculture** have created veritable food deserts for bees. In the past, the hedges surrounding meadows and fields teemed with a variety of wildflowers, but these have been replaced by monocultures. Flowery meadows have been supplanted by barren lawns or concrete.

This **monoculture** deprives bees of the floral diversity they need throughout the season. A colony that finds abundance in spring with rapeseed may starve to death in summer if no other flowering takes over.

Climate change: disrupted cycles

The early flowering of some plants may no longer coincide with the emergence of bees. Prolonged periods of drought or heavy rainfall affect nectar production.

Mild winters and late frosts can mislead colonies: they emerge too early from their wintering period and are destabilized.

2. Initiatives that Restore Hope

Creating favorable habitats

Around the world, initiatives are flourishing to recreate havens for bees. **Wildflower meadows** are planted along roadsides, in urban parks, and on building rooftops. These ecological corridors allow pollinators to circulate and find diverse resources.

Supervised and sustainable urban beekeeping raises awareness among city dwellers of the importance of pollinators while creating pockets of biodiversity.

Some farmers are reintroducing flowerbeds on their farms. These «honey-producing fallows» feed pollinators while also providing shelter for beneficial insects that naturally combat pests.

Reducing pesticides

Many municipalities are adopting a «zero pesticide» approach, banning pesticides from their green spaces. Farmers are rediscovering **integrated biological pest management** methods, **using natural predators** rather than chemicals.

The development of organic farming provides bees with refuge areas where they can forage without the risk of poisoning.

The search for innovation

Scientists are developing new techniques to combat the decline of bees. **Genetic selection programs** aim to create lines that are more resistant to disease and pests. résistantes aux maladies et aux parasites.

Early **detection** of health problems allows intervention before a colony completely collapses.

3. Act at Your Own Level: Every Action Counts: Your Practical Guide to Protect Bees

Creating a pollinator-friendly garden

- **Which plants should you chose?**

Your garden, even the smallest balcony, can become a restaurant for bees.

Favor local honey plants:

- **Lavender**, both fragrant and melliferous, attracts bees all summer long.
- The majestic flowers of **sunflowers** are full of pollen and nectar.
- **Echinacea** is a hardy perennial that is highly valued by pollinators.
- Stop pulling **dandelions**! These «weeds» are invaluable in spring.
- An assortment of diverse **local wildflowers** makes a natural canteen.

And spread out the blooms throughout the season:

- ✓ In **spring**: crocuses, snowdrops, goat willow, dandelion, hawthorn.
- ✓ In **summer**: lavender, thyme, sunflower, cosmos, phacelia, and white clover.
- ✓ In **autumn**: asters, goldenrod, ivy (yes, even ivy feeds late-blooming bees)**.**

Plant in generous beds rather than isolated plants. Bees prefer colorful "blanks" that they can easily spot.

Leave a corner of your garden «wild» with spontaneous plants. These «weeds» are often treasures for solitary bees.

- **Ban pesticides**

Avoid insecticides altogether, even those labeled «natural.» Adopt **biological control**: aphids are eaten by ladybugs, slugs are controlled by hedgehogs… A vibrant garden is home to natural predators that control pests. Adopt gentle methods: nettle manure, mixed plants, mulching…

If you absolutely must treat, do so in the evening when the bees have returned, using products certified «safe for bees».

- **Provide fresh water**

Bees are thirsty! Install a shallow watering hole: a simple dish with pebbles so they can rest without drowning. Change the water regularly to prevent mosquitoes from multiplying.

Install nesting sites for solitary bees

Honeybees represent only one species among 1,000 wild bees in France. These solitary bees, excellent pollinators, nest in hollow stems, holes in wood, or the ground. A simple bundle of bamboo or an «insect hotel» can provide them with shelter. *(See Appendix 2)*

Consume responsibly

Choose local organic products. Support beekeepers in your region by buying their honey directly. This simple economic gesture supports a sector that respects bees and their environment.

Please note: if you wish to install a hive, prior **beekeeping training** is **essential**.

Beekeeping requires specific knowledge and can be dangerous. *(See Appendix 2.)*

If you own land in the countryside, you can offer a beekeeper the opportunity to install his hives there. This collaboration benefits everyone: free pollination for your crops and space for the beekeeper.

4. Engage Collectively

Get involved in conservation.

Join organizations like the **Pollinator Partnership** or local environmental protection associations. These groups organize honey hedge plantings, trainings, or awareness-raising in schools and lobby for stricter pesticide regulations.

Raise awareness among those around you: explain the «weeds» are precious, and organize ecological gardening workshops with children.

Encourage public policies

Urge your local elected officials to adopt bee-friendly measures: pesticide-free green spaces, flower fallows along roadsides, subsidies for melliferous gardens…

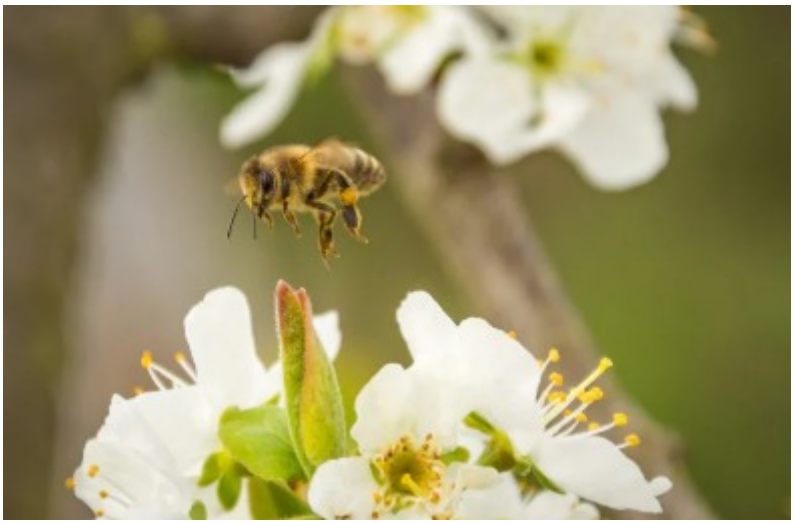
Support a ban on the most dangerous pesticides and mandatory labeling of «bee-friendly» products.

