Organic Farming in the
Tropics and Subtropics

Exemplary Description of 20 Crops

Pineapple

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Naturland would like mention the following authors and thank them for their contributions:

Franz Augstburger, Jörn Berger, Udo Censkowsky,
Petra Heid, Joachim Milz, Christine Streit.

The cultivation guidelines are available in English, Spanish and German for the following crops:

banana, brazil nut, cashew nut, cocoa, coconut, coffee,
cotton, hibiscus, macadamia, mango, papaya, peanut,
pepper, pineapple, sugar cane, sesame, tea, vanilla.

The cultivation guidelines for Bananas, Mangoes, Pineapples and Pepper were revised in 2001 for the United Nations Conference on Trade and Development (UNCTAD) by Udo Censkowsky and Friederike Höngen.

In 2002 two more guidelines, for rice and date palms, were published in English.

All the authors emphasize, that the cultivation recommendations at hand can just provide general information. They do not substitute technical assistance to the farmers with regard to the location.

All indications, data and results of this cultivation guidelines have been compiled and cross-checked most carefully by the authors. Yet mistakes with regard to the contents cannot be precluded. The indicated legal regulations are based on the state of the year 1999 and are subject to alterations in future. Consequently all information has to be given in exclusion of any obligation or guarantee by Naturland e.V. or the authors. Both Naturland e.V. and authors therefore do not accept any responsibility or liability.

Furthermore the authors kindly call upon for critical remarks, additions and other important information to be forwarded to the address below. The cultivation guidelines will be updated regularly by Naturland e.V.

Naturland e.V.
Kleinhaderner Weg 1
82166 Gräfelfing
Germany
phone: +49 - (0)89 - 898082-0
fax: +49 - (0)89 - 898082-90
e-mail: naturland@naturland.de
website: www.naturland.de

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Organic Cultivation of Pineapple

1. Introduction

1.1. Botany

Pineapples (*Ananas comosus L.)* originate from tropical South America. They are still cultivated there by the low-land population, who have integrated them into their agroforestry systems in a variety of ways. The varieties differ greatly in both taste and shape. Each variety also has local types. All pineapples are self-sterile and mostly free of seeds. The seeds are therefore only inseminated via external sources. The pineapple is a xerophyte, and can survive long dry periods. Rainwater, mist and dew are collected by the leaves and stored.

1.2. Varieties and countries of origin

Organically grown pineapples are found in the following countries: Burundi, Cameroon, Columbia, Ghana, Guinea, Honduras, India, Sri Lanka, Togo, Uganda, USA.
No special varieties can be recommended for organic cultivation due to a lack of scientific research. One important aspect is its lack of spikes, as also occurs amongst certain cayenne varieties. Other differentiation characteristics are: size, shape, flesh colour, taste and transportability. In addition, in many countries, local "varieties" are cultivated which are either suited for planting on conventional plantations or in agroforestry systems. In the latter case, a variety must be chosen which has a sufficient shade tolerance.

1.3. Uses and contents

Pineapples are eaten fresh or processed into dried fruits, juice and as canned fruits

Contents and weight in 100 g of the edible parts:

Content	Weight
water	86 g
Digestible carbohydrates	13 g
Raw fat	0,1 g
Raw fibres	0,5 g
Vitamin A	100 (20-200) I.E.
Vitamin C	30 mg
Energy	230 kJ
Waste before usage	40%

2. Aspects of cultivation

2.1. Site requirements

Pineapples as a plant of the first storey of a secondary forest eco-system prefer semi-shadowed conditions. Under the full strength of the solar radiation, the fruits can develop sun-burn, especially when they stand out to one side and are no longer protected by the crown.
For good harvests, 1000–1500 mm of rainfall are necessary (600 mm and 2500 mm being the outer limits). Pineapples prefer stable temperatures. Temperatures under 20°C can lead to metabolic disturbances and chlorotic discolouring. For this reason, away from equatorial regions, pineapples are generally only planted up to heights below 700 m. In warmer, wetter regions (near to the equator) the growth period up to harvesting is 14-16 months, in cooler regions 18-20 months.
Pineapples react very sensitively to stagnant water, and sites must therefore be well drained. Planting in depressions where stagnant water can accumulate should be avoided, pineapples otherwise place relatively few demands on soil type and fertility. Irrigation is only necessary when long dry period occur, although basin irrigation should be avoided. Due to their relatively low requirements, pineapples can be planted in degraded soil when the appropriate measures are taken, and can help to gradually improve the soil to a normal state (compare 2.4.).

2.2. Seeds and seedlings

Pineapples are vegetative propagated by lateral shoots. The best ones to use are the suckers at the base of the trunk. The slips that form underneath the fruits are more numerous and can be used, yet these only begin to shoot during the second year. The lateral shoots can be stored in the shade for up to 3 months and then planted in utterly dry soil. Only totally healthy and if possible large shoots should be chosen (ca. 400-500 g in weight are best), in order to ensure a uniform crop. The shoots growing underneath the fruits can also tolerate dryness, yet not as well as the suckers can because they are generally lighter in weight. All of the shoots should be cut with a sharp knife to ensure that the wounds are quickly sealed, or stored in a shady place to heal and dry the wounds more quickly. This will hinder an infection by dry-rot fungus. Care should be taken that no mealy bugs are present in the shoots or on the leaf blades. No soil should remain on the shoots to prevent an infection by soil-borne fungus such as e.g. *Phytophtora ssp.* and/or nematodes.
The fruit crowns can also be used for planting. The crop can also be increased by planting single leaves, which will then take up to 3 years before they produce any fruit.
Because the crops cannot be treated (dipping) with insecticides/ fungicides on organic pineapple plantations, the farmer is forced to pay particular attention to the quality and origin of the shoots (diseases that can be transmitted from crop to crop).

This is especially the case for shoots that have been bought. In principle, it is recommended to use shoots from the plantation itself and to work very carefully.
Small-holdings farmers are generally forced to use shoots from their own crops for economical reasons (small amounts, high costs). By utilising slips, a relatively large number of plants can be produced in a short time, because depending on the variety, one tree will produce up to 7-8 suitable shoots. Far fewer suckers are produced, though. Due to their smaller size, the slips are first planted in a shady place for a year before being transplanted. This is especially recommended when the pineapples are to be integrated within an agroforestry system, because otherwise, the cultivation procedures will be hindered and the young plants may not develop enough dynamic to compete with the secondary crops.

