

# UNDERSTANDING SPS REQUIREMENTS FOR GHANA'S EXPORT TO THE EU: **FOCUS ON MANGO PRODUCTS**

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# UNDERSTANDING SPS REQUIREMENT FOR GHANA'S EXPORT TO THE EU: FOCUS ON MANGO PRODUCTS

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## List of Acronyms and Abbreviations

CPIMS	Centre for the Promotion of Imports from Developing Countries Market Survey
EU	European Union
GSA	Ghana standard Authority
ITFC	Integrated Tamale Fruit Company
MOFA	Ministry of Food and Agriculture
MRL	Maximum Residue Level (pesticide residue level permitted in foodstuff)
PPP's	Plant Protection Products
PPRSD	Plant Protection and Regulatory Service Division
SPS	Sanitary and Phytosanitary

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# 1.0 General Background

Mango is touted as the next important product in Ghana, with the potential to replace cocoa as the country's most valuable crop. It is a widely grown fruit crop in the country that has gained commercial value through the cultivation of improved exotic varieties. Over the years, not only development agencies under various conservation and poverty alleviation programmes, but also private individuals and companies for export have shown keen interest in growing the crop<sup>1</sup>. The Centre for the Promotion of Imports from Developing Countries Market Survey (CPIMS) (2008) reports that mango fruit is one of the most valued fruits in the tropics.

In Ghana, export of mango has increased steadily from 244 Mt in 2000 to about 9,405Mt in 2019. Export of mango (fresh whole mangoes, fresh cut and dried) earned the country nearly \$68,322,000.00 million in 2019. The main buyers of Ghana's mango are Switzerland, the UK, France, Italy and Netherlands. The main export varieties are Kent and Keitt<sup>2</sup>. In recent years, there has been an expansion of domestic market for mangoes due to increase in growth in population of middle income earners, change in diet and increase number of foreign residents. Also, processed mangoes are sold mainly in the international markets. Companies involved in processing mangoes include Blue Skies (Nsawam), Integrated Tamale Fruit Company (ITFC), Bomarts, Peelco and HPW Company (Adeiso).

Favourable climatic conditions and low labour costs, resulting in low production costs, give the country a strong position in European markets. Ghana is closer to Europe compared to some countries in the southern region, which gives it an advantage in terms of market opportunities due to lower transport costs and shorter delivery times. Notwithstanding these opportunities, Ghana is unable to take advantage due to the lack of competitiveness in the industry. mango production and exports in Ghana have been increasingly volatile in recent years. This is due to pest and disease infestation and improper handling of the fruit during harvest and post-harvest, which affect the quality and shelf life of the exported mangoes. According to Abu et al. (2011)<sup>3</sup>, mango farmers in Ghana have difficulties in determining when to harvest for export and the local market. This affects the quality and safety of the harvested mangoes.

Food safety is a new benchmark in the field of food trade. Globalisation and economic liberalisation have brought with them the obligation to promote capacity building in the area of quality assurance. As a result, the focus of agricultural trade policy has shifted from tariff to non-tariff barriers over the last three decades. Among the non-tariff barriers affecting agricultural trade, sanitary and phytosanitary (SPS) measures occupy a very important place. SPS measures refer to product criteria, processes and production methods, tests, inspections, certification

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<sup>1</sup>Avah, V., Dzamefe, W., Narh, E., Abakah, J. K. and Eshun, E. A. (2008). Value chain analysis for mango; Southern horticultural zone, Ghana. pp 13.

<sup>2</sup>Ministry of Food and Agriculture (2019): Facts and Figures 2019

<sup>3</sup>Abu, M. Olympio, N. S. and Darko, J. O. (2010): Quality criteria for mango export in Ghana (Doctoral dissertation).

procedures, quarantine treatments, animal transports, and packaging and labelling requirements that are directly related to food safety.<sup>4</sup> Compliance with phytosanitary measures is important for several reasons. These include:

(i) To protect animal or plant life or health in the territory of the member from hazards arising from the introduction, establishment or spread of pests, diseases, disease vectors or disease-causing organisms.

(ii) To protect human or animal life or health in the territory of the member from hazards, resulting from additives, contaminants, toxins or disease-causing organisms in food, drink or foodstuffs; and

(iii) To prevent or limit other damage in the territory of the member caused by the introduction, establishment or spread of pests.<sup>5</sup>

However, phytosanitary compliance can especially be a big obstacle for international trade<sup>6</sup>. Consumers can easily be exposed to risk arising from additives, contaminants, toxins or disease-causing organisms in food traded at the national and international level. Despite the importance of SPS, most small and

medium scale enterprises (SMEs) in Ghana are unable to meet these requirements due to lack of training on conformity to SPS measures. This manual provides an understanding of sanitary and phytosanitary measures for mango products (fresh whole mangoes, fresh cut and dried) with potential for enhancing exports from Ghana into the European market. It covers two mango products

- (i) a guide on fresh whole mango and
- (ii) a guide on dried processed mango.

The guide has been designed with two main objectives

(i) specifying the general sanitation/hygiene, food safety and commercial quality requirement for mango and

(ii) helping all actors working at different stages of the process (producers, transporters, processors and exporters) comply with this requirement. Having this self-assessment guide for mango sector in Ghana offers operators the opportunity to familiarize themselves with the prescribed norms and rules governing national and international regulatory requirements and standards while formalizing the control measures governing the different stages of mango production and export.

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<sup>4</sup>Henson, S. (2006): *The Role of Public and Private Standards in Regulating International Food Markets*

<sup>5</sup>OBENG I. Y. (2020). *Sanitary and Phytosanitary Export Measurement Requirements: The case of cocoa, cashew nuts, and tuna products*. Geneva: CUTS International, Geneva

<sup>6</sup>Ayeduvor, Obeng and Adomako (2020). *Understanding SPS Requirements for Ghana's Exports to the EU: Focus on Cocoa, Cashew and Tuna products*. Geneva: CUTS International, Geneva.

## 2.0 Methodology

The approach for this study was to conduct an assessment of the sanitary and phytosanitary measures of mango products for export (fresh mango, cuts and dry mango) into the European market and to provide a directory of what potential SME exporters of the covered products need to do to ensure that their exports meet the EU SPS standards and are therefore able to access the EU market. This is premised on the fact that the EU provides a largely open and lucrative market that can be leveraged by SMEs in these sectors if they are able to conform to the SPS requirements. The study engaged several stakeholders responsible for production, processing,

inspection, certification and export of mango. These include institutional representatives from the Ghana standard Authority (GSA), Food and Drug Authority (FDA), Ministry of Food and Agriculture (MoFA), Plant Protection and Regulatory Service Division (PPRSD), Crop Research Institute (CRI), mango farmer association, processors (Blue Skies, HPS company), mango exporters association. Additionally, data was collected from mango farmers, key informants and other relevant institution. The study provides a guide for good practices in ensuring sanitary and phytosanitary measures applicable to mango sector in Ghana.