Small gestures, big impacts

Never forget that **every little bit helps**. Planting lavender on your balcony, letting clover grow in your lawn, choosing local honey… These actions seem trivial, but when multiplied by millions of people, they can reverse the trend.

Bees have offered us their treasures for millennia: honey, propolis, wax, and, above all, the invisible pollination that nourishes the world. It is our turn to offer them a future.

Hope exists. Resilient colonies emerge, varieties of melliferous plants are being rediscovered, and more environmentally friendly agricultural practices are developing. But this renaissance will only happen with our participation.



By protecting bees, we are preserving our own survival. So are you ready to become guardians for bees?

Remember: every little bit helps. Hope is reborn in every flower you plant. 🌻

Before concluding our journey into the heart of the world of bees and honey, one last crucial point deserves our attention: How can we enjoy all their benefits safely? Because even the wonders of nature require a few precaution.

Chapter 8:

Precautions for Safe Enjoyment

Enjoying honey safely

While it's interesting to know the benefits of honey… certain precautions must also be observed.

Indeed, this nectar with its many virtues requires, like any powerful natural food, a few simple precautions to safely enjoy the treasures of the hive.

Hence the composition of this short practical guide, which provides a reminder of them.

1. Honey Consumption: Essential Precautions

Honey allergies: rare but real

Although uncommon, allergic reactions to honey deserve attention:

These may be related to:

- **Residual pollen**: people allergic to the pollen of certain plants may react to the corresponding honey. Symptoms range from simple oral itching to more serious reactions.
- to **propolis** or **wax residue**: These natural substances from the hive are allergenic for sensitive individuals.

Warning signs include itching, swelling of the lips or tongue, hives, and difficulty breathing. In very rare cases, an anaphylactic reaction may occur: **an absolute emergency.**

What to do? If you have a history of pollen or bee sting allergies, first test a very small amount of honey and consult your doctor.

Possible contamination: choosing safe honey

Honey can sometimes be contaminated by:

- **microorganisms**: bacteria or fungi during harvesting or improper storage.
- **Environmental pollutants**: pesticides, heavy metals, antibiotics if hives are located in polluted areas.

- **Clostridium botulinum spores**: naturally present in the environment, can contaminate raw honey.

How to protect yourself from it?

Choose **quality honey:**

- Buy your honey from **trusted beekeepers** or **reputable brands** (*labels: AB, Demeter, IGP Miel de Corse, Label Rouge Miel d'Alsace…).*
- Favor **local** and **bio-organic** honey, which guarantees traceability and respect for the environment.
- Check the appearance and smell before consumption: uniform color, suitable texture (liquid, creamy), and absence of impurities.
- Trust your senses: natural floral fragrance, clean taste, not overly sweet.

Check certain **criteria**:

- complete label, geographical origin, harvest date, beekeeper name
- **cold extraction** method, without solvents or excessive pasteurization
- Packaging in tinted glass to protect from UV
- **certified:** organic or recognized quality labels
- **Fresh**: Choose a recent harvest date.

The microbial risk (apart from infant botulism) is very low, as honey is **naturally antibacterial and highly resistant to contamination;** this is explained by its **acidic pH**, **high osmolarity,** and **natural antibacterial enzymes.**

Special attention for infants

Danger : Never give honey to babies under 12 months old. Their immature digestive systems cannot neutralize potential botulinum spores. This **precaution is formal and applies without exception.**

Diabete et blood sugar: moderate consumption

Honey remains a natural sugar rich in fructose. People with diabetes should:

- Consume honey le miel avec parcimonie
- Include it in their carbohydrate calculations
- Monitor their blood sugar after consumption
- Favor honeys with a lower glycemic index (acacia, chestnut)
- *Some studies* show a less drastic effect of honey on blood sugar compared to white sugar.

Dental hygiene: a simple reflex

Honey sticks to teeth and can promote cavities. A simple rinse with water after eating is enough to prevent this risk.

2. Practical Tips for Safe Consumption

Optimal storage

- At room temperature in a cool, dry place (15 to 20°C) (59 to 68°F)
- away from light: dans un placard ou cellier
- in an airtight container, as honey absorbs moisture from the air.
- Use a clean spoon to avoid cross-contamination.

Balanced consumption

Consume reasonable amounts, i.e.

- 1 to 2 tablespoons per day for an adult (approximately 20 to 40 g) (0.7 to 1.4 oz) maximum
- 1 to 2 teaspoons per day for a child over 2 years old (approximately 5 to 10 g) (0.17 to 0.35 oz) maximum

Honey remains a fast-acting sugar (glucose, fructose), so it must be included **in the overall daily intake** of sugars recommended by the WHO:

- no more than 25 g (0.87 oz) of added sugars per day for a child
- no more than 50 g (1.75 oz) for an adult

Honey does, however, have one advantage: it provides antioxidants, enzymes, and minerals that refined sugar lacks.

