



United Republic of Tanzania

MINISTRY OF NATURAL RESOURCES AND TOURISM



Guidelines for Quality Assurance of Bee Products in Tanzania

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GUIDELINES FOR QUALITY ASSURANCE OF BEE PRODUCTS IN TANZANIA

1.0 BACKGROUND

Tanzania has a good environment for producing high quality bee products because there are abundant plant species that produce nectar and pollen for honeybees. The main bee products in Tanzania are honey and beeswax. These products are of high quality in the hives. Therefore, they can acquire a high price if the quality is maintained.

Honey is mainly used as food and Medicine. Honey is used as an essential ingredient in bakeries, confectionaries, cosmetics, beverages and pharmaceutical. Beeswax has several uses; these include candle making, pharmaceuticals, cosmetics, polish, batiks and many others. Only a small amount of beeswax is used locally for candle making and batiks and the rest of it is exported.

According to the National Beekeeping Policy of March 1998 and National Beekeeping Programme of November 2001 Tanzania produces about 4,860 tons of honey and about 324 tons of beeswax per year. On average the country exports 500 tons of honey and 282 tons of beeswax per year (FBD 2004). The main buyers of Tanzanian honey are Germany, United Kingdom, The Netherlands and Belgium. The main buyers of beeswax are Japan, The Netherlands, United States of America and German.

Despite of the big market for honey and beeswax, producers are less exposed to quality standards suitable for domestic or external market hence resulting in fetching low prices.

In view of this problem these guidelines has been produced by Forestry and Beekeeping Division in accordance with part III of Beekeeping General Regulation of 2005, to guide beekeeping staff, beekeepers, dealers and other stakeholders on quality assurance of bee products.

2.0 COMPOSITION AND CHARACTERISTICS OF HONEY AND BEESWAX

Honey is defined as sweet substance produced by the honeybees from the nectar of blossoms or from secretions of living parts of plants, or excretions of plant sucking insects on the living parts of the plants, which the honeybees collect, transform and combine with specific substances of their own, deposit, remove water, store and leave to ripen and mature in honey combs.

2.1 Composition of Honey

Honey is composed primarily of sugars and water. On average honey contains about 79.6% sugar and 17.2% water. The primary sugars are fructose (38.2%) and glucose (31.3%). These are simple sugars that are readily absorbed by the body. Other sugars include maltose (7.3%) and sucrose (1.3%). Honey also contains acids (0.57%), some proteins (0.26%), a small amount of minerals (0.17%) and a number of other minor components including pigments.

2.1.1 Characteristics of honey

Honey has the following characteristic that makes it the most appropriate for several uses:

(a) Antibacterial properties

Presence of high sugar content, hydrogen peroxide and high acidity in honey prohibits growth of microorganisms. Antibacterial properties of honey are reduced or removed when it is subjected to change from its natural condition.

(b) Hygroscopic properties of honey

Hygroscopic is the tendency of honey to absorb moisture from the air, this depend on relative humidity of the environment and amount of moisture in honey. The lower the moisture content in honey, the higher the tendency of absorbing moisture from the air.

(c) Viscosity of honey

This is the property of liquid honey that affects its tendency to flow. The higher the viscosity, the slow the honey will flow. This property is affected by the amount of moisture in honey and temperature. Honey with low water content flows relatively slow and an increase in temperature reduces its viscosity.

(d) Formation of Hydroxyl- Methyl-Furfural (HMF)

Hydroxyl-Methyl-Furfural (HMF) is a product formed when a solution of sugars containing fructose in acid media is heated. Fructose, one of the sugars found in honey is very sensitive to heat. Once subjected to heat, fructose forms HMF and the colour of honey changes to dark brown. Storage of honey at room temperature for long periods also denatures the fructose in honey resulting into formation of HMF. This is an indicator of honey freshness (honey which is recently harvested and not been subjected to high temperatures) and whether it has been overheated. In fresh honey there is practically no HMF but it increases upon storage depending on pH of honey and

storage temperature. Recommended standard of HMF content is not more than 40mg/kg.

(e) Aroma and flavour substances

Honey has characteristic taste and smell. These depend mainly on where the bees collected the nectar and pollen. As many plant flowers have different aroma and flavours, the same goes to honey. For instance, honey from sunflower farm may taste and smell different from that of miombo woodlands or the mangroves. There are as many different flavours as there are plant nectar sources.

(f) Granulation

Granulation is a tendency of honey to form crystals. This tendency is related to honey composition and storage conditions. Some honeys never granulate while others will do so within a short time after extraction, or even in the comb. The two major sugars in honey (fructose and glucose) are the main factor determining the tendency of honey to granulate. The higher the glucose, the faster honey granulates and the higher the fructose the slower it granulates. Other factors, which favour granulation, are low temperatures and high colloidal content.

