FILTH-TEST ASSESSMENT OF HONEY QUALITY

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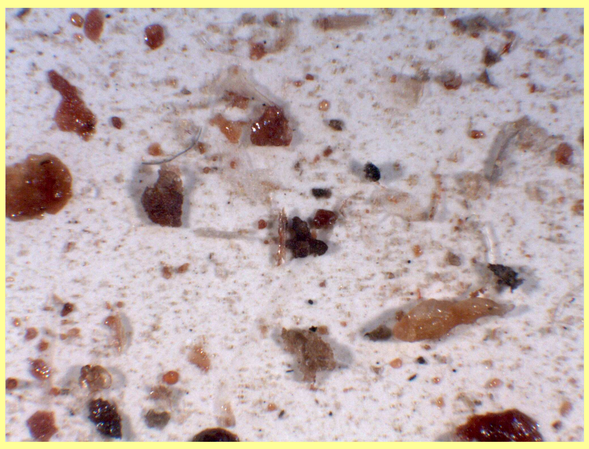
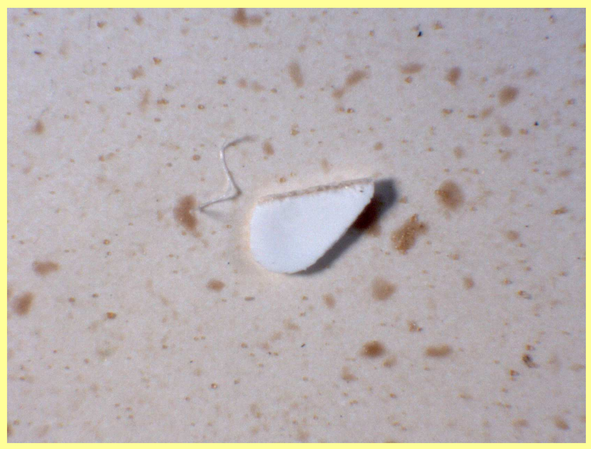
Within the frame of an investigation carried out to assess the quality of commercial honey in Italy, 59 pots of extracted honey were bought in the towns of Ceva, Mondovì, Montezemolo, Bagnasco, Garessio, and Murazzano (province of Cuneo, Piedmont, Northwest Italy) in local markets, shops, and small and big supermarkets.
Through the filth-test technique, the aim of the research was to evaluate the hygienic requirements and the level of cleanliness of honeys extracted by centrifugation and packaged in glass pots, typical of the area under investigation: black locust, chestnut, dandelion, honeydew, mixed nectar, mixed nectar of mountain flora.

In honey, intrinsic elements like wax, pollen, propolis may be present, but also completely extraneous materials like animals or their parts, plant, wood, glass, plastic, foil fragments, textile fibres, hair and coal residues can be found.



Impurities of various kinds retained by a cellulose acetate filter



Plastic impurity

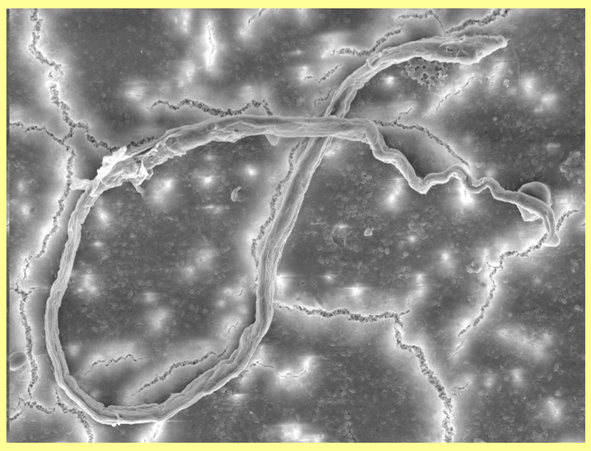
Coal residues

Foreign substances can be incorporated into the honey during the production process for different reasons, as a result of the behaviour of the beekeeper: excessive use of smoke in the terminal stage of super removal in the apiary, inappropriate clothes, poor hygiene of vehicles and honey processing and packaging premises.