Preferably, include it in your diet: tea, yogurt, toast, cooking, rather than in excess, in extra.

Choose the right time: in the morning, at breakfast, or before exercise. Drink water afterward.

3. Living with Bees: Respect and Safety

Our winged allies

Bees will only sting if they feel threatened, to protect their flock, their hive. They are not naturally aggressive. Understanding their behavior allows for harmonious coexistence.

The different species:

- **Honeybees**, the ones that produce honey, are generally docile.
- **Bumblebees**, larger and with a «fluffy» appearance, are very peaceful.
- **Solitary bees** do not form colonies and are almost harmless.
- **Africanized bees**, found in some regions, are more defensive.

Golden rules

- **Stay calm and collected**: sudden movements and panic attract their attention. If a bee approaches, remain motionless; it will leave on its own.
- **Avoid sweet scents**: perfumes, fragrant creams, and sugary drinks can attract them.
- **Choose neutral colors**: bright colors and floral patterns intrigue them. Favor white, beige, or khaki.
- **Respect their territory**: Never approach a hive or a swarm. Keep your distance.
- **Cover food and drinks**: When eating outdoors, protect your sugary foods.

In case of a simple sting

- **Remove the sting**: scrape it off with a flat object (such as a bank card) rather than pinching it; this prevents injecting more venom.
- **Wash** with water and soap.

- ➔ **Apply cold** (an ice cube, not directly to the skin, but wrapped in a cloth) for 10 to 15 minutes to reduce pain and swelling.
- ➔ **Monitor**: Pain and local swelling are normal and disappear within a few hours.

Severe allergy: absolute emergency

Warning symptoms (within minutes of the sting):

- breathing difficulties
- swelling of the face or throat
- generalized rash
- dizziness, faintness
- Blood pressure drops.

Action to take: **Immediately call 911 (USA and Canada), 112 (European Union: works across all EU countries), 000 (Australia), 111 (New Zealand), 108 (India), 120 (China), or 119 (Japan)**.

This is a **life-threatening emergency**.

When faced with an aggressive swarm 😨

- ➢ Run in a straight line toward shelter (house, car): **don't run in a zigzag pattern**!
- ➢ **Protect your head**: cover yourself with clothing.
- ➢ **Never enter the water**: the bees will be waiting for you at the surface.
- ➢ **Call emergency services** if necessary: the fire department or emergency medical services in case of multiple stings.
- ➢ **Contact a beekeeper** to recover the swarm (never attempt to remove it yourself).

Thus, the treasure of bees can be enjoyed in complete peace of mind if we follow a few simple rules.

Knowing more about our little pollinators allows us to coexist peacefully with them while respecting them.

Let's now dive into the appendices, which will reveal other fascinating aspects of this adventure.

Let's begin with a journey through the millennia to understand how humanity has forged its bond with honey.

APPENDICES

Appendix 1: History of Honey: A Thousand-Year-Old Nectar

Appendix 2: The Work of the Beekeeper

Appendix 3: Medical Applications

Appendix 1:

History of Honey, a Thousand-Year-Old Nectar

Long before the invention of writing, long before humans cultivated the ground, there already existed a secret alliance between humanity and bees. This age-old love story, etched in the stone of prehistoric caves and sung in the oldest sacred texts, tells us how a simple flower nectar became the liquid gold of our civilizations.

1. Origins: The First Honey Hunters

The cave paintings of Spain

In the *Cueva de la Araña* caves, near Valencia, an 8,000-year-old painting reveals one of the oldest relationships between humans and bees. It shows an individual clinging to vines, his hands buried in a rocky cavity from which angry bees emerged.

These first «honey hunters» risked their lives for a few honeycombs of golden wax. Armed only with smoking torches and extraordinary courage, they climbed cliffs to steal their precious treasure from wild bees.

Since prehistoric times, humans understood that this amber nectar was worth all the dangers.

The Art of Domestication

Over the millennia, humans learned to tame bees rather than fight them. The first hives were probably hollow tree trunks, woven wicker baskets, or pierced clay jars. The use of smoke to soothe bees truly transformed primitive beekeeping.

2. Ancient Egypt: The Honey of the Pharaohs

A food of the gods

At that time, honey was more than just a sweetener: it was a bridge between the world of the living and that of the gods.

This explains why honey accompanied the pharaohs on their journey to eternity. In Tutankhamun’s tomb, archaeologists discovered 3,000-year-old jars of honey (still edible): a fact that fascinated the ancients.

The first industrial beehives

The Egyptians developed advanced beekeeping. They built cylindrical clay hives, which they stacked by the dozen along the banks of the Nile. Then, they loaded these hives onto boats during the lotus boom and sailed upriver, following the scent of nectar.

This river transhumance, the ancestor of our modern hive movement, allows bees to forage continuously and beekeepers to harvest up to three times a year.

The royal symbol

The bee became the royal emblem of Lower Egypt. On royal cartouches, it symbolized the pharaoh himself: industrious, organized, and protective of his people. Honey was part of sacred offerings and was also used as currency.

But the history of honey doesn’t stop at the banks of the Nile; it extends to the shores of the Mediterranean, where Greeks and Romans gave it a central place in their culture.

3. Greece and Rome: Wisdom and Medicine

The nectar of the muses

The Greeks produced ambrosia, the divine nectar that granted immortality to the inhabitants of Olympus. It was closely linked to bee honey.

Aristotle, the father of biology, devoted entire pages to the study of bees. He was the first to understand the central role of the queen in the colony, even though he still considered her a king. His detailed observations led to the development of natural beekeeping.