(g) Fermentation

Fermentation of honey is caused by the action of sugar-tolerant yeasts upon levulose and dextrose, resulting in the formation of alcohol and carbon dioxide. The alcohol in the presence of oxygen then may be broken down into acetic acid and water. As a result, honey that has fermented has a sour taste. The main factors in honey fermentation are yeast, high moisture contents and temperature.

(h) Moisture content

Honey having high moisture content is more likely to ferment. Under the EU and Tanzania standards a maximum of 21% has been set. However under Tanzania conditions, the values of 21% are very seldom attained except honey from stingless honeybees which range from 20-25%.

(i) Mineral content

The non-volatile inorganic residue after ignition of honey is referred to as ash, and its separate components as minerals. Most of these are metals, some of which are present in only minute amounts and are called trace elements. The minerals, e.g. potassium, chlorine, sulphur, sodium, and calcium originate from the soil and get into honey via the plants. Minerals are among the many components that affect honey colour. Very light coloured honeys often contain little mineral matter and dark honeys contain more mineral matter.

(j) Diastase content

Diastase content is a quality factor influenced by shelf life, temperature and use of heat when processing. It is therefore an indicator of freshness and overheating. Although there is a large natural variation of diastase, the minimum Diastase Number (DN) of 8 is set as minimum.

(k) Water insoluble solids

Water insoluble solids refer to pollen, combs, debris, bee and filth particles are important means to detect honey impurities. Water insoluble solids content for honey in EU and Tanzania Standards is not more than 0.1% for extracted honey while for pressed honey is not more than 0.5%.

2.2 Beeswax

Beeswax is a natural animal wax produced by various species of honeybees. The wax is secreted by four pairs of glands located on the ventral side of the abdomen of worker bees. They use it to form cells and capping for the purpose of storing new honey.



Picture 1: Beeswax prepared for sale

2.2.1 Composition of beeswax

Beeswax is mainly composed of a mixture of about 70% esters (largely myrical palmitate), 15% ceric acids, 12% hydrocarbons, with traces of water, higher alcohols, minerals and dyes.

2.2.2 Characteristics of beeswax

Beeswax contains the following characteristics;

(a) **Specific gravity**

Beeswax has a low specific gravity compared with water therefore it floats in water. Any beeswax sample, which sinks in water, indicates that it has been contaminated or adulterated.

(b) Melting point

Beeswax may exist in two forms; solid or liquid. Beeswax has higher melting point than paraffin wax and low melting point than other waxes of plant origin.

(c) Acid number

Acid number is the number of milligrams of pure Potassium Hydroxide (KOH) required to neutralize completely the free fatty acids in one gram of wax. Thus an average sample of beeswax with an acid number of 20 needed 20mg of KOH per gm of wax to neutralize the acid content. Determination of acid number of beeswax can tell whether beeswax sample has been adulterated.

(d) Saponification value

Saponification value is the number of milligrams of Potassium Hydroxide required to neutralize the acids resulting from the complete hydrolysis of 1gm of oil or fat. High saponification value indicates adulteration with vegetable oils.

(e) Iodine value

Iodine value is defined as the number of milligrams of iodine that will combine with 100gm of oil or fat to give the degree of unsaturation of the acids in the substance. Saturated fatty acids absorb no iodine, thus the iodine value is a measure of proportion of unsaturated fatty acids present in waxes. The higher the iodine number indicates adulteration.

3.0 PROBLEMS ENCOUNTERED IN THE PRODUCTION OF QUALITY HONEY AND BEESWAX

Honeybees perform their duties in two different environments, inside and outside the beehive. The foraging environment from which, honeybees collect pollen, nectar and water may be contaminated with bacterial, fungal spores, dusts and chemical residues, industrial pollutants, and hydrocarbon emissions from vehicles and naturally occurring toxins found in plants.

Microorganisms and chemicals enter into honey either while bees are collecting nectar (primary source) or after the honey has been harvested (secondary source). The primary sources of microorganisms, water insoluble solids and chemicals are likely to include pollen, nectar, dust, air, flour and the honeybees themselves.

The secondary sources of contamination in honey and beeswax are human, beekeeping equipment, insects, animals and water. Honey harvesters and processors of bee products may contaminate bee products with microorganisms and chemicals through mishandling, tools and containers.

3.1 Problems related to quality of the beekeeping area

Hives sited near plantation areas/urban/industrial areas are always at high risk of collecting chemically contaminated pollen and nectar. These chemical contaminants eventually affect the quality of honey and beeswax.

3.2 Problems related to inadequate appropriate knowledge by stakeholders

Beekeeping in Tanzania is mainly conducted by people with indigenous technical knowledge, with little appropriate

knowledge of quality standards of bee products needed in markets.