2.3. Planting methods and cultivation systems

In the majority of organic plantations, local varieties are planted together with other crops either in agroforestry or mixed crop systems. Examples exist where pineapples are planted as a rotation-fruit with green fallow land and other crops. The farming plan will depend upon which cultivation form is adopted (agroforestry system, mixed crops as a bottom culture, crop-rotation etc.).

Examples of differing organic cultivation systems:

Country	Variety	System	Marketing type
Ghana	Smooth Cayenne	Crop rotation with different crops plus undersowing of legumes (green manure)	Export of fresh pineapples
India	local varieties	Agroforestry system	Export of dried pineapples
Columbia	ditto.	Bottom crops in coffee plantation	Processing into jams, juices etc.
Uganda	ditto.	Agroforestry system	Export of fresh pineapples and dried pineapples

Example: pineapples in a crop rotation system

1. Planting procedure

There exist a variety of planting methods (one, two or three rows), where double rows are in the majority. The distances between the plants or rows depends upon the variety used (tall or short plants) as well as the type of product desired (more plants per hectare for fresh fruits than for fruits being made into jams). Distances of 25-35 cm (using alternating planting holes) between the plants are sufficient in double-row systems, and 40-60 cm between the rows, with 75-90 cm between the double-rows. The distances should be greater for tall varieties (e.g. Cayenne: 90 x 90 cm planting

distance, 120 cm between the double-rows). The soil should be neither water-logged nor completely dry. The shoots should be pressed into soil which has been lightly loosened and then filled in again. They should not be pressed in too deeply, and the vegetation point where the leaves will sprout must lie above the surface. Non-climbing legumes (e.g. *Arachis pintoi)* can be sowed to cover the ground (protection against erosion) and to help suppress weeds before the pineapple shoots are planted.

2. Cop rotation

A pineapple monoculture is not permitted in organic farming systems. The pineapples are integrated with the other crops in rotation (e.g. peanuts, beans, rice, vegetables), whereby after the pineapples have been planted a two up to three year break must follow. To prepare the land used for pineapple production green manuring plants like e.g. *Vigna unguiculata*, *Crotolaria juncea* or *Mucuna capitata* can be sowed prior to the pineapples.

3. Flower formation

The flower formation is induced by ethylene. On conventional pineapple farms, special preparations can be used to induce the flower formation to occur after only 10 months. These preparations are not permitted on organic plantations. This is also valid for carbide (CaC2). Neither in the European Regulation for Organic Agriculture nor in the IFOAM Basic Standards the use of carbide is permitted. Nevertheless some certification bodies are approving the use of carbide in exceptional case by case decisions. Actually, the EU-Commission is evaluating whether carbide should be allowed in the future[1]. Should carbide be used , great care must be taken to prevent any explosions when manufacturing spraying mixtures (e.g. no copper containers!).

4. Protection against "sunburns"

Depending on the region, very intensive solar radiation (and from a lack of shade on the plantation) can damage the fruit (sunburns). The only method of protection in these cases is the labour-intensive way of binding the leaves around the fruits in order to cover them.

[1] An update information is available from your certification body.

Example: pineapples in agroforestry systems

1. Planting procedure

Pineapples are an excellent choice to plant for a limited time on young agroforestry systems. Pineapples as well as papaya are well suited as so-called “nursery crops” to raise trees. Yet they are less demanding regarding the soil fertility. The way that pineapples are used on the plantation, and the types of other trees and bushes chosen, depends on the site. In its early stages, a pineapple plant requires a lot of light, yet later on, it will be capable of growing even under a relatively thick roof of trees. Pineapples can only be added under limited conditions to systems which are already quite developed, or to older plantations.

The yields of pineapples in agroforestry systems are significantly lower than those of. One of the main reasons for this is the relatively low density of trees in agroforestry systems. Instead of the 40,000 to 100,000 trees per hectare (according to whether they are being grown for fresh fruit or to be canned) on conventional mono-culture plantations, the density lies at around 5,000-25,000 trees. Yet in the long-term, these systems actually achieve a greater stability with a higher level of total productivity (along with the pineapples, the other crops also turn in a harvest). In addition, agroforestry systems, especially those in regions near to the equator, adequately fulfil the demands made upon an ecologically tenable and long-lasting plantation system, which then also raises the soil fertility even in the long-term.

The following examples show a few of the possibilities available on organic pineapple plantations:

A site with poor soil and heavy growth of Graminaceen

Sites that have been degraded already by the damage done by incorrect farming methods can reach a high level of yield again, by utilising the natural regeneration possibilities that eco-systems offer. The grass is mown down and spread over the surface as mulching material. Manioc and pineapples are planted in the prepared field. Seeds from the undemanding trees and bushes that naturally grow locally should be mixed with the pineapples. The pineapples will grow under the protection of the manioc. At the same time, the many varieties of trees and bushes that establish themselves should be left to their own accord . Only the weeds and grass that thrive should be cut down and spread over the surface. The tree vegetation should be regularly cut back. In the course of time, more and more demanding varieties can be planted in the places where organic material is beginning to collect. The pineapple yield will not be very high in this first years. In addition to the use of the manioc and the improvement of the soil, the pineapples can be processed into dried fruits.

A site with relatively good soil – system combining lemons

Young lemon plantations (up to 5 years old with diameters of 6 x 6 m) can be converted into agroforestry systems.

A double row (0.5 x 1.0 m) of pineapple trees is sown between the rows of lemon trees. A mixture of tree seeds (*Erytrina ssp., Inga ssp*., as well as primary forest varieties) is sown along with each pineapple, together with a handful of compost to activate the initial development. Additional bananas can be planted every 4 m. The pineapples will develop very well in this system. The advantage lies in the pineapples being able to be sold before the main harvesting phase of the lemon trees has been reached.

A simple system on relatively good soil

Cuttings from 1.5-2 m tall *Gliricida sepium* and *Erytrina ssp* are planted at 2 x 3 m.. In between, a double row 1 x 1.5 m or 1 x 1 m of pineapples is planted, also with a mix of *Inga ssp*. as well as other species. In this relatively simple system, that is very similar to a young secondary forest with few varieties, the flower formation can easily be influenced by altering the shade conditions. The entire plantation can be eroded after 7-9 years and will afterwards have a greatly improved soil fertility.

Mixed plantation

Pineapples are easy to combine with other crops as a bottom crop. In particular: coffee, cocoa, coconut, cashew nuts, coconut and date palms, hevea (rubber), avocado and also mangoes.