## 3.0 Legislative and Regulatory Enforcement for SPS Measures in Mango Sector

Ghana is a member and signatory to the World Trade Organization (WTO) agreement on (SPS) which establishes a framework for food safety and standards including plant health. In that regard, the SPS regulatory regime in the

country covers food safety and standards, animal and plant health. The regulatory and legislative framework on mango products covered in this study are briefly summarized in the Table 1.

**Table 1: Competent Control Authorities for SPS Measures in Mango Sector in Ghana**

<b>Authority/ Institution</b>	<b>Stage of Value the Chain</b>	<b>Role</b>	<b>Ministry</b>
<p>Ghana Standards Authority (GSA) Address: P. O. Box MB, 245, Accra Digital address: GA-288-5605 Website: gsa.gov.gh Tel: (+233-302) 506991-5/500065/6</p>	<p>Post- production/ processing</p>	<ul style="list-style-type: none"> <li>● Competent Authority for standards and method development, testing and analysis</li> <li>● Demand-driven analysis of all products, both non-food and foods products; including mangoes and their processed products covering domestic, exports and imports</li> <li>● Conducts pesticide, microbiological, heavy metals, histamine and mycotoxin analysis on food and food products on client own samples delivered to the Authority</li> <li>● Conformity assessment. Tasks include: <ul style="list-style-type: none"> <li>– Standards development</li> <li>– Certification services</li> <li>– Inspection services</li> <li>– Laboratory services</li> </ul> </li> </ul>	<p>Ministry of Trade and Industry (MoTI) Address: Ministries Accra, Ghana. GPS Address: GA-144-0150 Website: moti.gov.gh Tel:+233 302 686-528</p>

<p>Food and Drugs Authority (FDA)</p> <p>Address: Behind Tullow Oil, Tetteh Quarshie Interchange Telephone: 0302 233200 0302 235100 Mobile: 024 4310297 Website: fdaghana.gov.gh</p>	<p>Preprocessing/processing and production</p>	<p>Regulatory Authority for monitoring quality and Food safety compliance of food and drugs to both operating domestic and international standards for all food types including mangoes in the fresh, semi-fresh and processed forms covering, domestic, exports and imports products. This includes:</p> <ul style="list-style-type: none"> <li>- Food premises inspection &amp; registration</li> <li>- Food post market surveillance</li> <li>- Food safety and quality management</li> <li>- Food standards and legislation research</li> </ul>	<p>Ministry of Health (MoH) P.O.Box M 44 Ministries Accra, Accra, Ghana TEL: +233 302 665651 Website: www.moh.gh.gov</p>
<p>Plant Protection &amp; Regulatory Services Directorate (PPRSD) Contact information: Pokuase Mayera Road P. O. Box M 37, Accra Tel: +233 (0) 243 305 049 Website: waapp.org.gh</p>	<p>Production/farming and export station</p>	<ul style="list-style-type: none"> <li>● Capable Phytosanitary Authority managing diseases and pests, especially quarantine, of mangoes including exports and imports</li> <li>● Regulates the quality and safety of mangoes; especially inputs like pesticides and fertilizer and the associated challenges after their application on mangoes.</li> <li>● Competent authority for registration of fertilizers</li> <li>● Conformity inspection at KIA of EU SPS requirement</li> <li>● Training of farmers when related to quarantine pests and safe application of pesticides</li> </ul>	<p>Ministry of Food and Agriculture (MoFA) P. O. Box M 37, Accra Tel: 021-662961, 663036, 662810 Website: www.mofa.gov.gh</p>

<p>Environmental Protection Agency (EPA)  Address: No. 91 Starlet Street, opp Ghana News Agency  P. O. Box M 362, Accra  Tel: 0302664697/0302664698/0302662465  Mobile: 0289673960 /0289673961  www.epa.gov.gh</p>	<p>Pre-production/production/post-production</p>	<p>Competent National Agency charged with the responsibility for regulating the procurement, importation, storage, sales, distribution, disposal and application of all pesticides or plant protection products (PPP) covering all crops including mango in a manner that they do not harm the environment, pose health hazard and safety risk to human beings, crops, animals, plant and fish products for consumption. This includes:</p> <ul style="list-style-type: none"> <li>● Pesticide registration &amp; licensing</li> <li>● Inspection &amp; monitoring of (agro)chemicals</li> <li>● Management of hazardous chemical waste disposal and</li> <li>● Obsolete (agro)chemicals</li> <li>● Post registration enforcement</li> <li>● Analysis of pesticides</li> <li>● Take corrective measures if discoveries in the area of chemical residues detrimental to the soil are observed</li> </ul>	<p>Ministry of Environment Science and Technology (MEST)  Post Office Box M232 Ministries, Accra  Ghana. 0302-666 049  0302-688913/688 663  contact@mesti.gov.gh  www.mesti.gov.gh</p>
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<p>Directorate of Crop Services (DCS)  Mail: P.O. BOX 3785,  Fumesua-Kumasi,  Ghana  Email: info@  cropsresearch.org  cridirector@  cropsresearch.org</p> <p>Tel.:  FUMESUA  233-(0)3220 60396,  62522 (Director)  233-(0)3220 60389,  60391 &amp; 60425 (Main  Lines)  KWADASO  233-(0)3220 50221,  50222 (Main Lines)</p>	<p>Pre-production</p>	<p>Responsible for the development of the Green label – good agricultural practice development for mangoes, including development of standard operating practices (SOPs)</p>	<p>MoFA  P. O. Box M 37, Accra  Tel: 021-662961,  663036, 662810  Website: www.mofa.gov.gh</p>
<p>Customs, Excise and Preventive Service (CEPS)  Address:  Location: Off Starlets’  91 Road, near Accra Sports Stadium  Postal: P. O. Box 2202,  Accra-Ghana  Telephone: +233- (0) 302 904545 OR +233- (0) 302 904546  Email: info@gra.gov.gh  Website: gra.gov.gh</p>	<p>Export station</p>	<p>Enforcement of laws on import and export restrictions and prohibitions</p>	<p>Ministry of Finance (MoF)  Contact. Address.  28th February Road,  Finance Drv, Accra.  Phone. +233 302 747 197. Email. info@mofep.gov.gh.  Website: mofep.gov.gh</p>

Source: Edwin van der Maden, et al. (2014)

## 4.0 Characteristics of Major Export Mango Varieties in Ghana

### Haden

Haden produces a vigorous tree with a large spreading canopy. The fruit is bright yellow with crimson or red blush and numerous large yellow spots. The fruits are generally, oval with rounded base and measured about 10.5 to 14cm long, 9-10.5cm across and 8.5-9.5 cm thick. Haden fruits weight between 510 and 680 g. Fruit skin is thick, tough and adherent while the pulp is firm, juicy and moderately fibrous. In Ghana, the cultivar flowers from the December through February and comes into season in April-May. The fruit weight between 400 and 600 g. The fruit colour turns from green to yellow-red as it ripens. Its alternate bearer and its fruits have a short shelf-life.