3.3 Problems related to harvesting methods

3.3.1 Due to defensive behaviour of honeybees and lack of appropriate protective gears, harvesting is done at night forcing beekeepers use large amounts of smoke resulting into smoky odour and other flavours in honey and even contamination with microscopic soot.

3.3.2 Beekeepers mix combs containing unripe honey, pollen and combs containing ripe honey due to lack of appropriate skills in harvesting. This increases the moisture content of honey and its pollen content. High pollen content makes honey cloudy in appearance and poses high granulation risk. Mixing of old dark combs of honey with new ones make honey to darken in colour.

3.3.3 Use of chemical repellents during honey harvesting cause contamination of honey with the same substances.

3.3.4 Use of contaminated equipment during harvesting.

3.4 Problems related to processing methods

3.4.1 Use of inappropriate processing methods leading to high amounts of water insoluble solids showing low clarity of honey.

3.4.2 Over heating of honey during processing leads to high HMF, smoke smell hence poor quality products.

- 3.4.3 Use of poor strainers that lead to low quality bee products.
- 3.4.4 Delayed straining of honey after harvesting may cause granulation (forcing the beekeeper to heat honey).
- 3.4.5 Processing of honey at those periods when air humidity is high makes honey liable to ferment.
- 3.4.6 Honey processors lack adequate processing equipment resulting into honey contamination.
- 3.4.7 Unhygienic processing environment lead to contamination of honey.
- 3.4.8 Sometimes beekeepers contaminate beeswax with addition of foreign materials to increase weight e.g. stones etc so that they get more money.
- 3.4.9 Mixing of old and new combs may results into inconsistent colour of beeswax hence low beeswax quality.
- 3.4.10 Direct heating of beeswax darkens its colour.

3.5 Problems related to storage facilities

- 3.5.1 Due to inadequate appropriate beekeeping containers, some beekeepers and bee product dealers use containers used in storage of other commodities including kerosene, beer, and pesticides. These contaminate honey.
- 3.5.2 Storage containers and processing equipment are sometimes made of rusting materials. As honey is

acidic the surfaces of containers become corroded thus affect the colour and flavour of honey.

3.6 Problems related to transportation

3.6.1 Transportation of honey during hot hours raises HMF content of honey hence affecting the quality of honey.

3.6.2 Sometimes honey is transported with other commodities such as kerosene, fertilizers, and pesticides bags which may contaminate honey.

3.7 Problems related to weather

3.7.1 Temperatures in Tanzania are sometimes high and hot which may last for more than six months. This condition affects the quality of honey by increasing HMF content.

3.7.2 Honey harvesting during rain season may raise moisture content hence reduces the quality of honey.

4.0 PRODUCING QUALITY HONEY AND BEESWAX

Due to problems stated above in section three that lead to production of low quality of honey and beeswax, the following are the guidelines to ensure quality products.

4.1 Quality of the beekeeping area

4.1.1 According to Beekeeping Regulations, 2005 Part II, Section 4 (1) and Section 6, apiaries must be established at least 7 kilometres away from agricultural areas that make use of intensive chemicals, pesticides and insecticides and away

from industrial sites, in order to control chemical contaminations in honey.

- 4.1.2 The sites should be ensuring access to water and bee fodder plants that will meet nutritional needs of the honeybees.

4.2 Inadequate appropriate knowledge by stakeholders

- 4.2.1 Forestry and Beekeeping Division and other interested stakeholders should make sure that extension services on appropriate beekeeping reach the target groups.

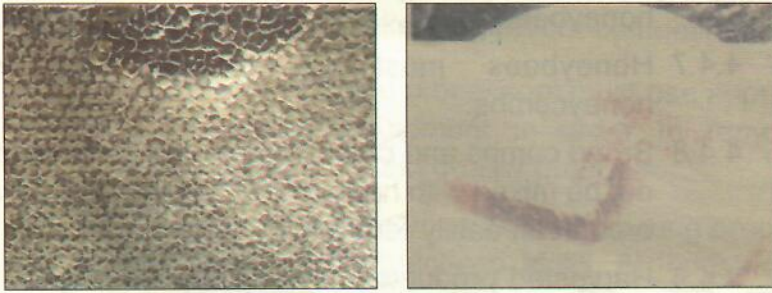
4.3 Sitting of bee hives

- 4.3.1 Beehives should be sited at an appropriate height to get honeybee colonies.
- 4.3.2 Beehives should be baited using pure beeswax, bee propolis and or other locally available baiting materials before sitting.
- 4.3.3 The comb foundation sheet shall be made from pure beeswax.
- 4.3.4 The hives should be made from locally; well seasoned and readily available, affordable raw materials accepted to the honeybees.
- 4.3.5 Bee houses are recommended for areas without enough trees to provide protection and shade for bee colonies.