Greek poets, from Pindar to Homer, compared their verses to honey: sweet, precious, and immortal. The Greeks and Romans also drew their inspiration from the world of bees to create artistic decorations.

Rome and the medical arts

The practical Romans used honey to treat various ailments. Pliny the Elder, in his «Natural History,» lists dozens of therapeutic uses: healing wounds, treating sore throats, and remedying poisoning.

Thus, the Roman legions never failed to take pots of honey with them when they went on a mission. This «universal medicine» healed wounds and restored strength to exhausted soldiers.

4. Sacred Honey: Spiritual traditions

In Hinduism: divine purity

In India, honey is used in rituals. This nectar represents purity, heavenly sweetness, and spiritual wisdom. According to Vedic writings, the gods created bees to offer humans a taste of paradise.

The Bible: Land of Milk and Honey

In Judeo-Christian texts, honey occupies a unique place that goes beyond its practical uses: it symbolizes sweetness, blessings, wisdom, and provision.

The Promised Land is described as «flowing with milk and honey,» a metaphor for a divine abundance that nourishes body and soul.

God’s Word is like honey: Psalm 19:10: «The judgments of The Lord are more precious than gold, than much fine gold; they are sweeter than honey, than that which drips from the comb.» This comparison between divine wisdom and the sweetness of honey runs through all the sacred texts.

John the Baptist, in the desert, ate «locusts and wild honey» (Matthew 3:4), this combination of austerity and natural gentleness symbolized spiritual preparation.

Even more disturbing: in the Gospel according to Luke (Luke 24–42), after His Resurrection, to the surprise of the apostles, The Lord Jesus showed them His Wounds. Noticing their astonishment, He asked them for something to eat. They offered Him fish and a honeycomb. And, He ate it in front of them. – As if to prove to them the reality of His Return among the living!

These spiritual and cultural traditions have not disappeared: they continue to live in our celebrations and actions today.

5. A Modern Legacy

Rosh Hashanah: the sweet new year

Even today, Jewish families dip apple slices in honey to celebrate Rosh Hashanah, wishing the new year to be «as sweet as honey.» This age-old tradition unites generations around a shared hope for happiness.

Weddings and honey

Our modern «honeymoon» stems from a very ancient custom. In many cultures, newlyweds drank mead (honey wine) during the first month of their union, believed to promote fertility and marital bliss.

A living heritage

This thousand-year-old story is not just a dusty memory. Every jar of local honey purchased supports a tradition that endures, from medieval monks to connected beekeepers.

Honey teaches us an extraordinary lesson: there are treasures that defy time. Unlike most foods, pure, well-preserved honey never spoils.

Today, as we savor this amber nectar, we taste both the flowers of our region and the memory of humanity because, beyond its nutritional and medicinal properties, honey remains a promise: sweetness can triumph over bitterness.

And this story continues to be written every spring, when the bees resume their old-age ballet...

Following this journey through civilizations, let's now take a look at the men and women who continue this ancestral tradition today. Let's explore the exciting profession of beekeeper, the modern guardian of this know-how.

Appendix 2:

The Work of the Beekeeper

A millennia-old, evolving profession

Beekeeping is much more than just raising bees. It's a delicate art that requires patience, observation, and respect for nature.

Whether you want to become a professional beekeeper or simply install an insect hotel in your garden, proper training is essential to succeed and protect these precious pollinators.

The beekeeper doesn't really own his bees; he accompanies them. Each hive is a living organism, both fragile and powerful, that must be listened to with patience and humility…

1. The Daily Life of a Beekeeper

His essential missions are numerous and vary with the seasons.

- **Colony monitoring and health:**

He regularly inspects his hives (every week during the active season).
And he must detect diseases and parasites (varroa, nosema, foulbrood) early.
He also knows how to assess the queen's egg laying and the colony's dynamics.
Finally, he manages natural swarming.

- **Seasonal management:**

In spring, he visits the overwintering area, stimulates and divides the colonies. In the summer, he installs supers, harvests honey, and monitors swarm control. Then in the fall, he does his final harvest, treats against varroa mites, and prepares for winter storage. Finally, in winter, as the bees rest, he maintains the equipment and continues his training.

- **Production and processing:**

- He extracts the honey under strict hygienic conditions.
- He filters, monitors maturation, and then pots.
- He handles other hive products: wax, propolis, and pollen.
- He complies with health and traceability standards.

2. Modern Challenges

Environmental challenges are numerous and require, among other things, adapting to climate change, managing declining floral resources, and protecting against pesticides. We must also fight against invasive species (the Asian hornet).

It is also important to master **technical developments** in various fields:

- new technologies (connected hives),
- queen rearing,
- genetic selection for disease resistance,
- computerized livestock management.

Today, sensors, scales, and mobile applications allow us to monitor colony health remotely. But despite these innovations, direct observation and field experience remain irreplaceable.

3. Beekeeping Training

Why is training essential?

Safety first: **Practical training** teaches how to prevent accidents (multiple stings, allergic reactions), how to properly handle colonies, and how to use the smoker and equipment appropriately.

To ensure **animal welfare,** it’s important to respect the bee’s natural cycles, and understand stress-free techniques to use for colonies. It’s also important to be aware of how to prevent diseases through good practices.

Efficient and sustainable beekeeping requires optimizing production and reducing colony losses. And above all, it must be managed in an environmentally sustainable manner.