### Kent

The tree is large and vigorous with a dense upright canopy bears green-yellow fruits with red or crimson blush and numerous small yellow dots. The fruit is oval shape with a rounded base and measure 11-13cm long, 9.5-11 cm broad and 9-9.5 cm thick. The fruit weight between 600 to 700g. Fruits skin is thick, tough and adherent to the pulp. The quality is excellent. In Ghana, Kent flowers from January to March and comes into season in late June through July. The fruits weight between 400-900g. Immature fruits are green colour but turns greenish-pink or crimson/red blue when ripe. The fruits take 3.5-4 months to mature. Kent is the most preferable standard in terms of quality on the export market.

### Palmer

Palmer mango is moderately vigorous tree, forming a large, upright canopy. The fruit is yellow-orange with dark red to crimson blush and a few small white dots. The fruit is oblong with a rounded base. Fruits measure 12-15 cm long by 8.5-10 cm broad by 6.5-7.5 cm thick and weight 510 to 850 g. In Ghana, Palmer flowers between January and March and comes into season in late June through August. Immature fruits are pinkish in colour but turn reddish-purple when ripe. The fruit takes about 3.5-4 months to mature.

### Keitt

Keitt produces a medium size and moderately vigorous tree. The tree tends to be upright with an open canopy. The fruit is greenish-yellow, with pink or red blue and numerous small white or yellow dots. The fruit is normally oval with a rounded base and measures 13-15cm by 9-11cm broad by 8.5-10cm thick. Typically, fruits weight between 510 and 2000g. The fruit is thick, tough and adherent and the pulp is firm and juicy with little fibre. The pulp is lemon yellow in colour with a sweet and mild pleasant aroma of good to excellent quality. In Ghana, Keitt flowers between January- March and comes into season in late June through August. The fruits are large with a yellow green color and a slight pink to red blush. The minor season flowering begins from August to September and fruit matures in January to February. The Northern sector experiences one flowering season which start from January to March with fruits maturing between May to July.

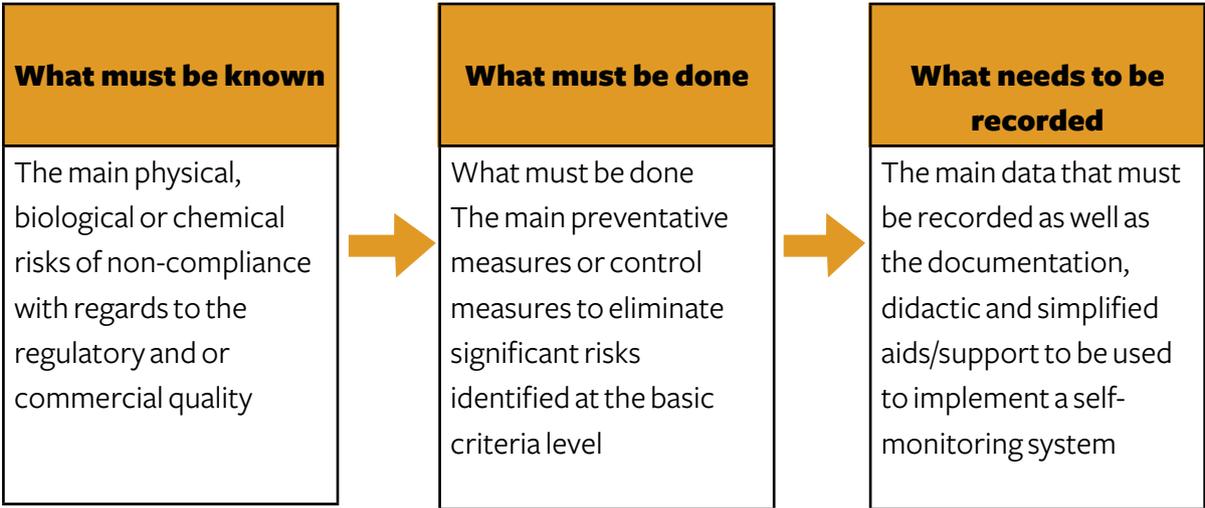
# 5.0 General Guidelines and Directions for use of Manual

The description of each activity (production, harvesting, transport and exportation) for the products (Fresh Mango, Cut Mango and Dried Mango) covered by the manual shall include:

- The general information related to the process as well as general requirements of good practices
- The general scheme of processes and the description of surveys at the stakeholder level
- Risk evaluation and a detailed analysis of the dangers, taking into consideration actual practices and a proposition of control measures (points of attention)

- Registration models for traceability and self-monitoring

Based on the risks associated in field practices, an analysis of risks was done at each stage of the process. These categories of risks are analyzed in the guide, according to the scheme down below to allow SMEs to adopt good practices and to participate in the supply chain of the various products.



This level is concerned with describing the main dangers that may arise and that lead to the risk of non-compliance with the applicable regulatory or commercial requirements and which must be the subject of appropriate

controls. The dangers could be of a biological, chemical or physical nature or result from the non-control of a process that could have an impact on the commercial quality criteria (taste and color)

To do this, at each stage, the risks are analyzed according to the steps below:

- Risks concerned with the general quality of products targeted in this study: for example, bruises on produce, presence of pests and progressive diseases, inappropriate/early maturity of produce, lack of traceability etc.
- Risks to health of consumers: for example, pesticides, aflatoxin and other possible contaminations
- Risks to the producers and employees (harvesters, station staff): For example, injuries during pruning or cutting down trees during harvesting etc.

### **What must be done**

This stage is a matter of proposing prevention or control measures that can be implemented to ensure the prevention or control of the identified risks at the basic criteria level. Depending on the importance of the risk, that is to say the probability of occurrence of the danger and the severity of its impact, the prevention or control measure will be rated. The rating system has 3 levels of requirements: MAJOR requirements, MINOR Requirements and Recommendations

#### **Major Requirements**

These relate to preventive or control measures, of which non-implementation may lead, with a very high probability, to non-compliance, the impact of which may be critical, with regards to regulatory requirements in terms of sanitary, phytosanitary or commercial plans (eg. exceeding of MRLs of a plant protection product used, etc.). They also relate to preventive or control measures whose non-implementation leads to non-compliance, the impact of which can be serious on the commercial quality of the product or the health of the consumer (example: rotting of mangoes upon arrival in Europe, pesticide residue content exceeded on peanut oil, etc.). Lack of traceability from production to export is also a major requirement.

#### **Minor requirements**

They relate to preventive or control measures whose non-implementation may result in non-compliance whose impact may be more or less severe on the sanitary or commercial quality of the product.

#### **Recommendations**

They relate to control measures whose non-implementation does not have a significant detrimental impact on the sanitary, phytosanitary, or commercial quality of the product.