4.4 Harvesting methods

- 4.4.1 Honey harvesting should preferably be done during the daytime. Every caution and care in hygiene should be taken to prevent contamination.

4.4.2 Beekeepers must harvest only ripe honeycombs.



Picture 2: Sealed comb honey

4.4.3 Chemical repellents are strictly prohibited and no chemicals should be included in the fuel material of the smoker.

4.4.4 Beekeepers should use (beekeeping) protective gears when harvesting. To control the defensive behaviour of honeybees only few puff of cool smoke will be used to calm the bees.



Picture 3: Honey harvesting using protective gears

4.4.5 Old dark honeycombs should be kept separately from new white honeycombs to obtain honey of separate colours.

4.4.6 Equipment for harvesting honey must be clean and dry with air tight lids to prevent honey from

absorbing air moisture, foreign matters and robber honeybees.

- 4.4.7 Honeybees must be brushed off from honeycombs.
- 4.4.8 Brood combs and combs containing pollen should not be mixed with honeycombs (Honey mixed with brood can easily ferment).
- 4.4.9 Harvested products should be stored in cool and dry storage facilities away from sun's direct heat.

4.5 Healthy and welfare of the bees

- 4.5.1 Bee colonies should be protected from pests and diseases.
- 4.5.2 The hives and apiary should be inspected regularly in order to keep away pests, check colony development and other management practices.
- 4.5.3 The Beekeeping Act No. 15 of 2002 Sec.31 instructs beekeepers as soon as becoming aware of the existence of any disease, to notify the Director of Forest and Beekeeping or the inspector.
- 4.5.4 The inspector is obliged to take the necessary steps to treat the bees or eradicate the disease in any means.
- 4.5.5 No antibiotic will be used to treat bees to avoid contamination of honey.

4.6 Processing methods

According to Beekeeping Regulations, 2005 Part III, Section 13

(a - j) directs, when processing bee products every caution and care in hygiene should be taken to prevent contamination.

4.6.1 Beekeepers and processors must use appropriate processing equipment in order to remove all impurities to attain quality products.

4.6.2 Boiling or overheating of honey during processing should not be practiced at all. At industrial level honey warming should not exceed 35°C to maintain low HMF content.

4.6.3 Honey must be strained immediately after harvesting while viscous and before granulation occurs.

4.6.4 Beekeeping equipment used in processing bee products should be of stainless steel, aluminium, enamel, food grade plastics or galvanised iron to avoid rusting or reaction with products.



Picture 4: Honey Processing Unit

4.7 Processing of beeswax

4.7.1 During processing of beeswax containers should be covered to avoid impurities getting into molten beeswax.

4.7.2 Processing of old and new combs should be done separately to maintain colour uniformity.

4.7.3 Beeswax for export shall be processed in uniform blocks

4.8 Packaging, marking, labelling of honey

According to Beekeeping Regulations, 2005 Part III, Section 21(4) (a - i) directs producers, retailers, whole sellers and exporters of honey to be aware of packaging and labelling regulations of Tanzania and of the country where the product will be marketed. Labelling and marking provides useful information on ingredient/content, quality grade, place of origin, and weight of the product.

4.8.1 Honey for retail sale shall be packed in hygienically clean, plain, well sealed jars or any other suitable containers which are food graded, acid resistant, non reactive (stainless steel, plastic or glass) to the content and cannot cause the transfer of foreign odours to the honey.

4.8.2 The container must be moisture - proof.

4.8.3 Mouth of the containers must be wide enough to facilitate removal of crystallized honey.

4.8.4 Containers which previously contained other commodities (e.g. kerosene, gasoline, oils, alcohol etc.) should not be used in packing honey.



Picture 5: Honey packed for retail sale

4.8.5 Honey for bulk sale shall be packed in new or used lacquered drum.



Picture 6: Bulk honey packed in lacquered drums

4.8.6 Packages or containers of honey should bear the following information, which should be easily visible and clearly legible:

- (i) Name of the product;
- (ii) Type of honey (comb, granulated, cream honey);
- (iii) Name and address of the dealer;
- (iv) Source from where the product was produced (mangrove, miombo, acacia etc);
- (v) The words "Honey" and "Produce of Tanzania" in case of export;
- (vi) Date of processing and packaging;
- (vii) Net weight of the product;

4.9 Storage of honey

According to Beekeeping Regulations, 2005 Part III, Section 16(1) and (2) directs how honey can be stored to maintain its quality that meet market standards.

4.9.1 Honey must be stored in well-ventilated rooms, with temperature below 25°C and relative humidity of less than 65% to maintain low HMF content.

4.10 Packaging, marking, labelling of beeswax

According to Beekeeping Regulations, 2005 Part III, Section 281(1) - (3) directs on how to package and label beeswax as per regulations of Tanzania and of the country where the product will be marketed.