2. Crop rotation

In diverse agroforestry systems, crop rotation is unnecessary. Although, if the pineapples are planted as bottom crops in a mixed system, e.g. with oil or date palms, then the crop rotation methods mentioned above must be adhered to. This is the only way to avoid a heavy growth of pests and a decrease of the soil fertility.

3. Flower formation

The flower formation in agroforestry systems can be induced by selective tilling of the weeds and the cutting back of trees 2 months before the blossoming is supposed to occur. The resulting sudden influx of light will have a similar effect to using carbide. This enables the harvesting time to be controlled in response to market demand (e.g. before or after the usual regional harvesting season to gain a price advantage).

4. Protection against “sunburn”

Not applicable.

2.4. Supplying nutrients and organic fertilization management

2.4.1. Nutrient requirements

The nutrient requirements for 1 ton of fruits are ca. 1 kg N; 0.2 kg P; 2.5 kg K; 0.3 kg Ca and 0.1 kg Mg.
A harvest of ca. 35 tons per year, would thus require 35 kg N, 7 kg P, 88 kg K, 11 kg Ca and 4 kg Mg. The amounts given refer to research carried out on conventional plantations, and are therefore only intended as orienting values.
The nutrient requirements of a crop rotation system is mainly provided by green manure (green fallow land as a first pre-crop, or sowing of non-climbing legumes). Deficits in the potassium supply can be balanced out by the use of wood ash (combined with compost). In exceptional cases, the certification bodies will allow the use of potassium magnesia. All of the remnants from the pineapples production should be spread over the soil (composting or mulching).
In calculating the amounts of compost required, it should be noted that the use of legumes as green cover plants can supply significant amounts of nitrogen to the soil. In this case, a compost with a rather high C/N ratio should be used. If possible, the compost should be spread in two separate lots. One half (ca. 2.5 tons) before planting, and ca. 2.5 tons to induce the flower formation. If the undergrowth is too dense, then either the entire compost can be spread in one go before planting, or the undergrowth can be mulched together with the second lot of compost.
Pineapples planted in diverse agroforestry systems will usually have no need to be supplied with external, organic fertiliser. The less varieties an agroforestry systems contains (especially when leguminous trees are lacking), the more the soil will need to be fertilised with compost (or an undergrowth of soil-covering legumes).

2.5. Biological methods of plant protection

Pineapples suffer from pests and diseases seldom when good growth conditions are prevalent. This necessitates, if possible, using plants from the plantation itself. The following pests and diseases occur especially in systems which lack diversification.

♦ **Rot root**, caused by *Phytophtora cinnamomi* and other fungi are only a problem in moist soils; pineapples cannot be planted in soils prone to waterlogging. Soil qualities can be improved by selective fruit rotations and application of organic compost material.

♦ **Thrips** (carrier of the viral disease 'yellow spot') poses no serious problem in a well-balanced plantation system. In chronic cases, liquid herbal manure can be used, or in extreme situations, sulphur or pyrethrum[2] sprayed among the crops.

♦ **Mealy bugs** (*Dysmicoccus brevipes*) cause 'wilt disease'. Mealy bugs are transmitted by ants. Should the ant population gain the upper hand, due to a lack of natural enemies such as birds or small mammals, an infestation by lice can be significantly reduced by laying out sugar-water traps.

♦ **Nematodes** can appear in pineapple monoculture plantations. Problems with nematodes occur only on organic plantations, due to the normal practice of fruit rotation. Care should nevertheless be taken when buying in shoots or young plants.

2.6. Crop cultivation and maintenance

2.6.1. Crop monitoring

The following points need to be heeded when cultivating pineapples:

- Choice of planting stock.
- Checking the site for water-logging. Should such areas exist on site, these cannot be used to grow pineapples, and soil improvement measures must be integrated into the planning of a crop rotation system.
- The plantation must be regularly checked to make sure that the pineapples are allowed uninhibited growth. An infestation of mealy bugs through ants must be stopped as soon as possible, providing shade for the fruits early enough might help.
- In agroforestry systems, any shading should be thinned out 6 months ahead of a planned harvest in order to induce flower formation.
- During harvesting, ripe fruits should be chosen according to their coloration.

As soon as the plantation begins to produce fruit, any harvested plants should be removed and cut up before being spread over the soil. The plantation will also need to be thinned out from time to time, because suckers which continually develop may limit the amount of room available for each individual plant.

2.6.2. Weed Management

Tilling weeds is difficult to mechanise on pineapple plantations, and in its usual form, is neither possible nor desirable in agroforestry systems. When all possible niches are already occupied with plants, weeds will have little chance of gaining a foothold, and can also easily be uprooted by hand. Mature weeds can be cut down with a knife or

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2 The European Regulation for Organic Agriculture 2092/91 as well as the IFOAM Basic Standards do only allow for the use of natural pyrethrins (extract from the flower heads of Chrysanthemum). Synthetical pyrethroids persist in the environment and are forbidden.

pulled out and then cut up to be used for mulch material. One preventative measure is to sow non-climbing legumes before the pineapples are planted (e.g. *Pueraria ssp, (Purearia phaseoloides* develops strong tendrils, and is not suitable for pineapples)*., Arachis pintoi*, some *Vigna ssp*. among others). Usually, this bottom culture will suppress the growth of weeds. Depending upon the amount of water available, when enough weeds have accumulated, these can be cut down and used as mulching material.

2.7. Harvesting and post-harvest treatment

2.7.1. Harvesting

The average harvest for Cayenne on conventional plantations is around 35-40 tons/ha. The first year will usually yield ca. 38 tons, and the following seasons ca. 25 tons/ha. The fruits must be chopped down with a clean cut of a knife, for if the fruits are torn off, these wounds will leave behind ideal spots where fungus can develop.
The fruits should be harvested at the ideal time, and this time is dependent upon the form the pineapples are marketed as. Fresh fruits destined for the local market are plucked when almost ripe. Fresh pineapples destined for export are harvested green-ripe or half-ripe (beginning to turn yellow-green at the base of the fruit), and can then be cool-stored for up to 4 weeks (storage temperature ca. 7°C). This enables the fruit to be transported by ship, instead of by an expensive and for ecological reasons difficult to justify air-route. Because of their low sugar-content, pineapples harvested too early are unpopular amongst consumers (pineapples do not ripen afterwards). This requires the establishing of a closed cycle of cooling facilities and dependable transport/logistic infrastructure.
The colour of the skin is an important criteria in determining the ripeness of the fruit. Fruits destined for the European market are often classified according to the extent to which an orange-yellow colouring has spread up from the base of the fruit:

- Ripeness-colour 1: Only the base is orange-yellow.
- Ripeness-colour 2: The orange- yellow colour covers half of the fruit.
- Ripeness-colour 3: The orange- yellow colour reaches further up.
- Whole of the fruit.