# 6.0 Guide of Good Practices for Fresh Mangoes- HS Codes 08045020

## 6.1 Ghana National Standards and Requirement for Fresh Mango Export

This standard (GS 546:2017) specifies the requirements for mangoes of varieties (cultivars) derived from *Mangifera indica* L. of the family Anacardiaceae, which enter national and international trade in the fresh, natural state. Mangoes for industrial processing are excluded. The following are the national requirements for exporters of fresh mangoes. This standard is in line with the Codex standard for mangoes (CODEX STAN 184-1993, Amend. 1-2005). In all classes, subject to the special provisions for each class and the tolerances allowed, the mangoes must be

- Whole, firm, ripe and fresh in appearance
- Sound; produce affected by rotting or any other deterioration rendering it unfit for consumption is excluded
- Clean, practically free from visible foreign matter
- Free from black necrotic spots or traces extending below the skin
- Free from pronounced bruising
- Practically free from damage caused by pests infesting the fresh
- Free from damage caused by low temperatures

- Free from abnormal external moisture, except condensation after removal from cold storage
- Free from any foreign smell and/or taste
- Sufficiently developed and with a satisfactory degree of ripeness

### National Standard Classification

Fresh mangoes for Export in Ghana are classified into three classes defined below;

#### “Extra” Class

Mangoes in this class must be of superior quality. They must have the typical characteristics of the variety. They must be free from defects with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

### **Class I**

Mangoes in this class must be of good quality. They must have the typical characteristics of the variety. However, the following slight defects may be allowed provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- Slight defects of shape;
- Slight skin defects due to rubbing or sunburn, cork spots due to resin exudation (including elongated marks) and healed bruises not larger than 3, 4, 5, 6, 7, 8 cm<sup>2</sup> for size groups A, B, C, D, E and F.
- Slight bruising
- Scattered rust-coloured lenticels
- Yellowing of green varieties due to direct sunlight not exceeding 40% of the fruit, excluding necrotic patches.

### **Class II**

This class includes mangoes which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in Clause 4.1.1 above.

The following defects may be allowed, provided the mangoes retain their essential characteristics as regards the quality, the keeping quality and presentation:

- Defects in shape
- Skin defects due to rubbing or sunburn, suberized stains due to resin exudation (elongated trails included) and healed bruises not exceeding 5, 6, 7, 8, 9, 10 cm<sup>2</sup> for size groups A, B, C, D, E, F respectively.
- Bruising
- Scattered rust-coloured lenticels
- A yellowing of green varieties due to exposure to direct sunlight, not exceeding 40 per cent of the surface of the fruit, excluding necrotic stains.

### **Size**

Size is determined by the weight of the fruit, in accordance with Table 2. Mango size may also be determined by fruit count.

**Table 2: Specification for Sizing for Fresh Mangoes**

<b>Size Code</b>	<b>Weight (in grams)</b>
A	100-350
B	351-550
A	551-800
D	801 – 1000
E	1001 – 1300
F	> 1300

Source: GSA

The maximum permissible difference between fruits in the same package belonging to one of the above-mentioned size groups shall be 75, 100, 125, 150, 175 and 200 g respectively. The minimum weight of mangoes must not be less than 100 g.

**Quality and Size Tolerances**

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

**Table 3: Quality and Size Tolerances for Fresh Mango**

<b>National Classification</b>	<b>Quality tolerances</b>
“Extra” Class	Ten per cent by number or weight of mangoes not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.
Class II	Ten per cent by number or weight of mangoes satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting, marked bruising or any other deterioration rendering it unfit for consumption.

For all classes, 10 per cent by number or weight of mangoes in each package are permitted to be outside (above or below) the group size range by 50 per cent of the maximum

permissible difference for the group. In the smallest size range, mangoes must not be less than 90 g as specified in Table 4:

**Table 4: Size Tolerances for Fresh Mango**

<b>Size Code</b>	<b>Normal Size Range (in grams)</b>	<b>Permissible Size Range (&lt; 10% of fruit/package exceeding the normal size range) (grams)</b>	<b>Max. Permissible Difference between fruit in each package (grams)</b>
A	100-350	90 – 385	112.5
B	351-550	315.9 – 605	150
A	551-800	495.9 – 880	187.5
D	801 – 1000	720.9 – 1100	225
E	1001 – 1300	900.9 – 1430	262.5
F	>1300	>1170.9	

Source: GSA

**Minimum Quality Requirement**

The tolerances are based on a specific number of defective fruits allowed within the total number of fruit examined. If the total number of defects exceeds the number allowed or if the absolute limit for a specific defect in any sample is exceeded then the lot would fail.

The basis of a lot passing or failing depends on the total number of defective fruits. The actual number of defective fruits would not be shown on the certificate unless specifically requested by the applicant.

**Table 5: Tolerances and Application of Tolerances**

<b>Defects allowed</b>	<b>Tolerances Allowed (per cent by number or weight of defective fruit)</b>		
	<b>Extra Class</b>	<b>Class I</b>	<b>Class II</b>
Total Tolerances	5	10	10
Sunburn	0	1	12
Damage caused by Pests	0	0	0
Healed Cracks/Scars	1	1	2
Skin defects – resin exudation	0	1	2
Decay/Black Necrotic stains	0	0	0
Bruises	1	1	2
Peduncle Length	1	1	1

Source: GSA

## Quality, Condition and Grade

Regardless of the origin of the mango, the quality requirements of the Ghana Standard for mango apply.

**Table 6: Limits of Individual Defects Per Class**

Defects	Extra Class	Class I	Class II
Fruit: • Sunburn- (bleaching & softening of the skin)	0	3.7 cm <sup>2</sup> in area	5 cm <sup>2</sup> in area
Damage caused by pests	0	0	0
• Healed Cracks/Scars - (not penetrating • Beyond Skin layer)	Smooth & not detracting in appearance.	13 mm wide x 2cm long	13 mm wide x 3 cm long
• Gummosis	Not more than 2 mm in diameter or 5 mm long	Not more than 4 mm in diameter or 10 mm long	Not more than 6 Mm diameter or 5 mm long
• Black Necrotic Stains	0	0	0
• Bruises	Very Slight	Not more than 2 mm wide by 8 mm long	Not more than 4 mm wide by 12 mm long
Peduncle:	1	1	1
Decay	0	0	0
Length	Not more than ± 1 mm variation	Not more than ± 3 mm variation	Not more than ± 3 mm variation

Source: GSA

## Production and Harvesting

Harvesting requires properly trained personnel who follow instruction carefully and are able to distinguish between fruit arising from different flowering periods, select mangoes that arising from the criteria set out by the packaging plant, handle the fruit carefully by avoiding impact, scratches and contact with any source of contamination such as dead leaf litter, soiled harvesting crates, moist and/or sandy-gravelly soil.

Carefully manage exuding sap and avoiding soiling the fruit with resin, sort fruits before dispatching them to the packaging plant, carefully place fruit in the crates. A picking bag should be used to harvest the mangoes located at the tip of the branches that are difficult to reach hand. The fruits stem should quickly be cut back to the oval base.

### **Transport of Fresh Mango**

The fruit should be transported swiftly to the packing plant, where it should be placed in the shade in batches of the same origin. The final inspection should take place a few hours after acceptance so that a number of defects that may have occurred during harvesting or transport can be detected. The accepted fruits are then weighed.

### **Packaging, Labelling and Palletization**

Mangoes must be packed in such a way as to protect the produce properly. The material used inside the package must be new, clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, in particular paper or stamps bearing trade specifications, is permitted provided that non-toxic inks or adhesives are used for printing or labelling. Mangoes must be packed in each container in accordance with the recommended International Code of Practice for the Packaging and Transport of Fresh Fruit and Vegetables (CAC/RCP 44-1995, Amend. 1-2004). Containers must meet the quality, hygiene, ventilation and resistance characteristics to ensure adequate handling, transport and preservation of the mangoes. The packages (or lots in the case of produce in bulk) must be free from all foreign matter and odours. Each package of mangoes must be legibly labelled with the following information: Name of produce, variety or type, size, number, classification, date of packing, country of origin of produce, name and

address of exporter/packer, net weight, gross weight of package, post-harvest treatment (if applicable) and batch number.