- 4.10.1 Beeswax should be packed in unused Hessian cloth or in gunny bags.
- 4.10.2 Every package of beeswax for export shall bear the following information
 - (i) Name of the dealer;
 - (ii) Net weight;
 - (iii) Shall be marked with the words "Beeswax" and "Produce of Tanzania".

4.11 Storage of beeswax

According to Beekeeping Regulations, 2005 Part III, Section 23 directs how beeswax can be stored to maintain its quality that meets market standards.

- 4.11.1 Beeswax shall be kept in containers and room that is free from chemicals, dampness or temperature not exceeding 25°C

4.12 Transportation of honey

According to Beekeeping Regulations, 2005 Part III, Section 19 (1) and (2) directs transportation of honey.

- 4.12.1 Honey shall be carried so as to protect containers from mechanical damage and contamination.
- 4.12.2 Transportation of honey shall be done during the night in order to avoid the heat of the sun that

could adversely affect the quality of honey or if done during the day shall be done using refrigerated or insulated containers.

5.0 QUALITY STANDARDS OF HONEY AND BEESWAX

5.1 Quality standards of honey

According to Beekeeping Regulation 15 (1-3) the quality of honey shall conform to or comply with Codex Alimentarius or European Union Standards/specifications. Honey shall be free from residues of antibiotics, including sulphonamides, quinolones and pesticides of carbamates, organochlorines, organophosphorus and polychlorobipheny (PCB). Tanzania has set maximum levels of metal contaminant and /or tolerable limits of antibiotics, pesticides and other industrial chemicals. Table 1 shows the quality standards of honey according to EU, Codex and Tanzania.

TABLE 1: STANDARDS OF HONEY ACCORDING TO EU CODEX AND TANZANIA

S/N	CRITERIA	EU	CODEX	Tanzania
1.	Moisture content, (%)	Not more than 21	Not more than 20	Not more than 21
2.	Water insoluble solids Pressed honey, (%) Extracted, (%)	0.5% Max 0.1% Max	0.5% Max 0.1% Max	0.5% Max 0.1% Max
4.	Ash content, (%)	0.6 Max		0.6 Max

5.	Sugar contents Reducing sugars, % Sucrose, %	Not less than 65 Not more 5	Not less than 60 Not more than 5	Not less than 65 Not more than 5
6.	Acidity, mill equivalent/kg	Not more than 40	Not more than 50	Not more than 40
7.	Diastase Number	Not less than 3	Not less than 8	Not less than 10
8.	HMF, mg/kg	Not more than 40	Not more than 40	Not more than 40

Table 2: Shows the quality standard of Tanzanian honey produced by stinging honeybees

TABLE 2: QUALITY STANDARDS OF TANZANIAN HONEY

S/N	CRITERIA	Table honey	Industrial honey
1.	Moisture content, (%)	Not more than 20	Not more than 22
2.	Water insoluble solids Pressed honey, (%) Extracted, (%)	0.5% Max 0.1% Max	0.5% Max 0.1% Max
4.	Ash content, (%)	0.6 Max	0.1 max
5.	Sugar contents Reducing sugars, % Sucrose, %	Not less than 60 Not more than 5	Not less than 65 Not more than 10
6.	Acidity, mill equivalent/kg	Not more than 40	Not more than 50
7.	Diastase Number	Not less than 8	Not less than 10
8.	HMF, mg/kg	Not more than 20	Not more than 40
9	Fructose/Glucose ratio	1	1
10	Fienche's test	Negative	Negative

TABLE 3: MAXIMUM LEVELS OF METAL CONTAMINANTS AND TOLERABLE LIMITS OF ANTIBIOTICS AND PESTICIDES

S/N	Contaminant	Tolerable limit
1	Phenol	Not more than 1 ppb
2	Coumaphos	Not more than 1 ppb
3	Organophosphorus	Not more than 50 ppb
4	Organochlorine	Not more than 50 ppb
5	Streptomycin	Not more than 1 mg/kg
6	Tetracyclines	Not more than 1 mg/kg

7	Sulfonamides	Not more than 1 mg/kg
8	Arsenic	Not more than 1 mg/kg
9	Lead	Not more than 0.5 mg/kg
10	Copper	Not more than 2.0 mg/kg
11	Zinc	Not more than 5.0 mg/kg
12	Tin	Not more than 5.0 mg/kg

5.2 Quality standards for beeswax

According to Beekeeping General Regulations, 2005 Part III, Section 23, Tanzania has set quality standards for beeswax produced for market. Table 4 shows the standards which are set in the EU and Tanzania.

