



REPUBLIC OF KENYA



KALRO
Kenya Agricultural & Livestock
Research Organization



NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN
DEVELOPMENT PROJECT

BEEKEEPING HARVESTING AND PROCESSING EQUIPMENT



Introduction

Beekeeping equipment includes all items used to enable and facilitate smooth operations to achieve high-quality hive products. Various tools are necessary to reach this goal. The demand for mechanization in apiculture is further necessitated by the need to save handling time, reduce costs, and enhance safety during beekeeping practices.

As technology continues to advance, so does the need for better equipment. The following are details of various tools and equipment available to beekeepers to facilitate their work.

A) Pre-harvesting and harvesting

1. Complete Bee Suit

This is used to protect the person handling bees in hives from stinging. Most Kenyan bee colonies are wild and quite aggressive. However, once they settle in an apiary and the beekeeper regularly inspects and handles the colony, the aggressiveness is lowered. Furthermore, some people have bee sting allergies, so it is advisable to minimize stings for such individuals as much as possible.

The following are components of a complete bee suit:



Complete bee suit. Photo: Jonah Kinyanjui

a) **The Overall/Garment**

The overall protects against bee stings. It features zips and not buttons for complete closure, ensuring bees cannot find any space to access the person. It is crucial to note that bees are quite aggressive and are persistent in seeking entry point to sting the person. Therefore, this overall should not be torn or have a gap where bees can enter. Overalls are made from various materials, with the most common being cotton (American khaki), nylon, and gunny bag materials.



Overall: Photo courtesy of ABIRI team

b) **The Headgear and Veil**

These are 2-in-1 items that are fully joined to offer protection for the head and neck while allowing the handler to see well and carry out the activities of interest. The veil is used to protect the face from bee stings while enabling the harvester to see through it. It is usually made of mesh, mostly plastic, in black or green to ensure visibility. The veil is attached to the headgear, which is constructed to prevent the head from directly touching the garment/veil, thereby reducing the possibility of a bee sting to the head/face.



Head gear. Photo courtesy of ABIRI team

c) Pair of Gloves

The gloves are designed to protect the hands from bee stings. They are made of leather and cotton fabric to support along the arm to prevent bee stings from penetrating through. They also allow for finger movements, enabling the harvester or beekeeper to work with ease.



Gloves. Photo courtesy of ABIRI team

d) Pair of Boots

The boots are used to protect the feet from bee stings. Additionally, they secure the garment, preventing bees from penetrating the suit. Regular shoes are unable to tuck in the garment and are therefore discouraged. However, if bees are not aggressive, it is possible to use such shoes.



Boots. Photo courtesy of ABIRI team

2. Hive Tool

A hive tool is a pry bar-like instrument used to open hives, separate hive components, and scrape off propolis or wax. It helps beekeepers to manipulate frames and access hive contents during inspections and harvesting. It is made of food grade metal since in its use, there is possibility of touching the honey. It is also used in harvesting the propolis.



Hive tool. Photo courtesy of ABIRI team

3. Smoker

A smoker is a device used to produce cool smoke that calms bees during hive inspections and honey harvesting. Smoke is usually intoxicating as it reduces oxygen levels, making bees have difficulties in breathing and hence disarming them to reduce their aggressiveness. The smoke also acts to mask alarm pheromones, disorganizing the defense systems of the bees and hence making it easy to work on the colony. It consists of a firebox (source of smoke), bellows, and nozzle.



A smoker. Photo courtesy of ABIRI team

4. Bee Brush

A bee brush is a soft-bristled brush used to gently remove bees from frames, supers, and other hive components when opening the hive and handling frames. It enables beekeepers to move bees while minimising accidental injuring or killing of bees during hive opening and closing.



A bee brush. Photo courtesy of ABIRI Team

B. Honey processing

1. Uncapping Knife or Uncapping fork

An uncapping fork or knife is used to remove the wax capping from honey-filled framed combs before extraction. To enhance performance, uncapping knives/forks can be gently heated to ensure they glide smoothly through the wax.



Uncapping knife (left) and uncapping fork (right). Photo courtesy of ABIRI team

2. Uncapping Tray

An uncapping tank or tray is a container designed to collect the wax capping removed during uncapping. It typically has a rack used to hold the framed combs during the uncapping process on both sides of the comb. The racks slide to hold the comb without allowing dripping of honey. Consequently, only the wax debris and a small amount of honey collect at the bottom, which is later collected and processed. The uncapped framed comb is then taken for honey extraction.

