

How to get clean wax from your own apiary

Re-melting in a steam wax melter, clarifying with oxalic acid and slow settling

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Good to know before you start

This method cleans and lightens the wax well, but it does **not sterilise it**. American foulbrood spores survive re-melting at 100 °C, even for a long time. They are only reliably destroyed by heating under pressure (autoclaving) at companies that process wax.

Do not re-melt or move combs from colonies where you suspect American foulbrood. Report the suspicion to your bee inspector or the County Administrative Board (Länsstyrelsen).

1 Raw material

- **Wax for foundation:** cappings, old combs and culled frames are melted together in the same batch.
- **Wax for salves, creams and lip balm:** the cappings are usually melted separately. But even that isn't the purest, as it contains a little propolis. The purest wax comes from fresh natural comb – comb the bees have built entirely on their own without foundation and that has not yet been capped.
- Only use material from healthy colonies.

2 Re-melting in a steam wax melter

- Put the frames into the wax melter whole – you don't need to cut out the combs.
- The steam melts the wax, which runs down into a stainless steel or heat-resistant plastic container.
- When the wax has stopped running, take out the frames and shake or knock out the residue (cocoons and bee bread).
- The residue (slumgum) doesn't have to be thrown away: it can be used for other things, for example as fertiliser. Bear in mind that after the steam melter there is still a fair amount of wax left in it – up to 20–30% in beekeepers' experience. It can be pressed out, but it is laborious: the residue is boiled up in water again in a separate pan, and the hot mass is put in a tight cloth bag and pressed, for example in a home-made press. The steam only partly cleans the frames; scrape them if needed.
- Once the wax has set, it still contains dirt and small particles. The next step cleans it.

3 Clarifying with oxalic acid

- **Use only soft water:** rainwater, distilled water or reverse-osmosis water. The salts in hard water react with the wax (it turns grey and porous) and form a white precipitate of calcium oxalate with the oxalic acid.
- Pour soft water into a pan made of **stainless steel** (or an undamaged enamel pot), using roughly as much water as wax (about 1 litre of water per kg of wax).
- **First dissolve the oxalic acid in the water:** 10 g for every 2 kg of wax (5 g per kg). For example, 2 kg of wax and 2 litres of water need 10 g of acid. Weigh the acid on kitchen scales – don't measure it with a spoon.
- Add the wax and bring to the boil. Let the mixture boil properly: the boiling acts as vigorous stirring and drives the acidified water through all of the wax. As long as there is water in the pan, the wax won't get hotter than 100 °C.

Watch the foam

Boiling wax and water can suddenly foam up and boil over, just like milk. Fill the pan no more than half full and don't leave the stove. If the foam starts rising, turn the heat down at once: the boil should be vigorous but even. Never add acid to a mixture that is already boiling.

Why it works

In a 2025 study, washing melted wax with hot water and 0.25% oxalic acid at 70 °C while stirring gave the lightest, most yellow wax. After two washes, more than 99% of neonicotinoid residues had gone. Plain hot water washed out the residues almost as well – it is the heat and stirring that do the work, while the acid mainly gives a lighter colour. The bees readily accepted foundation made from the wax.

Fat-soluble varroa treatments (fluvalinate, coumaphos) are not washed out this way, as they are dissolved in the wax itself. For foundation, wax from colonies that have not been treated with such products is therefore best.

4 Slow cooling and settling

The most important step: while the wax is still liquid, the dirt sinks to the bottom.

- Pour the hot wax and water mixture into a stainless steel or heat-resistant plastic bucket and put a lid on.
- Put the bucket somewhere insulated. A beehive works well: stack a couple of boxes, stand the bucket inside and put a roof or insulation on top.
- Leave it at least overnight, ideally for 24 hours. The slower it cools, the more dirt sinks to the bottom and the fewer cracks there are in the wax block.

5 Cleaning the wax block

- Take out the set wax block. The acidic water stays in the bucket.
- Scrape off the dark, loose layer on the underside with a chisel or a hive tool until you reach firm, clean wax.
- Keep the scrapings for the next batch of raw material.

6 Optional: final melt and filtering

- Melt the clean wax block once more, in a water bath or with a little soft water, this time without acid.
- Strain the melted wax through a filter cloth. We recommend synthetic filter fabric: flannel soaks up a lot of wax, and nylon stockings filter more coarsely.
- Pour into moulds and let it cool slowly again.
- Store the wax blocks dry and cool, wrapped in paper or a bag.

Safety

Do not use aluminium pans with oxalic acid: the acid corrodes aluminium. Copper, brass, galvanised steel and untreated iron are not suitable either – they discolour the wax.

Handle oxalic acid with gloves and safety glasses, and store it out of reach of children and away from food. Never heat wax without water directly over the heat source, and never leave it unattended. **Never put out burning wax with water:** put a lid on and turn off the heat.

Don't pour wax down the drain – it sets in the pipes. Only pour away the water under the wax block once all the wax has been removed.

Summary

Step	Details	Purpose
Re-melting	Steam wax melter, whole frames	Quick, no cutting out; residue is shaken out of the frames
Water	Rain, distilled or RO water; ~1 litre per kg of wax	No saponification or grey film
Oxalic acid	10 g per 2 kg wax (5 g/kg), weighed	Lighter wax, impurities washed out
Boiling	With water and acid from the start; pan no more than half full	Vigorous washing of the wax; with water it doesn't overheat
Cooling	Insulated, e.g. in hive boxes, overnight to 24 hours	Dirt settles, the block doesn't crack
Final step	Re-melt without acid, fine filter	The cleanest possible wax

Good luck with your wax!

Sources: Yáñez K. et al. (2025). Removal of Neonicotinoid Residues from Beeswax Using an Eco-Friendly Oxalic Acid Treatment. *Agriculture* 15: 2409. Máchová M. (1993). Resistance of *Bacillus* larvae in beeswax. *Apidologie* 24: 25–31. County Administrative Board of Blekinge (Länsstyrelsen Blekinge): Biodling.



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