TABLE 4: STANDARDS OF BEESWAX ACCORDING TO EU AND TANZANIA

S/N	Criteria	EU	Tanzania
1.	Iodine values	8-12	8-12
2.	Acid numbers	17-24	17-24
3.	Saponification values	85-100	85-100
4.	Melting point , oC	62 - 65	62-65
5.	Specific gravity	0.962 & 0.979 at 15.5oC and 25oC respectively.	0.962 & 0.979 at 15.50c and 250 c respectively
6.	Refractive index at 75oC	Lies between 1.4398-1.44451.	Lies between 1.4398-1.444510c
7.	Dielectric constant in °c	3.1-3.30c	Not available

6.0 SAMPLING AND LABORATORY ANALYSIS

6.1 Sampling

Sampling is the act of selecting a certain portion, number of containers or product units from a particular lot of the beeswax and honey. Samples are normally sent to the laboratory for analytical purposes. The condition of the same arriving in the laboratory shall reflect conditions at the time of sampling. The results obtained from the laboratory will be the basis of removal of the product from the market, legal or administrative action to the producer, seller, distributor, exporter and consumer. Therefore in order to achieve the anticipated results, sampling should be drawn according to the laid down procedures.

6.6.1 Sample preparation, handling and dispatch

Sampling involves collecting, holding, sealing, storing and delivering the beeswax and honey samples to the laboratory in the manner that will reflect the condition or state prevailing at the time it is sampled. Beeswax and honey samples must be prepared, handled and dispatched in the manner that prevents change of identity, breakage or spoilage.

6.2 Sampling guidelines

6.2.1 Use containers that are clean, dry, leak proof, wide mouth, sterile, air tight and of a size suitable for submission. Plastic or glass jar containers that are leak proof may be used for honey.

6.2.2 All samples packed for dispatch must be secured with shock absorbing materials to protect them from damage. Containers should be wrapped heavily in paper and cushioning material for dispatch.

6.2.3 In order to maintain integrity, packages containing beeswax and/or honey samples should be secured or sealed to prove their authenticity i.e. to ensure they have not been tampered with or changed, on transit to the laboratory.

6.2.4 Sample size should range between 250gm to 500gm depending on number of parameters for analysis.

TABLE 5: SIZE OF SAMPLE TO BE SELECTED FOR TEST

Lot size (drums)	No. of containers to be drawn	
	500g and above	Below 500g
Up to 25	3	6
26-150	4	9
151-500	5	12
501 and above	7	15

6.2.5 6.2.5 Samples will be submitted in three portions. Each part to be marked and sealed or secured in the manner permitted by its nature. The owner or vendor will be allowed to retain one portion.

6.2.6 The second portion of the sample will be sent to the laboratory for analysis and the authorized officer can retain the third sample for future comparisons.

6.2.7 Dealers of bee products are responsible for

submission of samples to the authorized laboratories.

6.2.8 Mark each unit of beeswax and/or honey sample with numbers. Every sub-sample must be marked with a sub-number. If necessary, correlate this number with the manufacturers/processors code number, if there is any.

6.2.9 For each honey sample collected Authorized Officer (Beekeeping Authorized Officer) should write a brief report for use by the laboratory and other interested parties. Where applicable the report should have some of the following relevant information:-

- (i) Sample number;
- (ii) Date collected;
- (iii) Product name;
- (iv) Type of the Products;
- (v) Indicate analysis needed where possible;
- (vi) Owner's codes;
- (vii) Owner's name and address;
- (viii) Size of lot from which sampled;
- (ix) Date submitted to the lab;
- (x) Description of sample and method of collection (number and size of units);
- (xi) Collectors Identification;
- (xii) Name of the sampler or authorized officer.

6.3 Essential Parameters for Analysis

The following parameter should be analysed:

6.3.1 Honey

- (i) HMF
- (ii) Water insoluble solids
- (iii) Moisture contents
- (iv) Mineral contents (Ash)
- (v) Diastase activity
- (vi) Acidity
- (vii) Sugar content
- (viii) Antibiotics residues
- (ix) Pesticides residues
- (x) Heavy metals

6.3.2 Beeswax

- (i) Iodine value
- (ii) Acid value
- (iii) Saponification value
- (iv) Specific gravity
- (v) Melting point
- (vi) Cloud point
- (vii) Settling point
- (viii) Ester ratio

6.4 Microbiological test in honey

Honey and beeswax are increasingly being used as an ingredient in different types of foods, pharmaceuticals and cosmetics. Manufacturers and food processors of such products often set stringent microbiological standards, so honey/beeswax may be subjected to microbiological tests. The following parameters should be analysed when necessary:

6.4.1 Total Plate Count (cfu/g)

Total Plate count is total amount of bacteria present in any food substance. Bacterial counts are often close to zero, but may occasionally reach 10,000 CFU (Colony Forming Units) per gram. An "average" count might be 400 CFU per gram is acceptable for food standards.