Types of training

Initial training includes a minimum of 40 to 60 hours on key topics such as:

- The bee: its biology, its life in the colony
- equipment and how to handle hives
- the beekeeping calendar and technical procedures
- diseases and treatments
- regulations
- Field practice with an experienced beekeeper

Then, more **specialized training courses** are offered:

- Queen rearing and colony multiplication
- organic beekeeping
- treating bees with bee products
- marketing and processing
- hobby or educational beekeeping

Various organizations exist for this purpose:

official organizations (beekeeping unions, chambers of agriculture, agricultural vocational training centers, agricultural high schools with beekeeping sections) and private and

associative training programs (local beekeeping associations, apiary schools, certified online training courses, internships with professional beekeepers).

Finally, it’s always possible to improve through **continuing education**:

Advanced training courses, regional technical days, scientific conferences, and health and regulatory monitoring are all good ways to keep your knowledge uptodate.

Regulatory aspects

In order to ensure everyone’s safety and to control beekeeping practices, certain **declarations** are **mandatory:** the annual declaration of hives, even if you only have one, and the declaration of veterinary treatments. You must also have an NAPI number (beekeeping number) and keep an up-to-date breeding register.

Health regulations:

A minimum distance from neighbors (5 to 10 meters, depending on the municipality) must be respected, as must prefectural decrees. Sometimes, a certain fence height is necessary.

Liability insurance is strongly recommended: it protects both the beekeeper and its neighbors.

Tips for getting started

It is recommended to follow certain steps:

1. Have comprehensive theoretical training (minimum 3 months)
2. Be sponsored by an experienced beekeeper (one full season)
3. Purchase your equipment step-by-step (prioritize quality over quantity).

4. Start with 2 or 3 hives maximum.
5. Evaluate and improve (continuing education)

Mistakes to avoid

- **A rushed start**

Setting up without prior training, purchasing unsuitable or poor-quality equipment, being negligent about regulatory aspects, or underestimating the time required… can be very damaging.

- **Inappropriate management**

Overly frequent visits that stress the bees, negligence in health treatments, excessive honey harvesting, or abandonment in the event of difficulties are all unfortunate deviations to be avoided.

4. Beyond Hives: Biodiversity and Insect Hotel

Modern beekeeping ethics involve:

- **Respect for bees** :

These include preserving animal welfare, using gentle and non-invasive techniques, maintaining genetic diversity, and combating inbreeding.

- **Environmental responsability**:

It is necessary to contribute to local biodiversity, use ecological and sustainable practices, raise public awareness, and share know-how.

It has a **positive impact on the ecosystem**.

- It uses **environmental services** for :

Pollination of crops and wild plants, environmental health indicators, maintaining natural balances, and providing educational support for ecology.

- **Local development** enables:

Short supply chains and direct sales, beekeeping tourism and agritourism, local preservation, and rural vitality.

Pollinators-friendly designs

Ecological gardening requires:
Select honey-producing plants adapted to the region, stagger flowering throughout the season, avoid using pesticides and chemical fertilizers, and also create wild areas and flowering fallows.

Space management must be differentiated; it is necessary to:
preserve fallow areas, mow late to preserve flowers, plant diverse hedges, and don't forget to install watering points.

Installing an insect hotel

Why even train for an insect hotel?

It is important to choose the right materials (untreated wood, suitable hollow stems). You must also know how to find the right orientation and optimal positioning and how to maintain and even renew materials.
In addition, the beekeeper must also be able to identify the insects that settle there and avoid ecological traps.

Effective design allows for:

- compartments adapted to each species (solitary bees, hoverflies, ladybugs)
- local natural materials
- proper size and height
- protection against humidity and predators

A long-term commitment

*«A forewarned beekeeper is forearmed.» B*eekeeping, whether professional or recreational, represents a serious commitment to nature and future generations. Training is not an option, but an absolute necessity, both for your safety and for the well-being of bees and the protection of our environment.

Being a beekeeper, means living in harmony with millions of fragile but essential wings. Every decision has its impact. If we learn to help bees, it is in fact, each of us that we protect.

Even installing a simple insect hotel requires an informed approach to truly benefit biodiversity. Every action counts in protecting our pollinators, and every beekeeper becomes a messenger for this essential cause.

Never forget: bees preceded us on this planet, and let's hope that they will survive. Our role is to support them with respect and expertise.

To conclude our journey, let's look at the most advanced applications of honey: its use in modern medicine. While our ancestors suspected its virtues, today's science reveals its full complexity and effectiveness.

Appendix 3:

Medical Applications

An ancient remedy validated by science

Since ancient times, humans have used honey to relieve certain types of pain: It was applied to wounds, used against inflammation, and healers attributed a thousand virtues to it.

Today, modern science confirms some of this ancestral knowledge: honey possesses remarkable therapeutic properties that make it a valuable ally in contemporary medicine.

⚠ ***Important disclaimer****: The following information is* ***for educational purposes only*** *and is not a substitute for medical professional advice.* ***Any therapeutic use of honey must be supervised by a physician,*** *particularly if you suffer from diabetes or allergies or are taking medications.*

We will now review some current medical applications and research, citing the references of the studies conducted at the end of this chapter.

1. The Scientific Foundations

Honey acts like a small natural laboratory. Its benefits are based on several mechanisms :

- An **acidic pH (3.2 to 4.5)** that inhibits bacterial growth.
- A **high osmolarity,** due to its high sugar concentration, which dehydrates microbes.
- **Hydrogen peroxide** is produced by the enzyme glucose oxidase, a true natural antiseptic.
- **Phenolic compounds**: natural antioxidants and anti-inflammatories.
- **Flavonoids**: molecules with multiple therapeutic properties.