In connection with the colour-scale of pineapple ripeness, it is worth noting that chemicals often used to promote the uniform colouring of the fruits is not permitted on organic plantations.

2.7.2. Post-harvest treatment

Post-harvest handling is usually limited to determining the classification of the fruits according to their size.

3. Product specifications and Quality Standards

3.1. Fresh pineapples

3.1.1. Processing

Depending on the variety, pineapples weigh between 0.9-4 kg, Baby-pineapples are mostly less than 500 g. The white-yellow fruit is contained in a hard, scaly, skin similar in structure to pine-cones. Ripe fruits can be eaten fresh, or processed into juice, jams, candied fruits, stored in cans or dried.
Fruits intended for export should be harvested half-ripe, just when the colour begins to change on their base. Juice squeezed out of the middle of the fruit should then have a "Brix"-value[3] of at least 13%. After harvesting, the fruits are then cleaned, the stalks cut to 2 cm, sorted, classified and packed.

- The EU Quality Standards are shown in the Annex!

3.1.2. Packaging and storage

Packaging
The regulations concerning carton labelling were dealt with in section VI of the 'Codex Alimentarius Standard for Pineapples'.

Storage
Unripe, hard fruits that are at present not saleable can be stored at 11-13°C and 90-95% relative humidity for up to 3 weeks.
Ripe fruits can be stored at 6-7°C and 90-95% relative humidity for up to 2 weeks.

Caution: temperatures under 5°C cause black-brown spots to appear in the pulp.

3.2. Dried pineapples

3.2.1. Processing

Drying is the oldest method of making food storable for longer periods. It is based on the fact that micro-organisms tend to cease growing below a certain level of water content. During drying, it is important to extract the water from the fruit as carefully as possible. The most important features are a good circulation of air and not too high temperatures

[3] A Brix value is the measure of the concentration of sugars, acids, and other identifying compounds in a juice. Every fruit juice has a slightly different Brix value.

The preparation stages from fresh to dried fruit are outlined and then described more fully below:

Fruit
↓
sorting
↓
washing
↓
peeling
↓
pulping
↓
drying
↓
Sorting and packaging
↓
Labelling and storing

Sorting
After harvesting, the fruits are sorted as only fresh, unripe and not fermented fruits can be used for drying.

Washing and peeling
Pineapples must be washed very carefully, in order not to damage them. Afterwards, inedible parts such as leaves, seeds, pips, heartwood and skins are removed.

Pulping and drying the fruits
The fruits are now cut into same-sized pieces, and laid out to dry in the air and sun in thin layers on racks, in solar dryers (drying tunnels) or drying ovens (artificial drying at 70°C).

Sorting and packaging
Before they are packed, the fruits are inspected and sorted again, to rid them of discoloured, skin remnants and seeds etc..

Labelling and storage
The packaged fruits can now be labelled and stored prior to being shipped.
During and after drying, the dried fruits are not permitted to be treated with methyl bromide, ethylene oxide, sulphur oxides or with ionising radiation.

3.2.2. Quality requirements

The following is a list of quality characteristics with minimum and maximum values for dried fruits, that are usually required officially or by importers. Different minimum and maximum values can be agreed between importers and exporters, providing these do not clash with official regulations.

Quality characteristics	Minimum and maximum values
Taste and smell	Variety-specific, aromatic, fresh, not mouldy
cleanliness	Free from foreign particles, such as insects, sand, small stones etc.
Water content	max. 18 %
aw-value	0.55 to 0.65 (at 20 °C)
Residues	
Pesticides	Not measurable
Sulphur oxide	Not measurable
Bromide and ethylene oxide	Not measurable
Micro-organisms	
Total number of parts	max. 10,000/g
Yeasts	max. 10/g
Mould fungus	max. 10/g
Staphylococcus aureus	max. 10/g
Coliforms	max. 1/g
Escherichia coli	Not measurable in 0.01 g
Enterococci	Not measurable in 1 g
Salmonella	Not measurable in 20 g
Mycotoxins	
Staphylococcus enterotoxin	Not measurable
Aflatoxin B1	max. 2 µg/kg
Total aflatoxins B1, B2, G1, G2	max. 4 µg/kg
Patulin	max. 50 µg/kg
Heavy metals	
lead (Pb)	max. 1.25 mg/kg
Cadmium (Cd)	max. 0.125 mg/kg
Mercury (Hg)	max. 0.10 mg/kg

In order that the quality requirements are upheld, and no contamination of the fruits occurs, preparation should take place under clean, hygienic and ideal conditions. The following aspects should be adhered to:

- Equipment (tubs, knives etc.), as well as working and drying surfaces (racks, mats etc.) and preparing and storage rooms, should be cleaned regularly.
- Personnel should be healthy, and have the possibility to wash themselves, or at least their hands (washrooms, toilets) and wear clean, washable garments.
- Water used for cleansing purposes must be free from faeces and other contaminants.
- Animals or animal faeces must not come into contact with the fruits. If the fruits are to be dried in the open, then fences must be erected to guard the racks against birds and nearby animals.

3.2.3. Packaging and storage

Packaging types and material

In order to be exported to Europe, the dried fruits can be packed in consumer packs, or wholesaler packs (bulk) in bags made of saleable, foils, impermeable to steam (e.g. polyethylene or polypropylene). Before sealing, a gas (e.g. nitrogen) may be added (nitrogen flushing).

Details given on packaging

If the dried fruits are packed directly for consumers, then the following details must be included on the outside of the packets:

- Product name ('trade name')

The name of the product, e.g.: Pineapple slices organically grown[4]

- Manufacturer

Name and address of the manufacturer, importer, exporter or trader within the country of origin, and which country.

- List of contents

A list of ingredients and additions, beginning with the heaviest proportion of total weight at the time of packaging.

- Weight

Details of the total packed weight in grams

[4] When products from certified organic are being declared as such, it is necessary to adhere to the requisite government regulations of the importing country. Information concerning this is available from the appropriate certification body. The EU-regulation (EEC) 2092/91 is applicable to organic products being imported into Europe.