6.4.2 Mouldy and yeast Count (Counts/gram)

Typically, yeast and mouldy counts in honey are less than several hundred CFU per gram if there are any at all.

7.0 CERTIFICATION OF ORGANIC HONEY

7.1 Organic Products Concept

Organic food is usually taken to mean food that has been produced without artificial fertilizers and that has not been subjected to treatment with synthetic pesticides or growth promoters of any type including hormones and antibiotics. Before a product is labelled "Organic" a Government -approved certifier inspects the production system to make sure that the rules and standards are followed. Each country may have its own certifying body, which will set the standards. The Tanzanian certifying body is called TanCert.

7.2 Definition of Organic Honey

The term "organic honey" is very specific and implies honey produced by applying a rigorous set of standards/ guidelines and conditions for the production of organic honey that must be adhered to by the beekeeper, processors and the packagers.

The organic honey shall be certified by a recognised certification body. The guidelines cover not only the origin of bees, but also restrict application of agricultural and industrial chemicals at a certain known radius to the apiaries site, use of antibiotics, use of chemicals in hive making materials, source of pollen and nectar, processing methods etc. In some countries the standards indicates that the apiaries must be in land that is certified as organic and nectar and pollen sources consisting essentially of organic crops or uncultivated areas.



Picture 7: Honey bee foraging on a flower of natural plant

7.3 Certification procedure

Certification is a system by which the conformity of products to applicable standards is determined and confirmed. Certification is a market instrument. It enables producers to access a special market, often with a premium price. In many cases the only way to create or maintain a separate "organic market" is through certification. The main purpose of certification is to give the consumer confidence that the products they buy as organic actually are organically produced. Certification of organic bee products is primarily certification of production methods. All

aspects of honey production including source of the nectar, foraging area of bees, management, processing, integrity, (no / contacting with non-organic honey) packaging materials are taken into account in certification process. This gives the consumer, the confidence that the honey has not been adulterated in any way from the hive to the table.

7.4 Important elements of an organic certification system

An organic certification system normally has the following elements:

7.4.1 Standards

Standards should be clearly formulated and communicated to all participants (beekeepers, traders, exporters, processors and packer and consumers) of the certification system as well as be available to all interested parties. Standards must also comply with existing regulation both in the country of production and in the country where the product will be marketed.

7.4.2 Contracts and legal framework

All producers within a certification system should be bound by written agreement with clear conditions, and consequences in case of violations.

7.4.3 Inspection

The inspection system must cover:

- (i) Beekeeping system
- (ii) Transactions between actors and documentations (producer, buyer, etc)

- (iii) Harvesting, handling, storage, processing
- (iv) Labelling (traceability level), documents and certificates

7.5 Certification guidelines

7.5.1 Registration of bee products producers

All individual persons dealing with the honey/beeswax in certification system (beekeepers, buyers, and store keepers) should be identified and registered.

7.5.2 Mapping of the apiary

The area or apiaries should be known and the apiary should be in unpolluted, natural and organic areas.

7.5.3 Procedures for conversion periods

Conventional period is based on the standards used and market.

7.5.4 Internal market

For the organic production, such services are provided by TanCert in collaboration with international accredited certification bodies.

7.5.5 Yield estimates

Yield estimate is done by the operators or producers according to number of registered individual beekeepers and number of hives by each individual

7.5.6 Developing Internal Control System

There should be an Internal Control System (ICS), which guards the integrity of the product (organic honey). This involves:

- (i) Developing all documents needed to be submitted to certifier. Some of the documents needed are Growers Contract, sub-Contractors Agreement (if any), Growers Entrance Form, Annual Questionnaire & Farm Inspection Forms, Violation Report, beekeepers List, book keeping records, etc.
- (ii) Training of staff involved, and their competence should be spelt out.
- (iii) Determining the critical control points/risk areas that can lead to non-compliance of organic standards have to be assessed by the ICS staffs and how the staff will control them should be clearly shown in the ICS manual.
- (iv) Developing Internal Organic Standards - IOS

7.5.7 Contracts

All producers within a certification system should be bound by written agreement with clear conditions, and consequences in case of violations. They should be instructed on the requirements for organic certification and contracted to ensure compliance.

7.5.8 External Inspection

The external inspection is done by certification body (certifier) to check the conformity of the standards set. The inspection covers the following:

- (i) Bee products production system (apiary distance from where synthetic inputs are applied, type of hives and type of construction materials, no synthetic paints, water sources, documents and staffs involved.)
- (ii) The buying system and transactions between participants
- (iii) Harvesting (there should not be any harm to the bee colon such as use of fire and any synthetic repellent is prohibited),
- (iv) Storage (separate stores from conventional bee products should used), processing (separate processing equipment is used)
- (v) Traceability /Labelling (should carry the logo of the organic certification body) and certificates (in case the operator did not buy direct from the bee products producer's).