In the case of produce transported in bulk, the above information must be placed on the same side of the container, legibly and indelibly marked and visible from the outside. This information must also appear on the documents accompanying the produce.

### **Processing and Storage of Fresh Mango**

From harvesting to packing in boxes, the mangoes are always stored at an ambient temperature between 20 and 30°C. A lower temperature has a positive effect on the storage period within certain limits. Mangoes are tolerant of temperatures that are too low. Temperatures lower than 10°C often cause damage. Storage temperatures must be between 10 and 12°C. There are several techniques to quickly lower the temperature of mangoes. These include hydro-cooling, where the fruit is immersed in a cold water bath for a few seconds just before final packing into cartons. It requires an efficient system for drying the mangoes and forced ventilation, where a stream of cold air is passed through all the cartons on the pallet to quickly cool the mangoes. This technique is usually used by large packing companies. Once the pallets are cooled to the centre, they are moved to a cold room with a temperature between 10 and 12°C. The relative humidity is kept at 90% and the air is renewed to avoid an increase in CO<sub>2</sub> and ethylene concentration.

## Export of Fresh Mango

Fresh mangoes imported into the European Union (EU) must be accompanied by a phytosanitary certificate issued by the competent authorities of the exporting country. Before being imported into the EU, the products are subject to customs and phytosanitary checks at the point of entry and must be imported into the EU by an importer who is registered in the official register of an EU country. Overall, there are two standards in the EU with which exporters must be familiar. The products must meet the public standards required by the EU, and then there are the private standards, which depend on the country of destination, and the private

standards signed by the importer. Food safety is a top priority in all food sectors in the EU, which is why many importers tend to demand additional guarantees from the exporter in the form of certifications. Many buyers in this market (traders, food processors, retailers) require the implementation of a HACCP-based food safety management system, the most important of which are BRC, IFS, FSSC22000 and SQF. Different buyers may have different preferences for a particular management system, so it is necessary to ascertain which system is required by the buyer before considering certification.

## 6.2 Production and Harvesting



### What you need to know

- Chemical contamination due to over application of pesticide if the operator is poorly trained, as a result of wrong interpretation of the dosage given on the label of the pesticide container (Environmental Protection Agency Act, 1994 (Act 490); Regulation (EC) No.396/2005).
- Chemical contamination from soil, water, and the use of contaminated fertilizer (cadmium, copper, lead and mercury) and plant protection products for the control of pests and diseases (Environmental Protection Agency Act, 1994, Act 490); Regulation (EC) No.396/2005).
- There is risk of the use of unapproved agrochemicals on mango. The use of non-authorized Plant Protection Product (PPP) treatment in your farm can lead to rejection of a whole consignment of produce from Ghana by the EU (Environmental Protection Agency Act, 1994 (Act 490); Regulation (EC) No.396/2005).
- Risk of contamination with crop protection products, fertilizers and other toxic products stored with containers such as baskets, sacks, plastic and metal bowls and harvesting equipment. (good agricultural practice (GAP)).
- Employees must have access to clean sanitary facilities (Public Health Act, 2012).

- Personal and equipment hygiene for employees are important to prevent contamination of mango fruits at the time of harvest (Public Health Act, 2012).
- High risk to consumers safety about levels of pesticide residues, mycotoxins and heavy metal contamination (Standards Authority Act, 1973 (N. R. C. D 173); Regulation (EU) No.1099/2010).
- Biological contamination by Salmonella, parasites and viruses through potentially tainted surfaces, including human hands. In addition, pathogens such as Listeria monocytogenes, Bacillus cereus and Clostridium botulinum are naturally present in the soil and may also be a problem.



### Main risk

- Risk of biological contamination from diseased and insect infested fresh mango.
- Risk of mechanical injury due to inappropriate harvesting by harvesters (harvesting pre-matured fruits or mal-handling of fruits by harvesters)
- Risk of chemical contamination due to excessive spraying and chemical application
- Risk of microbiological due to pest and disease infestation of the fresh harvested mango
- Risk of chemical contamination of excessive fertilizer application
- Risk of contamination as a results of unclean harvesting equipment
- Risk of biological contamination with microorganism on fruit surfaces during post-harvest handling
- Risk of physical contamination with workers hands while loading & unloading
- Risk of physical contamination during harvest when fruit contact with soil
- Risk of physical contamination when crates used for loading or unloading is unclean
- Risk of contamination by dust from soil and air

<b>What you need to do</b>	<b>Requirement level</b>
Employ only the healthy persons as much as possible to avoid contamination during field activity.	<b>Major</b>
Choose mechanized operations over the manual ones wherever feasible. Select only few essential numbers of persons to accompany the machine	<b>Major</b>
Harvesting at optimum maturity, prompt cooling, the use of optimum temperature, and optimum storage conditions, can maintain most mango cultivars for 2-4 weeks.	<b>Major</b>
Do not use calcium carbide, a banned chemical, for ripening of fruits. Such fruits do not ripen uniformly and quality of fruits is inferior.	<b>Major</b>
Maintain safe distance of 3-4 feet during rest, taking of meals, transfer of produce at collection point, loading/unloading.	<b>Minor</b>
Fruits should be handled very carefully and should never be dropped in any manner during harvesting.	<b>Minor</b>
Care should be taken to reduce mechanical injury.	<b>Minor</b>
Harvesting should be conducted by experienced pickers in case of manual harvesting.	<b>Minor</b>
Implement pre-export heat treatment (VHT) or hot water immersion treatment (HWDT) to control the quarantine risk of fruit fly species when exporting fresh mangoes.	<b>Major</b>
Harvesting should be done carefully to avoid mechanical damage to the fruit such as abrasion of the skin and breakage of the flesh.	<b>Major</b>
All persons involved should wear masks and wash their hands with soap at appropriate intervals.	<b>Minor</b>
Remove the stem and allow desapping by placing mangoes inverted on plastic/steel wire mesh for about 30 minutes.	<b>Minor</b>
Conduct periodic training of employees on food safety	<b>Minor</b>
Provide workers with Personal Protection Equipment (PPE)	<b>Minor</b>
Ensure that producers and employees observe personal hygiene	<b>Minor</b>



## What you need to register

- Checking of last chemical application.
- Prove of the cleaning of the vehicles (car wash receipts, cleaning record)
- Training records on safety, food safety and hygiene
- Proper handling of chemicals
- All training records must be signed indicating the nature of training, the topics covered and the resource persons used.
- All PPP types used, date, quantity and rate of application, requirement and approval records, storage, formulation and disposal methods, and location of containers must be recorded.
- Keep personal records of employee on their files
- All records of fertilizer and other agrochemicals used, including the location, dates, the reason for application, type and quantity, method (foliar or soil), and the person who applied them.
- Plant population, plot identify, and variety of mango, dates
- Record of residue analysis for pesticides.
- Label all crates and bins that leave the farm for easy traceability