The numbers describing the weight of the contents must be of the following sizes

Weight of contents	Letter size
Less than 50 g	2 mm
More than 50 g to 200 g	3 mm
More than 200 g to 1000 g	4 mm
More than 1000 g	6 mm

- Best before date

The 'Best before ...' details must include day, month and year; e.g.. best before 30.11.2001

- Batch number

Function of the product packaging

The product packaging should fulfil the following functions:

- Protect it from loss of aroma and against undesirable smells and tastes from its surroundings (aroma protection).
- Offer sufficient conservation properties, especially against loss or gain of moisture.
- Protect the contents against damaging.
- Provide a surface area for advertising and product information.

Transport packaging

Some form of transport packaging is required in order to ship the bulk or singly packed fruits. In choosing a type of packaging, the following should be heeded:

- Transport packaging made, for example, out of cardboard, should be strong enough to protect the contents against being damaged by outside pressure.
- The packaging should be dimensioned to allow the contents to be held firmly, but not too tightly in place.
- The dimensions should be compatible with standard pallet and container dimensions.

Information printed on transport packaging

The transport packaging should display details of the following:

- Name and address of the manufacturer/packer and country of origin
- Description of the product and its quality class
- Year harvested
- Net weight, number
- Batch number
- Destination, with the trader's/importer's address

- Visible indication of the organic source of the product[5]

Storage

The dried fruits should be stored in dark areas at low temperatures and relative humidity.
Under optimum conditions, dried fruits can be stored for up to 1 year.
If the organic product is being stored in a single warehouse together with conventional pineapples mixing of the different qualities must be avoided. This is best achieved using the following methods:

- Training and informing of warehouse personnel
- Explicit signs in the warehouse (silos, pallets, tanks etc.)
- Colour differentiation (e.g. green for the organic product)
- Incoming/dispatched goods separately documented (warehouse logbook)

It is prohibited to carry out chemical storage measures (e.g. gassing with methyl bromide) in mixed storage spaces. Wherever possible, storing both organic and conventional products together in the same warehouse should be avoided.

3.3. Pineapple jam

3.3.1. Processing

Jams are basically preparations made of fruit (jams) and various sugars that are made conservable mainly by heat treatment (boil down). The spreading consistency of these products is achieved by releasing the pectin found in the fruit pulp during the boiling process, and using this together with further pectin added to form a jelly-like mass.
The preparation stages from fresh fruit to jam are outlined and then described more fully below:

Fruit
↓
sorting
↓
washing
↓
Peeling and sorting
↓
pulping

5 Organic products must be protected from contamination by non-compliant substances at each stage in the process, i.e. processing, packaging, shipping. Therefore, products originating from a certified organic farm must be recognisably declared as such.

↓
addition of sugar
↓
heating and boiling down
↓
possible addition of pectin, citric acid and spices, then renewed heating
↓
filling into jars
↓
vacuum sealing
↓
Pasteurising
↓
cooling

Sorting

After harvesting, the fruits are sorted, because only those that are fresh, ripe and not rotten can be used to make jams. Jams can also be made from previously prepared, frozen fruits and pulp.

Washing

The fruit should be washed very carefully as it can easily be damaged.

Peeling and sorting

This follows the procedure of removing leaves, wooden pieces, pips or seeds and peel. Peeling is often done manually, or with knives, yet sometimes the skin is loosened with steam and then subsequently rubbed away mechanically. Finally, the fruits are sorted again to remove any blackened pieces, bits of peeling seeds etc.

Pulping and adding sugar

The peeled fruits are then pulped, and sugar added. They might also be mixed with water or fruit juice. To make jam, at least 350 g fruit per 1000 g finished product must be used; to make jam extra, at least 450 g fruit per 1000 g finished product must be used. The sugar must be organically grown.

Description	Fruit content during manufacture
Jam, extra	450 g fruit per 1000 g product
Jam	350 g fruit per 1000 g product

Heating and boiling

The mixture is now heated to 70-80°C and boiled down, while constantly being stirred, at 65°C until shortly before it reaches the desired consistency.

Adding citric acid, pectin and spices (optional**)**
If necessary or desired, citric acid, pectin and spices (spices from certified organic agriculture) can be added, and the mixture again briefly heated to 80°C.

Filling into jars, vacuum-sealing and Pasteurising
The liquid mass is now poured into jars, vacuum-sealed and pasteurised.

Cooling, labelling and storage
After the heating process, the jams are first cooled to 40°C, and then subsequently down to storage temperature, labelled, and finally stored.

3.3.2. Quality requirements

In addition to the previously mentioned quality requirements, such as clearly defined fruit content, the jams also have to conform to the following specifications. These quality requirements, with their minimum and maximum values, are generally issued by the authorities or importers. Yet agreements may be reached between individual manufacturers and importers upon different values, providing they still conform to official requirements.

Quality requirements	**Minimum and maximum values**
Smell and taste	Variety-specific, aromatic
Cleanliness	Free of foreign substances such as peel, stalks etc.
Contents of jam extra	Min. 450 g per 1000 g product
Contents of jam	min. 350 g per 1000 g product
Soluble dry mass in percent (measured refractometrically)	min. 60 %
Mycotoxins	
Aflatoxin B1	max. 2 µg/kg
Total aflatoxins B1, B2, G1, G2	max. 4 µg/kg
Patulin	max. 50 µg/kg
Residues	
Pesticides	Not measurable
Sulphur oxide	Not measurable
Bromide	Not measurable
Ethylene oxide	Not measurable

In order to conform to the quality requirements, and to prevent the fruit becoming contaminated, all preparations must be carried out under clean, hygienic and acceptable conditions. The following aspects must be heeded:

- Equipment (tubs, knives etc.), as well as working surfaces (tables etc.) and preparing and storage rooms, should be cleaned regularly.
- Personnel should be healthy, and have the possibility to wash themselves, or at least their hands (washrooms, toilets) and wear clean, washable garments.
- Water used for cleansing purposes must be free from faeces and other contaminants.
- Animals or animal faeces must not come into contact with the processed fruits.

3.3.3. Packaging and storage

Packaging types and material

In order to be exported to Europe, the jams are usually filled into consumer-size jars with twist-off lids.

Details given on packaging

The label on the jar must display the following:

- Product name ('Trade name')

The name of the product, consisting of: Name of the fruit with or without the description extra – according to fruit content; e.g.: pineapple jam extra, organically grown[6]

- Manufacturer

Name and address of the manufacturer, importer, exporter or product trader, plus country of origin.

- List of contents

A list of ingredients and additives in the jam, beginning with the heaviest proportion of total weight at the time of packaging

- Details of the total sugar content

Total sugar content per 100 g product (measured refractometrically at 20 °C) must be represented with the words "Total sugar content ....g per 100 g".

- Details of fruit content

The fruit content per 100 g product must be given with the words "manufactured from....g fruit per 100 g".