The filth-test is an analysis concerning the hygiene of the product, by which, in addition to the quantitative assessment of insoluble substances present, it is possible to recognize the various impurities and to trace the cause of their presence. The first aim of filth-test is therefore to establish the purity and hygienic quality of the final product.

Moisture and water-insoluble contents were determined for each sample. For the latter analysis, cellulose acetate membranes with a given porosity were used, thus separating and keeping all solid extraneous material along with pollen grains and wax and propolis particles usually present in honey.

For filth-test analysis, each sample was thoroughly mixed to homogenize it. Ten grams of honey were dissolved in 90 ml of warm (45 °C) deionized water in 100 ml tubes and centrifuged at 3000 rpm for 15 minutes. Subsequently, after removal of the supernatant, the sediment was resuspended with 100 ml of deionized water and the resulting suspension was filtered through an Advantech membrane filter (45 mm diameter and 0.45 µm porosity), previously dried at 105 °C and weighed after cooling in a crystallizer.



Textile fibers

After filtration, the membrane filter was dried again at 105 °C and weighed, after cooling in a crystallizer, obtaining by difference the weight of the insoluble substances in water.
The membrane filters were observed under a dissecting microscope for a qualitative assessment of the filth; when in doubt or in the most interesting cases, the relevant membrane pieces were mounted for scanning electron microscopic observation.

Six honey samples out of the 59 tested had a moisture content above 18%, but none exceeded the limit of 20% fixed by the EU Council Directive 2001/110/EC of 20 December 2001 relating to honey.

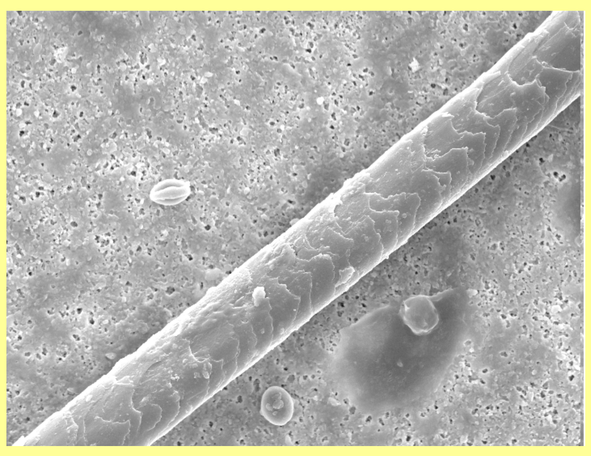
Only one sample, with 0.16 g/100g, had a water-insoluble content above the 0.1g/100g limit as indicated in the same directive.

Weights of insoluble substances in the various types of honey varied: black locust from 0.001 to 0.064, chestnut from 0.013 to 0.049, dandelion from 0.011 to 0.028, honeydew from 0.016 to 0.033, mixed nectar from 0.009 to 0.160, and the remaining samples from 0.011 to 0.035.

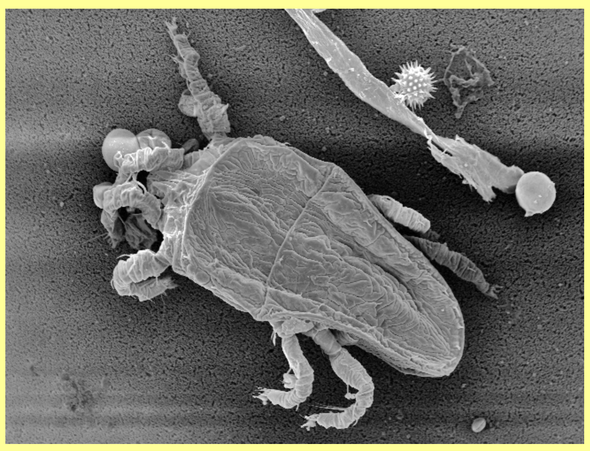
Average amount (g/100g) and st.dev. (g) of water insoluble substances found in different types of honey.