### 6.3 Transport of Fresh Mango



#### Main risk

- Risk of physical contamination as a result of improper handling of crates/bins when packing into trucks
- Risk of physical contamination from physical injuries during loading and loading
- High risk for physical contamination due to bad state of vehicles which can create material such as broken metal parts, glass from windows.
- Risk of contamination can also occur as a result of previous transportation of hygienically hazardous substances and other merchandise such as cements, fertilizer, agrochemicals
- Risk of contamination by insect and diseases



## What you need to know

- Excess debris in the vehicles creates a higher risk that foreign material could be embedded in the crates
- Vehicles in bad state create high risk for contamination from material such as broken metal parts, glass from windows.
- Contamination can also occur as a result of previous transportation of hygienically hazardous substances and other merchandise such as cements, fertilizer, agrochemicals
- There must be a written contract covering the state of hygiene of the vehicle
- Damage to walls of pack houses, floors, doors, ceilings should be in good condition
- Too large containers should not be used for transportation.
- Transport the fruits during the cooler part of the day, preferably at night

<b>What you need to do</b>	<b>Requirement level</b>
Have a written contract with the transporter with provisions for relevant procedures on food hygiene and safety	<b>Major</b>
Guarantee that the vehicles used for the transport of mango is free from all pests and insects nesting in equipment	<b>Major</b>
Ensure that the vehicles used are clean, dry, odour free and well maintained to prevent contamination from soil or dirt.	<b>Major</b>
Train or instruct drivers and loaders on the need to observe personal hygiene and cleanliness.	<b>Major</b>
Avoid using large containers for packaging and transporting of fresh mango	<b>Major</b>
Transport the produce during the cooler part of the day, i.e., during night.	<b>Major</b>
Do not throw the packages during loading or unloading. Maintain distance of 4-5 feet while loading and unloading.	<b>Minor</b>
Stack 4-8 containers, as per their strength, in pallets.	<b>Minor</b>

Arrange the boxes in the truck to allow proper air circulation	<b>Minor</b>
Cover the truck with tarpoline leaving proper ventilation.	
Clean all smell from previous deliveries or incompatible loads	<b>Minor</b>
Refrigeration capacity should be adequate for the quantity of fruit to be transported.	<b>Minor</b>
Pre-cooled the chamber before loading the pre-cooled fruit.	<b>Minor</b>
Labour or handlers should wear proper masks, gloves and ensure hand sanitation frequently.	<b>Minor</b>



## What you need to register

- Cleaning schedule and records
- Prove of cleaning of vehicles (washing bay receipts, cleaning records etc.)
- Details of hauler (Name, time of dispatch, time of arrivals, time of loading, date of previous vehicles cleaning, place of vehicle cleaning, vehicle registration)
- Prove of cleaning of vehicles (washing bay receipts, cleaning record etc.)
- Contract indicating the obligations of the transport and the exporter
- Training records-Safety, food safety and hygiene

## 6.4 Sorting, Grading and Packaging



### Main risk

- Risk of chemical contamination from toxic chemical residues
- Risk of chemical, physical and biological contamination as a result of damage to walls, ceilings, or floors which can let in the outside heat, cold, moisture, dirt, and insects
- Risk of chemical contamination if chlorine is used continuously corrode steel and some rubber compounds.
- Risk of biological contamination due to cross-contact with insects infesting culled fruits which may fly to good fruits, introducing pathogenic organisms, and increase losses
- Risk of contamination by metal staples used as packaging materials. All ingredients for packaging should be checked on delivery and damaged goods rejected.
- Risk of physical contamination from foreign materials including stones, wood, metal, glass, fibrous material, loose shells, dust and sand. Also, residues such as sand and dried pulp and shells should be removed to avoid further contamination.



### What you need to know

- Protect fresh mangoes from contamination by pests, or by chemical, physical or microbiological contaminants during handling (e.g. sorting, grading, washing).
- Sorting of fruits should be done depending on uniform categories (according to size, shape, color and ripening stage, and absence of defects), and to divert low-quality fruit to other uses such as pulp making.
- Packages should be well ventilated, but with a sufficient stacking strength. Ventilation
- openings are essential for adequate cooling and for heat and gas exchange. The recommended openings are to be at least 8% of the overall outer surface area of the package.
- Protect the mango fruits from mechanical damage and from contaminants, and not wvcause injury.
- Packages should be attractive, and should provide sufficient information including promotional data. The information needed to be printed on the package includes product name, source, and class. Required information includes product name, source, and class. Optimum temperatures for transport/storage (12.5 °C) and ripening (20–22 °C) should be indicated on the packaging.
- Packages should be well ventilated, but with a sufficient stacking strength. Ventilation

- openings are essential for adequate cooling and for heat and gas exchange. The
- recommended openings are to be at least 8% of the overall outer surface area of the
- package.
- Avoid pest access and harbourage
- Provide an environment which minimizes the deterioration of food (such as by temperature and humidity control)

<b>What you need to do</b>	<b>Requirement level</b>
Focus on applying good agricultural practices to reduce the presence of food contaminants	<b>Major</b>
Must comply with the maximum residue limits (MRLs) on the amounts allowed in food products: See the legislation regarding the control of pesticide residues (Regulation EC 395/2005)	<b>Major</b>
Comply with the new maximum levels of cadmium in food products (Regulation EU 488/2014)	<b>Major</b>
Sanitation of equipment can be done by spraying a sanitising agent such Sodium hypochlorite (liquid), containing 5% to 12.5% available chlorine, Calcium hypochlorite (powder), containing approximately 30% active chlorine and Use 20 to 50 ml of formalin/L water	<b>Major</b>
All persons engaged in sorting, grading and packaging should maintain hygienic conditions by Wearing disposable gowns, caps & hand gloves, not using perfumes, dangling jewellery or glass \ items and not eating, drink & smoke in the packaging area	<b>Major</b>
Provide changing facilities and PPE for loaders and sorters	<b>Major</b>
All machines should be sanitized at the entry point and at regular intervals. All transport vehicles, gunny bags or other packaging material should also be sanitized.	<b>Minor</b>
Monitor cleaning daily	<b>Minor</b>
Personnel training on food hygiene and safety	<b>Minor</b>



## What you need to register

- Labeling crates and bins
- Signed training records indicating the nature of training, the topics covered and the resource persons used.
- Cleaning and disinfection schedule for floors, walls, containers
- Record of inspection, grading and sealing
- Incoming Raw Material Inspection checks (product name, date, time, temperature, batch details etc). Provide prove of inspection checks during sorting, washing, grading and packaging.
- Hygiene procedures and training records on food hygiene
- Cleaning record
- Records of PPP type used, date, quantity and rate of application, requisition and approval records; storage, formulation and disposal methods, and location of containers.
- Request migration report for packaging
- Certificate of conformity per supply

### 6.5 Export of Fresh Mango

Prior to exporting fresh mango to the EU markets, it must abide by the general mandatory (public standards) requirements for fresh fruit and vegetables<sup>7</sup>. This is clearly stipulated in the framework regulation EC/178/2002, which laid down the general principles and requirements of EU food law<sup>8</sup>. Similarly, the exporter must observe the de facto mandatory (private standard) requirements<sup>9</sup>. Details of such preconditions are summarized below:

### Mandatory requirements (public standards)

- **Maximum residue levels (MRLs) for pesticides, Regulation (EC) No 396/2005<sup>10</sup>:** The European Union has set maximum residue levels (MRLs) for pesticides, to help prevent health and environmental risks. The Pesticide residues which are about five hundred and ten (510) in number including their maximum residue levels can be found at: (<https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/products/?event=details&p=76>).