- Notice about cooling

The notice about storing the product in a cool place must be given with the words:
"After opening, store in a cool place".

- Weight

Details of the total weight in grams

- Best before date

The 'Best before ...' details must include day, month and year; e.g.. best before 30.11.2001

- Batch number

6 Compare footnote No. 5

Transport packaging

A form of transport packaging is required to ship the sales packages. In choosing them, the following aspects should be heeded:

- Transport packaging made, for example, out of cardboard, should be strong enough to protect the contents against being damaged by outside pressure.
- The packaging should be dimensioned to allow the contents to be held firmly, but not too tightly in place.

The dimensions should be compatible with standard pallet and container dimensions.

Information printed on transport packaging

The transport packaging should display details of the following:

- Name and address of the manufacturer/packer and country of origin
- Description of the product and its quality class
- Year harvested
- Net weight, number
- Batch number
- Destination, with the trader's/importer's address
- Visible indication of the organic quality of the product[7]

Storage

The jams should be stored in a dark, cool room at temperatures of max. 15°C. Under optimum conditions, jam may be stored for 1-2 years.

If the organic product is being stored in a single warehouse together with conventional pineapples mixing of the different qualities must be avoided. This is best achieved using the following methods:

- Training and informing of warehouse personnel
- Explicit signs in the warehouse (silos, pallets, tanks etc.)
- Colour differentiation (e.g. green for the organic product)
- Incoming/dispatched goods separately documented (warehouse logbook)

It is prohibited to carry out chemical storage measures (e.g. gassing with methyl bromide) in mixed storage spaces. Wherever possible, storing both organic and conventional products together in the same warehouse should be avoid.

3.4. Canned pineapples

3.4.1. Processing

Canned foods are products that can be stored over a long period in airtight containers (metal or glass jars). They are preserved mainly by heat treatment, during which the

[7] compare footnote No.2

micro-organisms present in the fruit are significantly reduced in number, or their development so restricted, that they are prevented from spoiling the product.
The process involved in turning fresh fruit into canned products is described schematically, and then in more detail below:

Fruit
↓
Sorting
↓
Washing
↓
Peeling and sorting
↓
Pulping
↓
Filling into jars or cans with syrup
↓
Vacuum sealing
↓
Pasteurising or sterilising
↓
Cooling
↓
Labelling and storage

Sorting
After harvesting, the fruits are sorted, because only those that are fresh, ripe and not rotten can be used to make jams. Jams can also be made from previously prepared, frozen fruits and pulp.

Washing
The fruit should be washed very carefully as it can easily be damaged.

Peeling and sorting
This follows the procedure of removing leaves, wooden pieces, pips or seeds and peel. Peeling is often done manually, or with knives, yet sometimes the skin is loosened with steam and then subsequently rubbed away mechanically. Finally, the fruits are sorted again to remove any blackened pieces, bits of peeling, seeds etc.

Pulping
The peeled fruit can be cut into a variety of shapes, according to type (indicated by the crosses in the table). The shape of the cut fruit must be given on the can (slices, diced, pieces etc.).

Description	Cut shape	Pine-apple	Mango	Pine-apple	Banana
Whole fruit	Peeled				X
Slices	Slices of fruit cut into approximately the same size	X	X	X	X
Half slices	Uniformly cut, semi-circle shaped slices.	X			
Diced	Fruit cut into dice shapes of roughly the same size.	X	X	X	
Balls	Fruit pulp pieces cut into roughly ball shapes		X		
Pieces	Pieces of fruit cut into irregular shapes	X			
Grated	Irregular thin strips and pieces of fruit	X			
Chunks	Large regularly cut pieces of pineapple	X			
Titbits	Trapeze-shaped segments of pineapple	X			

Filling in jars or cans

The cut pieces are now filled into jars or cans and covered with syrup. Additional information must be given on the can according to the sugar content of the syrup.

Sugar concentration* of the syrup	Description on the can
9-14 %	Very lightly sugared
14-17 %	Lightly sugared
17-20 %	Sugared
over 20 %	Strongly sugared

* The sugar must be organically grown.

If the appropriate fruit juice has been used as syrup then "...in natural juice" must be included on the label, e.g.: Pineapple in natural juice.

Vacuum sealing, pasteurising or sterilising

After the jars or cans have been vacuum sealed, they are either pasteurised (temperatures above 80°C) or sterilised (temperatures above 100°C).

Cooling

After the heating process, the canned fruits are first cooled to 40°C, and then subsequently down to storage temperature.

Labelling and storage

After they have been cooled, the canned fruits are labelled and stored.

3.4.2. Quality requirements

In addition to the previously listed quality requirements, such as clearly defined sugar concentrations of the syrup and shapes specific to certain fruits, the contents should also conform to the following characteristics. These quality requirements, with their minimum and maximum values, are generally issued by the authorities or importers. Yet agreements may be reached between individual manufacturers and importers upon different values, providing they still conform to official requirements.

Quality requirements	**Minimum and maximum values**
Taste and smell	Variety-specific, aromatic, not mouldy
Cleanliness	Free of foreign substances such as peel, stalks etc.
Mycotoxins	
Aflatoxins B1	max. 2 µg/kg
Total aflatoxines B1, B2, G1, G2	max. 4 µg/kg
Patulin	max. 50 µg/kg
Residue	
Pesticide	Not measurable
Sulphur oxide	Not measurable
Bromide	Not measurable
Ethylene oxide	Not measurable

In order to conform to the quality requirements, and to prevent the fruit becoming contaminated, all preparations must be carried out under clean, hygienic and acceptable conditions. The following aspects must be heeded:

- Equipment (tubs, knives etc.), as well as working surfaces (tables etc.) and preparing and storage rooms, should be cleaned regularly.
- Personnel should be healthy, and have the possibility to wash themselves, or at least their hands (washrooms, toilets) and wear clean, washable garments.
- Water used for cleansing purposes must be free from faeces and other contaminants.
- Animals or animal faeces must not come into contact with the processed fruits.

3.4.3. Packaging and storage

Packaging type and material

In order to be exported to Europe, the fruits can be packed into single or wholesale packages (bulk) made of glass, aluminium or tin cans.

Details given on packaging

The label on the jar must display the following:

- Product name ('Trade name')

The name of the product, consisting of: Name of the fruit with or without the description extra – according to fruit content; e.g.: Pineapples in slices, lightly sugared, organically grown[8]

- Manufacturer

Name and address of the manufacturer, importer, exporter or product trader, plus country of origin.