These elements give it three major properties:

1) **Antibacterial:** It limits microbial proliferation.
2) **Anti-inflammatory**: it soothes irritated tissues.
3) **Healing**: it promotes cell regeneration.

2. Honey and Healing

Modern medicine has rediscovered what the ancients already practiced: applying honey to wounds.

- It acts as a **natural antimicrobial,** preventing infections. *(See source 1.)*
- Its enzymes facilitate **gentle debridement**, removing dead tissue without **damaging** healthy tissue. *(See source 2.)*
- It maintains an optimal moist environment for cell regeneration while preventing tissue maceration. *(See source 3.)*

These effects are primarily documented with **medical-grade honey,** sterilized by gamma radiation, and prepared under pharmaceutical conditions.

Clinical trials have demonstrated its benefits for **chronic wounds, pressure sores, and superficial burns.**

3. Honey and Burns

In the treatment of **minor burns (first and second degree**, especially **non-extensive)**, medical honey dressings have proven useful:

- reduced risk of infection,
- pain reduction,
- Sometimes faster healing.

(see source 4)

For severe burns, research is even exploring **dressings** associating **honey** and **silver nanoparticles** to combine their antimicrobial effects.

4. Honey and Oncology

Research is currently focusing particularly on managing **the side effects of radiotherapy.**

In patients treated for head and neck cancers, the preventive use of honey significantly reduces the risk and severity of mucositis (painful mouth ulcers). *(See source 5.)*

Caution: Honey is not a cancer treatment but a supportive supplement to improve quality of life.

5. Eye Health

Traditional and modern ophthalmology recognizes several virtues of honey:

- Its anti-inflammatory properties can help in the treatment of certain conjunctivitis and blepharitis, under strict medical supervision. (See source 6.)
- Its antioxidants are being studied for their potential role in cataract prevention. (See source 7.)
- Certain honeys rich in vitamin A may support night vision.

Caution: Never apply raw honey to the eye! Use only sterile ophthalmic preparations and consult an ophthalmologist before any treatment.

6. Limitations and Precautions for Use

Despite its benefits, honey is not without risks:

- Absolute contraindications: Infants under 12 months (risk of botulism), known allergies to bee products, and uncontrolled diabetes.
- Possible side effects: allergic reactions, increased blood sugar, excess scar tissue.
- Interaction: with certain anticoagulants, antidiabetics, and immunosuppressive treatments.

Which honey for which use?

Manuka honey (New Zealand) has strong antibacterial properties thanks to its methylglyoxal (MGO), making it a hospital standard.

Thyme honey is a powerful antiseptic.

Eucalyptus honey is beneficial for the respiratory tract.

Liden honey has calming and mildly sedative properties.

Mild, well-tolerated **acacia honey** is recommended for sensitive stomachs.

In medical use, the essential criteria are **sterilization** and **traceability.**

7. Bee Venom: Poison and Remedy

Ancestral therapeutic uses

Less well-known than honey, bee venom (or apitoxin) also attracts medical interest:

It contains:

- **Melittin**: powerful anti-inflammatory,
- **Phospholipase A2**: active enzyme,
- **Apamine**: neurological effects,
- **Adolapine**: natural analgesic.

Modern applications:

- relief of certain joint pain,
- cosmetic applications (it is said to stimulate collagen)
- desensitization of allergy sufferers (under hospital protocol),

Caution: These uses fall within the purview of specialized medicine and should never be attempted for self-medication.

Research is still exploring its potential in **inflammatory and neurological diseases, and in cancer prevention**… but the results remain to be confirmed.

Honey, a treasure of nature and a centuries-old remedy, is now validated and refined by modern science. It illustrates how traditional wisdom and contemporary research can come together.

Its unique therapeutic properties make it a complement to conventional treatments and an ally.

However, like any therapeutic agent, honey must be used **with discernment, under appropriate medical supervision,** and in accordance with its indications and contraindications.

The future of «honey medicine» lies in this balanced approach, combining respect for tradition and scientific rigor.

Sources :

1) Molan PC. « The evidence supporting the use of honey as a wound dressing » https://doi.org/10.1177/1534734605286014

2) Simon A. « Medical honey for wound care.» https://doi.org/10.1093/ecam/nem175

3) Jules A.B. « Honey as a topical treatment for wounds » https://doi.org/10.1002/14651858.CD005083.pub4

4) Subrahmanyam M. « A prospective randomized clinical and histological study of superficial burn wound healing with honey.» https://pubmed.ncbi.nlm.nih.gov/9625243/

5) Motallebnejad M.: « The effect of topical application of pure honey on radiation-induced mucositis » https://pubmed.ncbi.nlm.nih.gov/18335118/

6) A double-blind clinical trial on the efficacy of honey drops in vernal keratoconjunctivitis https://pmc.ncbi.nlm.nih.gov/articles/PMC3953621/

7) Therapeutic potential of honey and propolis on ocular disease https://pmc.ncbi.nlm.nih.gov/articles/PMC9696375

8) « Venom immunotherapy protocols.» https://www.frontiersin.org/journals/pediatrics/articles/10.3389/fped.2023.1192081/

«The antibacterial and healing properties of honey» by Y. Couquet and A. Desmoulière (2013) *https://www.sciencedirect.com/science/article/abs/pii/S0515370013004928*

« Honey, an advanced antimicrobial and wound-healing biomaterial » review detailing its antibacterial, antifungal, and viral properties. https://www.mdpi.com/1999-4923/14/8/1663

«Honey in wound healing: An updated review» describes its effectiveness against a wide range of injuries - https://www.degruyterbrill.com/document/doi/10.1515/biol-2021-0084/html

More reviews can be found on **PubMed**. https://pubmed.ncbi.nlm.nih.gov/

Conclusion

We have now reached the end of this exploration of the bee kingdom, and what an adventure it has been! From the fascinating mechanisms of pollination to the unsuspected virtues of honey, from the perfect architecture of honeycombs to the coded dances of foragers, we have lifted the veil on various extraordinary mysteries of nature.