7.5.9 Approval

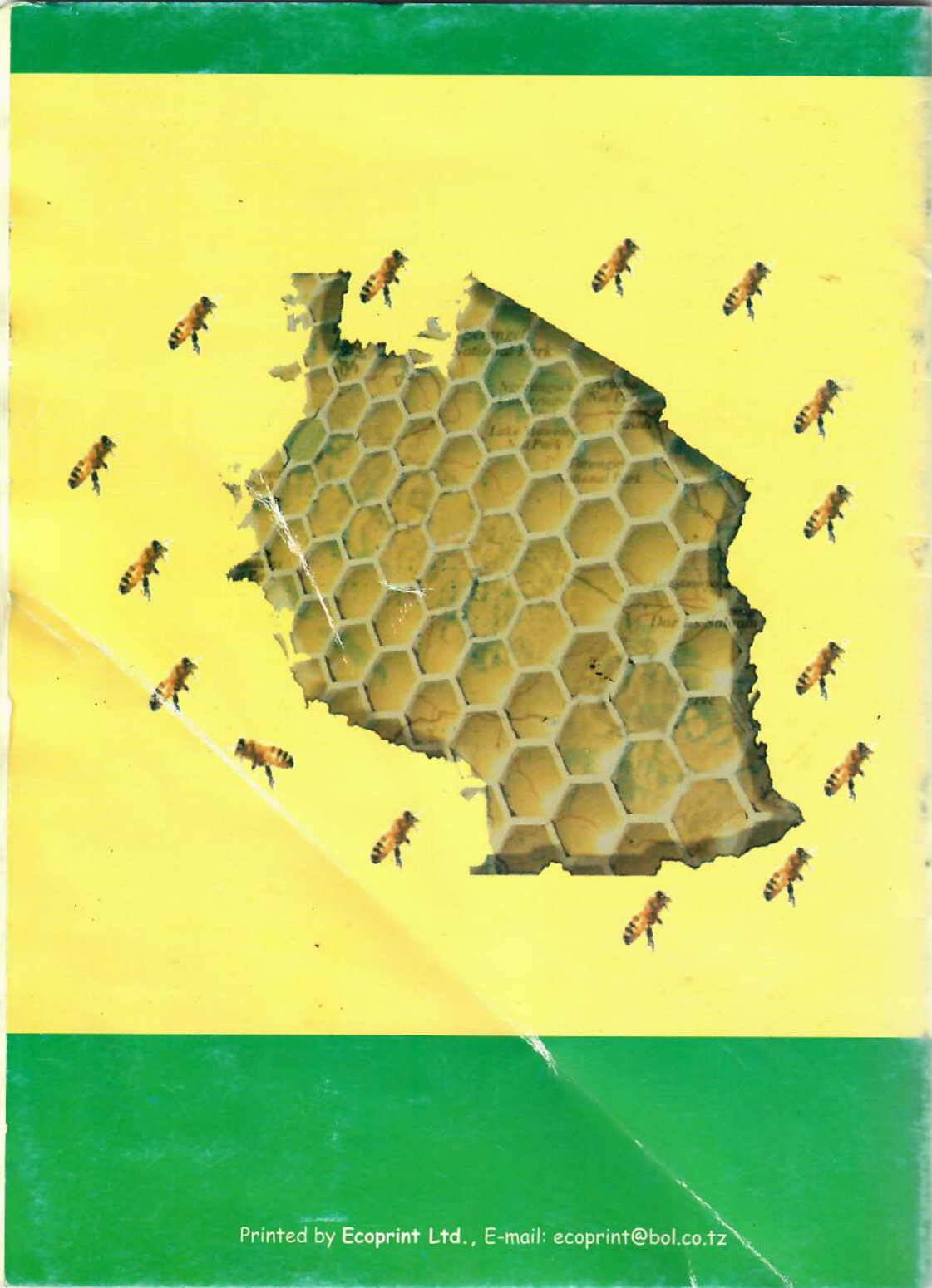
The Certification body is responsible for the approval of the ICS and to issue the certificate.

7.6 Steps in certification process

- (i) Operator (the producer of honey and in case of group certification then is the bearer of the certificate) requests information;
- (ii) Certifier sends application package;
- (iii) Operator fills in application;
- (iv) Application screened by certifier;
- (v) Certification contract is signed between the certification body and the operator;
- (vi) Certifier assigns inspector
- (vii) Inspectors visit the area and inspection report produced
- (viii) Assessment of inspection report (by the certification body's committee)
- (ix) Certification decision is made by certification body
- (x) Certification decision is communicated to the operator
- (xi) Certificate is sent to the operator

7.7 Costs

Costing for certification is based on nature of the business, size of production and volume of sales and geographical location.



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