

Overview of Bee Products Processing

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Key stages, equipment, quality considerations, and safety points

1. Main Bee Products and Their Commercial Value

Product	Primary Uses	Typical Yield (per hive)
Honey	Sweetener, cosmetics, pharmaceuticals	20–60?kg / season
Royal Jelly	Nutraceuticals, cosmetics, infant formula	0.5–1?g / day per queen
Bee Pollen	Dietary supplement, functional foods	2–5?kg / season
Bee Bread (fermented pollen)	Probiotic food, feed additive	0.5–2?kg / season
Propolis	Antimicrobial agent, dental care, cosmetics	0.2–0.5?kg / season
Bee Venom	Medical research, cosmetics, apitherapy	0.1–0.3?g / hive per collection
Bee Wax	Candles, cosmetics, food coating	1–2?kg / season

2. General Processing Flowchart

Harvest ? Cleaning/Sorting ? Extraction (if needed) ? Filtration ?
Heating/De?watering ? Packaging ? Storage

Each product follows a similar backbone but diverges at extraction and post-treatment steps.

3. Product-Specific Processing Steps

3.1 Honey

Step	Description	Critical Parameters
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Extraction	Uncapped frames placed in a honey extractor (centrifugal).	Rotor speed 3000–5000 rpm; temperature < 40°C to avoid enzyme loss.
Straining	Mesh (0.2 mm) removes wax, bee parts.	Stainless steel mesh; maintain flow < 2 L/min to prevent clogging.
Decolorizing (optional)	Activated carbon or diatomaceous earth.	0.1% carbon; contact time 30 min; monitor color (Pfund scale).
Pasteurization	Heat to 70–75°C for 1–2 min (optional for crystallization control).	Must not exceed 80°C; rapid cooling to < 30°C.
Crystallization control	Seeded crystallization for creamed honey.	Seed: 10% fine crystal; temperature 14–16°C; agitation 0.5 rpm.
Packaging	Food-grade PET, glass, or tin.	Fill temperature > 30°C; headspace < 5% of container volume.

3.2 Royal Jelly

Step	Description	Critical Parameters
Harvest	Gently scrape glands from queen cells (within 24 h of capping).	Temperature 0–4°C; avoid mechanical stress.
Cold Extraction	Blend with chilled distilled water (1:1 w/v).	pH 4.0–4.5; temperature > 5°C.
Centrifugation	Separate jelly from debris.	4000 g, 10 min, 4°C.
Microfiltration	0.22 µm membrane removes microbes.	Sterile conditions; pressure < 2 bar.
Freeze-drying (lyophilization)	Preserves bioactive proteins.	Primary drying: –40°C, 0.1 mbar