But this book isn't just a window onto a wonderful world: it's a call to action. Because today, we know that every bee that forages, every hive that thrives, every flower that blooms contributes to the fragile balance of our planet. From the smallest flower to the largest tree, every living being is connected to these humble little creatures that work diligently for our well-being.

You now hold the keys to actions.
Whether it's tasting this honey, which required the work of thousands of bees; planting honey-producing flowers on your balcony; choosing environmentally friendly products; or simply sharing your wonder with those around you, **every little bit helps**.

Bees have existed for so long. Our ancestors revered them as divine messengers, and today, science reveals that they are indeed extraordinary creatures, endowed with a collective intelligence that commands our admiration.
The story continues, and you are now a participant.

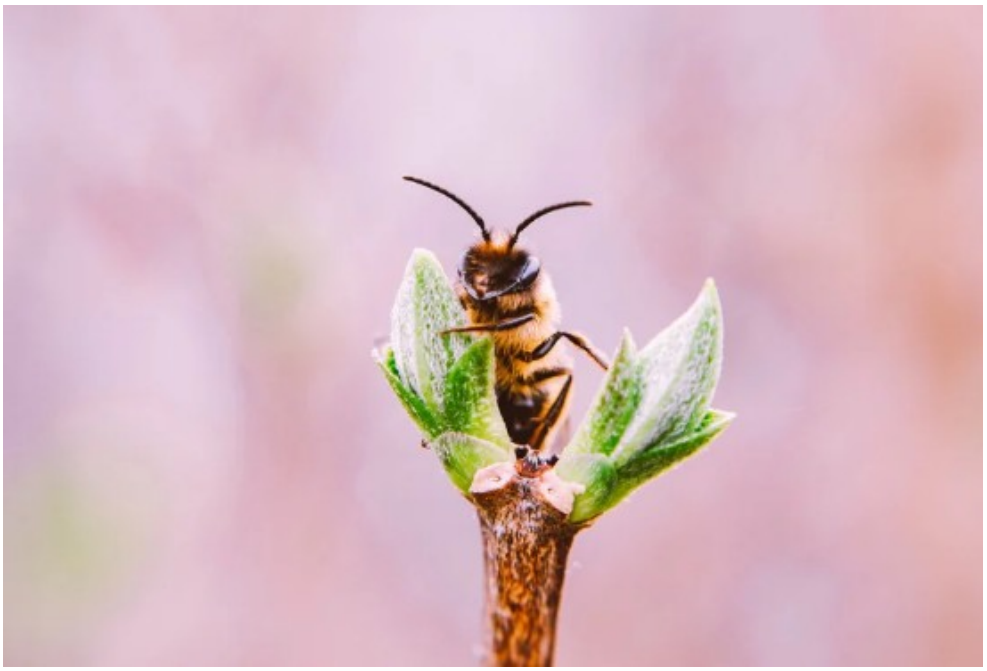
In this fast-paced world, bees teach us the value of patience, cooperation, and living in harmony with our earth. They show us that the greatest achievements often arise from the sum of small gestures repeated with perseverance.

Remember the precious gifts they offer us: not just the products of the hive, but also the delicious flavors, the multiple health benefits, and, above all, this existence they help to maintain.

So the next time you hear their familiar buzz, take a moment to observe them and thank The Lord for His creatures.
And never forget: By saving the bees, we are ensuring our own future.

NB: If you enjoyed this book, please leave a review,
it supports my work! 👍

Final QUIZ



After exploring the fascinating world of bees, it's now time to take stock of your knowledge. Good luck!

1. What is the lifespan of a worker bee in summer?
a) About 6 weeks
b) 7 months
c) 1 year

2. How many eggs can a queen lay per day during the peak season?

a) 500 eggs
b) 2,000 eggs
c) 5,000 eggs

3. How do bees regulate the temperature in the hive?

a) By flapping its wings to generate fresh air
b) By storing water in the cells
c) By grouping together or spacing out depending on the temperature

4. What percentage of the world's food crops depend on bee pollination?

a) 15%
b) 35%
c) 60%

5. How does a scout bee communicate the distance to a nectar source?

a) By the duration of its dance
b) By the intensity of its buzzing
c) By the number of turns it makes

6. How far can a bee travel from its hive to forage?

a) 1 kilometer (0.62 mi) maximum
b) up to 3 km (1.86 mi)
c) more than 5 km (3.1 mi) if necessary

7. What are the two main sugars in honey?

a) glucose and fructose
b) sucrose and lactose
c) maltose and galactose

8. How many flowers must a bee visit to produce one teaspoon of honey?

a) 1,000 flowers
b) 10,000 flowers
c) more than 40,000 flowers

9. What does honey that crystallizes quickly mean?

a) It is of poor quality
b) It is rich in glucose
c) It has been heated

10. What is the maximum water content of quality honey?

a) 15%
b) 18%
c) 22%

11. What property of Manuka honey makes it particularly sought after?

a) Its very sweet taste
b) Its strong antibacterial activity
c) Its intense golden color

12. Why is it forbidden to give honey to babies under one year old?
a) It is too sweet for them
b) Risk of botulism spores
c) It can cause allergies