	No. Samples	Mean g/100g	St. Dev.
Black locust honey	10	0.0160	± 0.0197
Chestnut honey	9	0.0324	± 0.0120
Dandelion honey	7	0.0189	± 0.0070
Honeydew honey	6	0.0248	± 0.0060
Mixed nectar honey	19	0.0360	± 0.0333
Other honeys	8	0.0148	± 0.0099

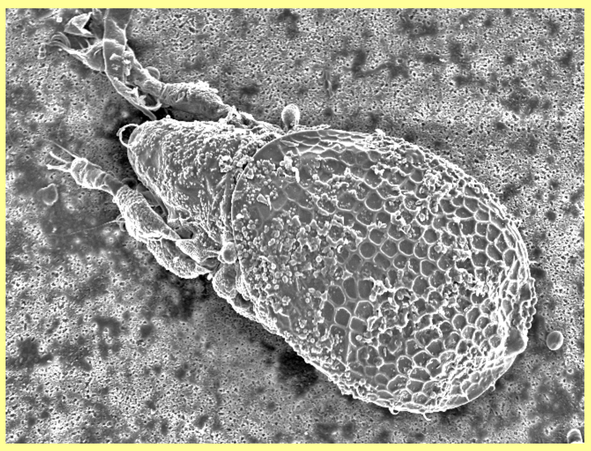
Rodent hair



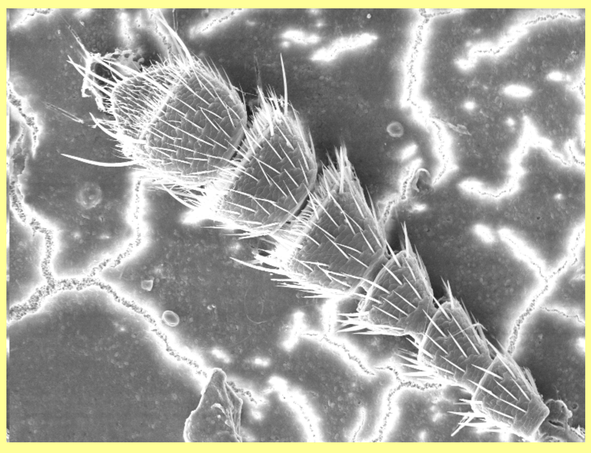
Rodent hair



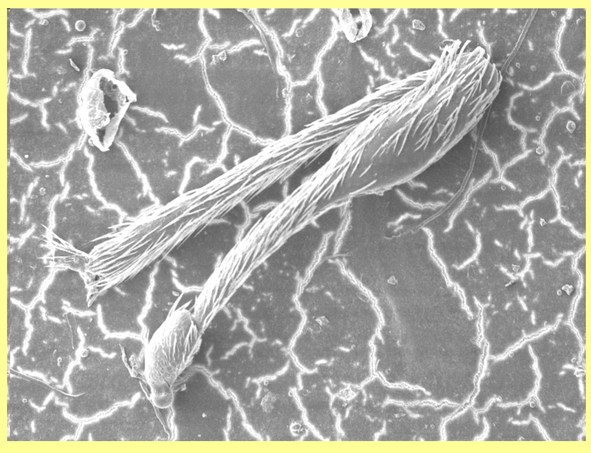
Oribatid mite



Tenuipalpid mite



Fragment of insect antenna



Fragment of insect leg

Different samples, although falling whitin the law limits, were found to contain foreign substances which are considered normally unacceptable under the existing legislation: impurities of animal origin (rodent hair, mites, insect fragments) were detected in 17 samples, textile fibers in 45 samples, plastic material fragments in 31 samples, coal residues in 10 samples. Moreover fragments of wax and resin droplets, material intrinsic to the hive, were identified in 31 and 22 samples, respectively.

The analysis performed by filth-test yielded good or satisfactory results in most cases, but it has also highlighted the need of making corrections in the process of honey extraction/packaging in order to substantially reduce or completely eliminate the presence of foreign substances in it. A clear improvement would be possible adopting bag filters with a mesh of 250/300 µm.

Most beekeepers should pay more attention to possible honey contamination ways and modify consequently their extraction and packing procedures, so as to avoid the presence of extraneous materials and thus increasing honey quality.