

The problem with permethrin in beeswax

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Demand for beeswax has soared as we see it used increasingly in cosmetics, food wraps and to coat confectionery. To meet regulations buyers require clean, unadulterated and chemical residue-free beeswax to use in their products. Residue-free means that the beeswax contains no trace of chemicals – these may be traces of medicines introduced to the bee hive by the beekeeper, or agrochemicals from the environment that have somehow found their way into the hive, or have contaminated the beeswax during its harvest, processing or storage.

Beeswax adulteration

Some people have opted to 'cut' their beeswax with paraffin – a much cheaper petrochemical-derived wax. However, beeswax processors and refiners will spot this adulteration and the business relationship will be damaged beyond repair. Sometimes the adulteration is unintentional: animal or vegetable fats are used as release agents for the beeswax mold. These 'lubricants' are oil-based like beeswax and will easily mix and contaminate the beeswax. A small splash of water around the mold immediately before pouring can be just as effective.

African beeswax

African beeswax is renowned for its cleanliness. Many thousands of beekeepers in Africa are using local-style bee hives with great success, and harvest comb honey. This comb honey yields proportionately more beeswax than is gained from frame hive beekeeping, and the wax is residue-free. African bees do not suffer from honey bee diseases and thus African beekeepers do not treat their bees with chemicals.

Using beeswax foundation

Very few African beekeepers use manufactured foundation sheets in their hives and this is a good thing, because if imported from elsewhere, foundation is likely to introduce chemical residues from treated hives.

Chemical residues within African beeswax

In recent years importers of African beeswax have noticed an increase in chemical residues within African beeswax. The chemical most frequently found is permethrin – an insecticide in the pyrethroid family, it is a widely available and effective insecticide. We



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Beeswax candles on display at the Uganda National Honey Week held in Kampala in August

believe that the explanation is the introduction of free, and much-needed mosquito netting by governments across Africa. Beekeepers and beeswax processors have found that these nets are an ideal, widely available and effective straining material to use when they render their beeswax! However the netting is impregnated with permethrin that kills mosquitos. Because permethrin is highly soluble in oils such as beeswax, it mixes with the molten beeswax when it is strained through the net. There is no going back from this: residues cannot be removed from beeswax once they have been introduced.

Mosquito nets are not the only culprits: second-hand polypropylene sacks that could have contained pre-treated seeds for planting can contaminate beeswax when used as a filter. Even the smallest amount of residue in beeswax will cause it to fail tests. In the case of permethrin, the limit of detection is very small: only 0.1 ppm. The result is that beekeepers and processors are greatly reducing the value of their beeswax – it cannot be used for food purposes or cosmetics if it contains residues of permethrin. The beeswax can still be sold, however at much lower price.



Netting is often used to filter beeswax. This bag has been sewn together using clean material

Why is it so important to tackle this issue? Many of **Bees for Development's** partner organisations, especially in Africa, have a valuable resource at their fingertips. Sensitising beekeepers to the value of beeswax is bearing fruit. Many exhibitors present during the 10th Uganda Honey Week in Kampala this August were trading in beeswax, or adding value to it by manufacturing cosmetics. There is still much work to be done: too many beekeepers still squeeze the honey out of combs and then discard the beeswax, as if it were any other waste product! Remember: beeswax is valuable – do not throw it away!



Every piece of equipment used in beeswax filtering must be residue free: this tin was food grade packaging

Conclusion

We need to raise awareness about the presence of chemical residues in beeswax. This information needs to be shared among associations, cooperatives and groups. The relationships between producers and processors should allow dialogue to tackle these issues, and beekeepers and processors need to find suitable, clean ways to filter beeswax. Finding the right solution requires understanding and effort from all parties and will ensure that the trade of beeswax reaches its full potential.

Top Tips for residue-free beeswax

Ensure that your beeswax stays at its best:

- Do not use mosquito netting to filter beeswax
- Only use new polypropylene bags to filter beeswax
- Avoid using large drums for melting, which may have held chemicals
- Never use any fat or oil to lubricate a mold: a splash of water can be just as effective
- Remember, once contamination occurs – it is irreversible.