- List of contents

A list of ingredients and additives in the jam, beginning with the heaviest proportion of total weight at the time of packaging

Weight

- Total and dry weight of the fruit

The numbers describing the weight of the contents must be of the following sizes

Weight of contents	Letter size
Less than 50 g	2 mm
More than 50 g to 200 g	3 mm
More than 200 g to 1000 g	4 mm
More than 1000 g	6 mm

- Best before date

The 'Best before ...' details must include day, month and year; e.g.. best before 30.11.2001

Batch number

Transport packaging

A form of transport packaging is required to ship the sales packages. In choosing them, the following aspects should be heeded:

- Transport packaging made, for example, out of cardboard, should be strong enough to protect the contents against being damaged by outside pressure.
- The packaging should be dimensioned to allow the contents to be held firmly, but not too tightly in place.

8 compare footnote No. 5

- The dimensions should be compatible with standard pallet and container dimensions.

Information printed on transport packaging

The transport packaging should display details of the following:

- Name and address of the manufacturer/packer and country of origin
- Description of the product and its quality class
- Year harvested
- Net weight, number
- Batch number
- Destination, with the trader's/importer's address
- Visible notice of the organic nature of the product[9]

Storage

The conserved fruit (especially in jars) should be stored in dark rooms at low temperatures (max. 15°C). Under optimum conditions, conserved fruit can be stored for 1 year (when pasteurised) or 2 years (when sterilised).
If the organic product is being stored in a single warehouse together with conventional pineapples mixing of the different qualities must be avoided. This is best achieved using the following methods:

- Training and informing of warehouse personnel
- Explicit signs in the warehouse (silos, pallets, tanks etc.)
- Colour differentiation (e.g. green for the organic product)
- Incoming/dispatched goods separately documented (warehouse logbook)

It is prohibited to carry out chemical storage measures (e.g. gassing with methyl bromide) in mixed storage spaces. Wherever possible, storing both organic and conventional products together in the same warehouse should be avoided.

3.5. Pineapple pulp

3.5.1. Processing

Canned foods are products that can be stored over a long period in airtight containers (metal or glass jars). They are preserved mainly by heat treatment, during which the micro-organisms present in the fruit are significantly reduced in number, or their development so restricted, that they are prevented from spoiling the product.

9 compare footnote No. 6

The process involved in turning fresh fruit into canned products is described schematically, and then in more detail below:

Fruit
↓
Sorting
↓
Washing
↓
Peeling and sorting
↓
Pulping and straining
↓
De-aeration (partially)
↓
Pasteurising or sterilising
↓
Filling
↓
Cooling, labelling and storage

Manufacturing pineapple juice

♦ In order to manufacture pineapple juice, only fresh, non-mouldy fruits may be used. After harvesting, the fruits are washed and the inedible parts removed (leaf crown, stalk etc). The following list points out various fruit-parts that cannot be used during the canning process, yet which can be used to extract juice – for this reason, a juice plant is often found side-by-side with a cannery:

- From fruit flesh that is unsuitable for canning (e.g. fruits too small)
- From unsuitable slices or squares
- From the juice that runs away during the canning process
- From the fibre-rich middle part of the fruit
- From flesh left stuck to the skin

All of the edible parts of the pineapples are fed through a hammer mill or worm-screw press – depending on the machinery available. The juice collected is then heated to 60°C and poured into tin cans, before being sealed, then pasteurised at a temperature of 88°C and rapidly cooled down again.
In a different procedure, the pulp is heated for 2 min. up to 95°C, and then filled into tin cans (lead-free, and up to 5 kg) whilst still hot, whereby the cans are sealed while being steamed, the temperature maintained for 5 min., and then rapidly cooled down. At temperatures of around 15°C, the pulp can be stored for up to 1 year. Pulp which has been filled under antiseptic conditions (bag-in-box) can be stored for up to 1 year at room temperature.

3.5.2. Quality requirements

These quality requirements, with their minimum and maximum values, are generally issued by the authorities or importers. Yet agreements may be reached between individual manufacturers and importers upon different values, providing they still conform to official requirements.

Quality requirements	Minimum and maximum values
Smell and taste	Variety-specific, aromatic
Cleanliness	Free of foreign substances such as peel, stalks etc.
Relative density (20/20) for pineapple juice	min 1.045
Brix value[10] for pineapple juice	min 11.2 %
Relative density (20/20) for Banana pulp	min 1.083
Brix value for Banana pulp	min 20.0 %
Relative density (20/20) for Mango pulp	min 1.057
Brix value for Mango pulp	min 14.0 %
Ethanol	Max 3.0 g/kg
Volatile acids, evaluated as acetic acid	Max 0.4 g/kg
Lactic acid	Max 0.5 g/kg
D-Malic acid	Not measurable
Sulphuric acid	Not measurable
Hydroxymethylfurfural (HMF)	Max 20 mg/kg
Heavy metals	
Arsenic (As)	Max 0.1 mg/kg
Lead (Pb)	Max 0.2 mg/kg
Copper (Cu)	Max 5.0 mg/kg
Zinc (Zn)	Max 5.0 mg/kg
Iron (Fe)	Max 5.0 mg/kg
Tin (Sn)	Max 1.0 mg/kg
Mercury (Hg)	Max 0.01 mg/kg
Cadmium (Cd)	Max 0.02 mg/kg

[10] A Brix value is the measure of the concentration of sugars, acids, and other identifying compounds in a juice. Every fruit juice has a slightly different Brix value.

Residues	
Pesticide	Not measurable
Sulphur oxide	Not measurable
Bromide	Not measurable
Ethylene oxide	Not measurable
Mycotoxins	
Aflatoxin B1	Max 2 µg/kg
Total aflatoxins B1, B2, G1, G2	Max 4 µg/kg
Patulin	Max 50 µg/kg

In order to conform to the quality requirements, and to prevent the fruit becoming contaminated, all preparations must be carried out under clean, hygienic and acceptable conditions. The following aspects must be heeded:

- Equipment (tubs, knives etc.), as well as working surfaces (tables etc.) and preparing and storage rooms, should be cleaned regularly.
- Personnel should be healthy, and have the possibility to wash themselves, or at least their hands (washrooms, toilets) and wear clean, washable garments.
- Water used for cleansing purposes must be free from faeces and other contaminants.
- Animals or animal faeces must not come into contact with the processed fruits.

3.5.3. Packaging and storage

Packaging type and material

In order to be exported to Europe, the pulp/juices can be packed into single or wholesale packages (bulk) consisting of glass jars, tin cans or polyethylene or polypropylene bags, and also filled antiseptically into 'bag-in-boxes'.