13. What hive product do bees use as «cement» to seal cracks?
a) wax
b) propolis
c) royal jelly

14. What is the nutritional benefit of bee bread?
a) It contains all the essential amino acids
b) It is rich in vitamin C
c) It contains no sugar

15. Which parasite poses the greatest threat to bees today?
a) The Asian hornet
b) The Varroa destructor
c) The wax moth

16. What does Colony Collapse Disorder (CCD) mean?
a) The physical collapse of hives
b) The sudden disappearance of worker bees
c) The death of the queen

17. What simple action can help solitary bees in your garden?
a) Install an insect hotel
b) Add sugar water
c) Use organic pesticides

18. To what maximum temperature can honey be heated without destroying its enzymes?
a) 40°C (104°F)
b) 60°C (140°F)
c) 80°C (176°F)

19. What is the best way to store honey?
a) In the refrigerator in an open jar
b) At room temperature in an airtight container
c) In the freezer to prevent crystallization

20. In which ancient civilization was honey used for embalming?
a) The Greeks
b) The Egyptians
c) The Romans

21. What declaration is required, even for a single hive?

a) Declaration to the town hall
b) Declaration with NAPI number

c) Declaration to the Chamber of Agriculture

22. What is the first safety rule in beekeeping?
a) Always wear a full suit
b) Never open a hive during a thunderstorm
c) Always have appropriate training

Detailed answers:

1.a) About six weeks During periods of intense activity (spring-summer), a worker bee lives 5-7 weeks. In winter, «winter» bees can live up to 6 months, as they are less active.

2.b) 2,000 eggs: A queen in full egg-laying mode can lay up to 2,000-3,000 eggs per day in spring, more than her own body weight!

3.c) By grouping together or spacing out depending on the temperature. Bees form a compact «cluster» to maintain warmth or space themselves out and fan with their wings to cool down. This allows them to maintain a temperature of 35°C (95°F) in the brood.

4.b) 35% Approximately 35% of global food production depends directly on animal pollination, primarily by bees. This represents 1/3 of what we eat!

5.a) By the duration of its dance: The further away the source, the longer and slower the figure « 8 » dance.
The direction is determined by the angular difference between the « 8 » and the vertical radius of the hive (between the resource and the sun).

6.b) up to 3 km The usual range is 1 to 3 km (0.62 to 1.86 mi), but bees can travel up to 5 km (3.1 mi) if necessary. Beyond this, the energy expended exceeds the energy gained.

7.a) Glucose and fructose: These 2 monosaccharides represent 70-80% of honey. Their proportion determines the crystallization rate: more glucose = faster crystallization.

8.c) More than 40,000 flowers: For one teaspoon of honey (7 g) (0.245 oz), a bee should have to visit approximately 40,000-50,000 flowers! That's the lifetime work of seven worker bees.

9.b) It is rich in glucose. Honey rich in glucose (rapeseed, sunflower) crystallizes quickly.
This is a natural sign of quality, not a defect. Acacia honey (rich in fructose) remains liquid longer.

10.b) 18% The water content should not exceed 18% for quality honey (17% for organic honey). Beyond that, there's a risk of fermentation and altered taste.

11.b) Its strong antibacterial activity: Manuka honey contains methylglyoxal (MGO), which gives it exceptional antimicrobial activity, measured by the UMF index.

12.b) Risk of botulism spores: Honey may contain *Clostridium botulinum* spores, which are harmless to adults but dangerous to babies whose digestive systems are immature.

13.b) Propolis: Plant resin collected and processed by bees, used to seal, sanitize, and mummify intruders in the hive. Powerful antimicrobial properties .

14.a) It contains all the essential amino acids. Bee bread (pollen + honey + ferments) is a complete «superfood» with proteins, vitamins, minerals, and natural probiotics.

15.b) The varroa destructor: This parasitic mite weakens bees and transmits deadly viruses. This is the leading cause of colony death in the world.

16.b) The sudden disappearance of worker bees: A mysterious syndrome where worker bees abandon the hive, leaving behind the queen, brood, and reserves. The exact causes remain debated (pesticides, stress, diseases, etc.)

17.a) Install an insect hotel Solitary bees (osmia, leafcutter bees, etc.) nest in hollow stems. A well-designed hotel provides them with valuable nesting sites.

18.a) 40°C (104°F). Beyond 40°C (104°F), honey enzymes (diastases) begin to degrade. To preserve its properties, never boil honey.

19.b) At room temperature in an airtight container: Honey can be stored indefinitely at room temperature, away from moisture and light. No need for a refrigerator!

20.b) The Egyptians used honey for embalming due to its antibacterial and dehydrating properties. (Honey that is still edible has been found in tombs.)

21.b) Declaration with NAPI number: A beekeeper's number is required for the first hive and must be renewed every year between September and December on the government website (European Union).

22.c) Always have appropriate training. Training is essential for the beekeeper's safety AND the well-being of the bees. Even for a hive, knowledge is essential.

Scale:
20-22 points: Beekeeping expert! You could almost become a beekeeeper
17-19 points: Very good level! You have thoroughly assimilated the knowledge in the ebook
12-16 points: Good level, some revision is needed on certain points
7-11 points: Decent level, but feel free to reread some chapters
Less than 7 points: Time to start the book again! 😊

Congratulations on completing the quiz!

Whether you got a perfect score or discovered new information, the important thing is that you deepened your knowledge of these extraordinary creatures. Each question was an opportunity to rediscover a fascinating aspect of the world of bees!