<sup>7</sup><https://www.cbi.eu/market-information/fresh-fruit-vegetables/mangoes/market-entry>

<sup>8</sup><https://www.food.gov.uk/sites/default/files/media/document/fsogfrni2004.pdf>

<sup>9</sup><https://www.cbi.eu/market-information/fresh-fruit-vegetables/mangoes/market-entry>

<sup>10</sup><https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02005R0396-20160513&from=EN>

It should be noted however, that buyers from many EU member states like Germany, the Netherlands and Austria, employ MRLs which is even lower than those set by the EU legislation.<sup>11</sup>

- **Food contaminants, Regulation EC 1881/2006:**

Exporters must adhere to the regulation on contaminants in foodstuffs. Particularly, the exporter should ensure that lead contamination in mangoes remains below 0.10 mg/kg and cadmium below 0,050mg/kg.<sup>12</sup>

- **Microbiological criteria for fresh cut mango:**

Concerning fresh pre-cut mango (ready-to-eat), the below microbiological criteria must be followed:

- E. coli contamination must be beneath 100 cfu/g during the manufacturing process. However, having two out of five samples up to the 1000 cfu/g limit is still tolerable.
- Salmonella in cut mango must be absent throughout their shelf life, at least in five samples of 25 g<sup>13</sup>

- **Phytosanitary regulation for fruit flies in mangoes, Directive 2000/29/EC and the new Implementing Directive 2019/523.**

Owing to its high-risk fruit nature regarding fruit flies (Tephritidae), phytosanitary document (certificate) is required for exporting mangoes to Europe. Moreover, hydrothermal treatments prior to export are the standard. Per the new

European Directive, the phytosanitary certificates for mangoes must include one of the below-mentioned points. Such a requirement must be communicated by the national plant protection organisation in the country of origin in advance<sup>14</sup>:

- i. The fruits emanate in a country recognised as without Tephritidae (non-European);
- ii. The fruits emanate in an area established by the national plant protection organisation in the country of origin as being free from Tephritidae (non-European);
- iii. No signs of Tephritidae (non-European) have been observed at the place of production and in its immediate surrounding since the beginning of the last complete cycle of vegetation (this includes official inspections at least monthly during the three months prior to harvesting and on the harvested fruit);
- iv. Information on traceability must be indicated on the certificates;
- v. The product has been subjected to an effective treatment to ensure freedom from Tephritidae (non-European). The treatment data should be indicated on the certificates.

- **Quality standard:** Generally, mangoes being exported to the EU must comply with the quality standard stipulated by the UNECE standards for mangoes and

<sup>11</sup><https://www.cbi.eu/market-information/fresh-fruit-vegetables/mangoes/market-entry>

<sup>12</sup>[https://webgate.ec.europa.eu/reqs/public/v1/requirement/aux/eu/eu\\_heafocn\\_annex\\_r1881\\_2006.pdf/](https://webgate.ec.europa.eu/reqs/public/v1/requirement/aux/eu/eu_heafocn_annex_r1881_2006.pdf/)

<sup>13</sup><https://www.cbi.eu/market-information/fresh-fruit-vegetables/mangoes/market-entry>

<sup>14</sup>ibid

the Codex Alimentarius Standard for mangoes ('Food code' of WHO and FAO). Particularly, the standard for mangoes depends on documents **ECE/TRADE/C/WP.7/GE.1/2010/2** and **ECE/TRADE/C/WP.7/2012/8**. It is expected of mangoes being exported to Europe to be exclusively

class I. Hence, such mangoes must be of good quality and meet permissible tolerance levels. The quality standard of the mango should be reflected in the appearance of the fruit, the quality, the keeping and presentation in packaging<sup>15</sup>

**Table 7: Quality Requirements and Permissible Tolerances for Fresh Class I Mangoes**

<b>General quality requirements (all classes)</b>
1. Intact;
2. sound, not affected by rotting or deterioration;
3. clean, practically free of any visible foreign matter;
4. fresh in appearance;
5. practically free from pests and damage caused by pests;
6. free from black stains or trails which extend under the skin;
7. free from marked bruising;
8. free from damage caused by low temperature;
9. free from abnormal external moisture;
10. free from any foreign smell or taste;
11. able to withstand transport and handling.
<b>Additional requirements and permissible tolerances for Class I mangoes</b>
1. a slight defect in shape;
2. slight skin defects due to rubbing or sunburn and suberised stains due to resin;
3. exudation (elongated trails included) not exceeding 3, 4, 5, 6 cm <sup>2</sup> for size groups A, B, C, D respectively;
4. slight bruising;
5. scattered rust-coloured lenticels;
6. yellowing of green varieties due to exposure to direct sunlight not exceeding 40% of the surface of the fruit, excluding necrotic stains;
7. a tolerance of 10% is allowed for fruit that meets Class II standards;
8. a tolerance of 10%, by number or weight, of mangoes not meeting the sizing requirements is allowed.

Source : <https://www.cbi.eu/market-information/fresh-fruit-vegetables/mangoes/market-entry>

<sup>15</sup>[https://unece.org/fileadmin/DAM/trade/agr/standard/standard/fresh/FFV-Std/English/45\\_Mangoes.pdf](https://unece.org/fileadmin/DAM/trade/agr/standard/standard/fresh/FFV-Std/English/45_Mangoes.pdf)

The classes of mangoes described in the table above have been depicted in the Figure 1.

**Figure 1: Mango with Quality ‘Extra’ Class, Class I and Class II (from left to right)**



- Provision concerning sizing: The lowest weight of mangoes to be exported to the EU should be 100g. To ensure sameness in size, the under-mentioned provisions as indicated in Table 8 must be adhered to<sup>16</sup>

**Table 8: Size Codes for Mangoes**

Size code	Weight in grams	Maximum permissible difference between fruit within the package in grams
A	100-350	75
B	351-550	100
C	551-800	125
D	>800	150

Source: UNECE standards for mangoes

<sup>16</sup>ibid

- **Provision concerning tolerance:**

Exporters should consider the required tolerance in terms of quality and size. At all marketing stages, tolerances concerning quality and size shall be permitted in each lot for produce not meeting the requirements of the class stipulated earlier. For **extra class**, a combined tolerance of 5 per cent, by number or weight, of mangoes not meeting the requirements of the class but satisfying those of Class I is permitted. Within this tolerance not more than 0.5 per cent in total may comprise produce satisfying the requirements of Class II quality. Concerning class, I, an overall tolerance of 10 per cent, by number or weight, of mangoes not satisfying the requirements of the class but meeting those of Class II is allowed. Within this tolerance not exceeding 1 per cent in total may consist of produce satisfying neither the requirements of Class II quality nor the minimum requirements, or of produce affected by decay. Regarding class II, a total tolerance of 10 per cent, by number or weight, of mangoes satisfying neither the requirements of the class nor the minimum requirements is accepted. Within this tolerance, not more than 2 per cent in total may consist of produce affected by decay.<sup>17</sup> Moreover, a total tolerance of 10 per cent, by number or weight, of mangoes not satisfying the requirements as regards sizing is accepted for the size tolerances for all classes<sup>18</sup>.