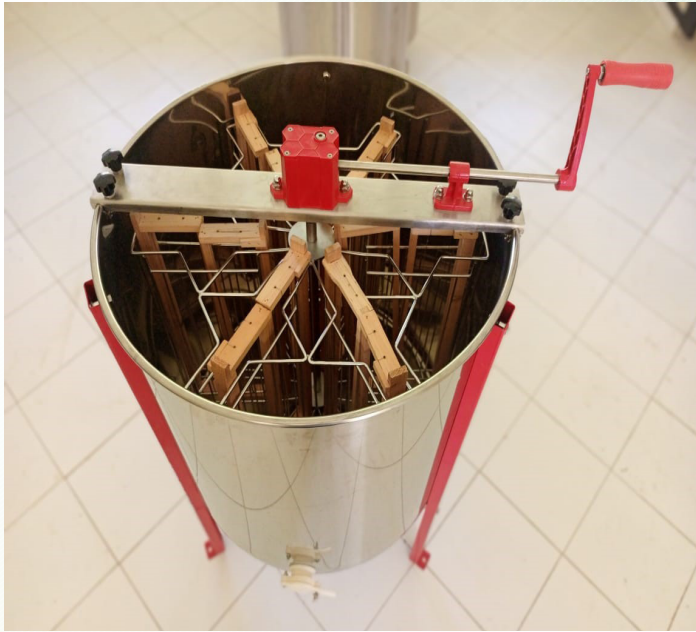


The uncapping tray with framed comb holding racks. Photo courtesy of ABIRI team

3. Honey Extractor

A honey extractor is used to extract honey from framed honeycombs without destroying the comb. It works by centrifugal force, spinning the frames inside a drum or basket to force the honey out of the cells. Honey extractors come in manual, electric, and radial designs, accommodating different beekeeping scales and preferences.

The extractors come in different sizes capable of handling 2 honey combs, 4, 6, 12 etc. They can be manual or electric.



A manual honey extractor by centrifugation. Photo courtesy of ABIRI team

4. Honey Press Machine

This machine is used to extract crushed comb honey. Pushing its press handle downwards in a screw-like manner, ‘squeezes’ honey out of the comb causing it to drip into a collecting container beneath the press.



Honey press. Photo courtesy of ABIRI team

5. Honey Filter

A honey filter can be in form of multiple layered sieves or a fine clothing material where honey is passed after collection from an extractor. It is used to remove impurities, wax particles, and other debris from extracted honey before storing and packaging it.



Multi-layer sieve honey filter. Photo courtesy of ABIRI team

6. Honey Settling Tank

A settling tank is used to allow air bubbles and small particles to rise to the surface of the honey before bottling. It helps improve the clarity and quality of the honey by allowing it to settle and mature before packaging.



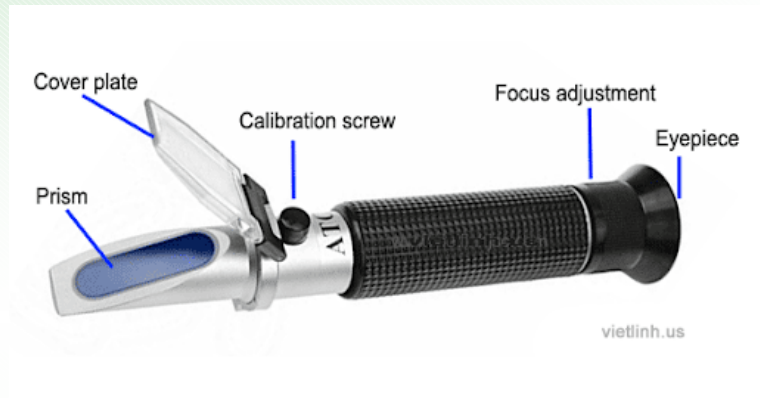
Honey settling tank. Photo courtesy of ABIRI team

C. Quality Control

1. Honey Refractometer:

A honey refractometer is a specialized instrument used to measure the moisture content of honey. It helps beekeepers ensure that honey has the appropriate moisture level for long-term storage and quality preservation.





Honey refractometer. Photo courtesy of ABIRI team

Photo credit: ABIRI Team comprising of Daniel Toroitich, Caroline Kimani, Mercy Jeptarus and Muo Kasina

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