

Introduction to Bee Products

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An overview of the main substances produced by honeybees, their composition, uses, and key considerations.

1. Overview

Bee Product	Primary Source (Bee)	Main Components	Typical Uses
Honey	Nectar collected from flowers	Sugars (fructose, glucose), water, enzymes, trace vitamins & minerals	Sweetener, culinary ingredient, wound care, cosmetics
Propolis	Resinous material gathered from tree buds & mixed with bee secretions	Flavonoids, phenolic acids, wax, essential oils	Antimicrobial agent, dietary supplement, dental care, cosmetics
Royal Jelly	Secreted by hypopharyngeal glands to feed larvae & queen	Water, proteins, sugars, fatty acids, vitamins (B? complex)	Nutritional supplement, skin ?care formulations, research on longevity
Bee Pollen	Pollen grains packed into pollen baskets on hind legs	Proteins, amino acids, lipids, carbohydrates, vitamins, minerals, enzymes	Dietary supplement, sports nutrition, allergy desensitization
Bee Bread	Fermented pollen stored in honeycomb cells	Lactic?fermented proteins, organic acids, vitamins, minerals	Nutrient?dense food, probiotic source
Bee Venom	Stinger injection	Peptides (melittin, apamin), enzymes, bioactive amines	Medical therapy (arthritis, multiple sclerosis), cosmetics
Bee Wax	Secretion from wax glands on abdominal segments	Long?chain fatty acids & alcohols, hydrocarbons	Candles, cosmetics, food coating, pharmaceuticals
Bee Bread	Fermented pollen stored in honeycomb cells	Lactic?fermented proteins, organic acids, vitamins, minerals	Nutrient?dense food, probiotic source

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2. Honey

2.1 Production Process

1. **Foraging** – Bees collect nectar and store it in the crop.
2. **Enzymatic conversion** – In the hive, enzymes (invertase, glucose oxidase) break down sucrose into glucose & fructose and produce small amounts of hydrogen peroxide.
3. **Water reduction** – Repeated regurgitation and evaporation in the honeycomb concentrate the solution to ~18% water.
4. **Capping** – Bees seal cells with wax when moisture is low enough for long-term stability.

2.2 Types (by botanical origin)

- **Monofloral** – Dominated by one plant source (e.g., Manuka, Acacia, Clover).
- **Polyfloral** – Mixed nectar from many plants; typical “wildflower” honey.
- **Honeydew** – From secretions of aphids or other sap-feeding insects; higher mineral content.

2.3 Key Properties

- **Antimicrobial** – Low water activity, acidity (pH 3.5–4.5), hydrogen peroxide, methylglyoxal (Manuka).
 - **Antioxidant** – Phenolic compounds, flavonoids.
 - **Energy source** – Rapidly absorbed glucose + fructose.
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3. Propolis

3.1 Composition Highlights

- **Flavonoids** (e.g., pinocembrin, galangin) – antioxidant, anti-inflammatory.
- **Phenolic acids** (caffeic, ferulic) – antimicrobial.
- **Essential oils** – contribute to scent & bioactivity.
- **Waxes & resins** – structural matrix.

3.2 Applications