Details given on packaging

The label on the jar must display the following:

- Product name ('Trade name')

The name of the product, e.g.: Pineapple pulp, grown organically[11]

Manufacturer

- Name and address of the manufacturer, importer, exporter or product trader, plus country of origin.
- List of contents

A list of ingredients and additives, beginning with the heaviest proportion of total weight at the time of packaging, e.g.: papayas, citric acid…

[11] compare footnote No. 5

- Weight

Total weight

The numbers describing the weight of the contents must be of the following sizes

Weight of contents	Letter size
Less than 50 g	2 mm
More than 50 g to 200 g	3 mm
More than 200 g to 1000 g	4 mm
More than 1000 g	6 mm

- Best before date

The 'Best before ...' details must include day, month and year; e.g.. best before 30.11.2001

- Batch number

Transport packaging

A form of transport packaging is required to ship the sales packages. In choosing them, the following aspects should be heeded:

- Transport packaging made, for example, out of cardboard, should be strong enough to protect the contents against being damaged by outside pressure.
- The packaging should be dimensioned to allow the contents to be held firmly, but not too tightly in place.
- The dimensions should be compatible with standard pallet and container dimensions.

Information printed on transport packaging

The transport packaging should display details of the following:

- Name and address of the manufacturer/packer and country of origin
- Description of the product and its quality class
- Year harvested
- Net weight, number
- Batch number
- Destination, with the trader's/importer's address
- Visible notice of the organic nature of the product[12]

[12] compare footnote No. 6

Storage

Pasteurised pineapple juice, as well as pasteurised banana, mango and papaya pulp can be stored as follows:

Packaging material/ storage temperature	Pineapple juice	Banana pulp	Mango pulp	Papaya pulp
Tin cans/glass jars, storage temperature below 15°C	1 year	1 year	1 year	9-12 months
Polyethylene bags/ Deep frozen at -18°C	-	18 months	18 months	12 months
Filled antiseptically, bag-in-box/ Room temperature	1 year	1 year	1 year	6-9 months

If the organic product is being stored in a single warehouse together with conventional pineapples of the different qualities must be avoided. This is best achieved using the following methods:

- Training and informing of warehouse personnel
- Explicit signs in the warehouse (silos, pallets, tanks etc.)
- Colour differentiation (e.g. green for the organic product)
- Incoming/dispatched goods separately documented (warehouse logbook)

It is prohibited to carry out chemical storage measures (e.g. gassing with methyl bromide) in mixed storage spaces. Wherever possible, storing both organic and conventional products together in the same warehouse should be avoided.

Annex: Quality Requirements

The **'Codex Alimentarius Standard for Pineapples'** (Codex Stan 182-1993) defines the quality requirements for trading with fresh pineapples. These do not necessarily have to be adhered to, yet they supply recommended guidelines. Pineapples intended for export are not included here. Different minimum and maximum values can be agreed between importers and exporters, providing they do not clash with official regulations.

The following is an excerpt from the 'Codex Alimentarius Standard for Pineapples (Codex Stan 182-1993)':

I. Defining terms

These standards apply to pineapples of *Ananas comosus Merr.*, that are delivered fresh to consumers.

II. Quality characteristics regulations

a. Minimum requirements

The pineapples must be as follows:

- Fresh and healthy
- Clean, practically free of visible foreign substances
- Practically free of pests and damage caused by them
- Free of fungus
- Free of bruising and frost-damage
- Free of strange taste of smell
- Well developed, ripe

b. Classifications

Pineapples are sold in three categories:

¨ **Class extra**

Pineapples in this class must be of the highest quality. They must possess the characteristics typical of their variety and/or trading type. The fruits must be unblemished, with the exception of very light surface flaws that do not detract from the fruit's general appearance, quality, the time it will keep.

¨ **Class I**

Pineapples in this class must be of good quality. They must possess the characteristics typical of their variety and/or trading type. The following blemishes are

permissible, providing they do not detract from the fruit's general appearance, quality, the time it will keep and the presentation of the bunch or cluster in their packaging:

- Slightly misshapen and discoloured
- Light flaws in the skin caused by friction or by other means, providing the area does not exceed 4 % of the total surface area of the fruit.

¨ **Class II**

This class is composed of those pineapples that cannot be placed in the upper classes, yet which fulfil the definitions of minimum requirements. The following faults are allowed, providing the pineapples retain their essential characteristics in terms of quality, conservation and presentation:

- Shape and colour defects,
- Skin flaws, caused by scratches, friction or other means.

The flaws are not permitted to affect the fruit's pulp.

III. Size classification regulations

The pineapples are sorted according to weight. The fruits must weigh at least 700 grams, with the exception of baby pineapples, which must weigh a minimum of 400 grams.

Reference letter	Weight
A	700 - 1000 g
B	1000 - 1200 g
C	1200 - 1600 g
D	1600 - 1800 g
E	more than 1800 g

IV. Tolerance regulations

Not dealt with here.

V. Presentation regulations

a. Uniformity

- The contents of a carton must be uniform, and may only contain pineapples of identical origin, variety and/or trade type, and quality.
- The visible part of the carton must be representative of the entire contents.

b. Packaging

- The pineapples must be packed in a way that ensures they are sufficiently protected
- Packing material used inside the carton must be new, clean, and so shaped that it cannot cause any damage to either the inside or outside of the fruit. The usage of

materials such as papers and stickers with company details on them is permitted providing the no toxic inks, dyes or glues have been used.

- The packaging must be free of all other materials.

VI. Carton labelling regulations

Each carton must display the following details in unbroken, legible, permanent letters visible from the outside:

a. Identification

- Name and address of the exporter and packer

b. Type of product

- "Pineapples", when the contents are not visible
- Name of the variety

c. Origin of product

- Country of origin, and optionally, national, regional or local description

d. Commercial characteristics

- Class
- Size (reference letter or weight class)
- Number of fruits (optional)
- Net weight (optional)

Although the following values are not laid down in the 'Codex Alimentarius Standard for Pineapples' they should nevertheless be adhered to:

Quality characteristics	**Minimum and maximum values**
Heavy metals	
lead (Pb)	max. 0.50 mg/kg
Cadmium (Cd)	max. 0.05 mg/kg
Mercury (Hg)	max. 0.03 mg/kg
Residues	
Pesticides	not measurable
Sulphur oxide	not measurable
Bromide	not measurable
Ethylene oxide	not measurable