- **Provisions concerning uniformity:**

Prior to exporting, the contents of each package must be uniform and contain only mangoes of the same origin, variety, quality and size. The visible part of the contents of the package must be representative of the entire contents<sup>19</sup>

- **Packaging:** Packing size 7 or 8, i.e. 7 to 8 mangoes per 4 kg box is preferred for the common mango varieties that are being exported to countries like the Netherlands, the United Kingdom (formerly part of the EU) and France. To export to Germany, size 6/7 is common, as big mangoes are popular. Mostly, smaller sizes are sold individually in Scandinavia countries. However, Spain is more flexible with sizes and can handle both large and small sizes<sup>20</sup>

To ensure a clean and quality packaging, the materials used inside the package must be clean and of a quality. This will also help to avoid inflicting any external or internal damage to the produce. Using paper or stamps bearing trade specifications, is permitted, if only the printing or labelling has been done with non-toxic ink or glue. Stickers individually affixed to the produce shall be such that, when removed, they neither leave visible traces of glue nor lead to skin defects. Information lasered on single fruit should not lead to flesh or skin defects and packages must be free of all foreign matter.<sup>21</sup>

- Provisions regarding marking: The packaged mango to be exported to the EU must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked and visible from outside.<sup>22</sup> Particularly, the package should contain the following:

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<sup>17</sup>ibid

<sup>18</sup>ibid

<sup>19</sup>ibid

<sup>20</sup><https://www.cbi.eu/market-information/fresh-fruit-vegetables/mangoes/market-entry>

<sup>21</sup>ibid

<sup>22</sup>ibid

## A. Identification

Packer and/or dispatcher/exporter:

- Name and physical address (e.g. street/city/region/postal code and, if different from the country of origin, the country) or a code mark officially recognized by the national authority if the country applying such a system is listed in the UNECE database.

## B. Nature of the produce

- Mangoes if the contents are not visible from the outside
- Name of the variety.

## C. Origin of the produce

- Country of origin and, optionally, district where grown, or national, regional or local place name

## D. Commercial specifications

- Class
- Size expressed by at least one of the following:
  - Minimum and maximum weight
  - Size code
  - Number of fruit

## E. Official Control mark

- This is optional

De facto mandatory requirements (private standards)

• **Variety:** The standard variety for majority of buyers in Europe is the fibreless mango. In this regard, Kent mangoes are largely approved, followed by Keitt mangoes. It should be noted however that other varieties such as Palmer and Tommy Atkins are appreciated in Europe although not as high as the previously mentioned ones. The acceptance of the latter is due to the fact that the former varieties cannot cover the full demand for mangoes on the EU market as they are seasonal.<sup>23</sup>

• **Maturity:** Mangoes being exported to the EU market must be matured enough to enable them to continue ripening process. However, exporters must check with the buyer on the required maturity level including brix (sugar content) and dry matter (normally between 14% and 16,5%). It should be emphasized that the said requirement can vary depending on the mango variety, time to market and buyer preference.<sup>24</sup> Follow this link ([https://www.mango.org/wpcontent/uploads/2017/10/Mango\\_Maturity\\_And\\_Ripeness\\_Guide.pdf](https://www.mango.org/wpcontent/uploads/2017/10/Mango_Maturity_And_Ripeness_Guide.pdf)) for the mango maturity and ripeness guide.

• **Certification:** Universal certifications for mangoes include GlobalG.A.P for good agricultural practices (GAP) and brand reputation compliance global standards (BRCGS), international food safety (IFS) or related hazard analysis and critical control point (HACCP)-based food safety management systems for packing and

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<sup>23</sup>ibid

<sup>24</sup>ibid

processing facilities. Management systems accepted by the Global Food Safety Initiative (GFSI) are most recommended. GlobalG.A.P certification as a basic requirement is especially true if an exporter wants to end up in large retail chains.<sup>25</sup>

- **Sustainability and social compliance:**

To ensure the well-being of the production sources, it is imperative for mango producers and exporters to comply with sustainable and social requirements including environmental requirements. Such requirements are a growing concern of many buyers and retailers in Europe. This can best be done through conforming to social and environmental standards like Sedex Members Ethical Trade Audit (SMETA) and GlobalG.A.P. These requirements are not static but rather dynamic as new ones are expected to be added on in the near future. For example, the Sustainable Trade Initiative for Fruit and Vegetables (SIFAV) which is a private covenant between European importers and retailers,

is developing new goals towards 2025 that comprise a fair living wage and the reduction of carbon point.<sup>26</sup>

### Requirements for Niche Markets

- Small but growing niche markets in Europe require organic certification from exporters. To market organic products in Europe, exporters must employ organic production methods according to European legislation and apply for an organic certificate with an accredited certifier. Organic certification has become necessary prompting a new legislation, **Regulation (EU) 2018/848** which was expected to come into in January 2021. In this regard, inspection of organic products will become stringent to avert fraud. This requirement must be complied with by both exporters and producers in the EU. It should also be noted that a new technology for labelling organic mangoes is laser since this prevents the use of plastic packaging and stickers to mark organic mangoes<sup>27</sup>

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<sup>25</sup>ibid

<sup>26</sup>ibid

<sup>27</sup>ibid



## Main risk

- Must comply with the maximum residue limits (MRLs) on the amounts allowed in food products: See the legislation regarding the control of pesticide residues (Regulation EC 395/2005)
- Comply with the new maximum levels of cadmium in food products (Regulation EU 488/2014).

What you need to do	Requirement level
Focus on applying good agricultural practices to reduce the presence of food contaminants	<b>Major</b>
Must comply with the maximum residue limits (MRLs) on the amounts allowed in food products: See the legislation regarding the control of pesticide residues (Regulation EC 395/2005)	<b>Major</b>
Comply with the new maximum levels of cadmium in food products (Regulation EU 488/2014)	<b>Major</b>
Provide an up-to date list of pesticides allowed for the treating shed, gratings and store produce.	<b>Major</b>
Record the batch being shipped with all necessary traceability record	<b>Major</b>
Investigate and ensure that monitoring equipment for control of critical parameters such as humidity, temperature and ventilation are functional	<b>Major</b>
Carry out pre-shipment analysis of physical, chemical, pesticide residue level (MRL). Ensure absence of insect, microbiological organisms, heavy metals and mycotoxins and issue release or reject results	<b>Minor</b>



## What you need to register

- Record of storage period and pre-shipment period
- Record of cargo history of ship and cleaning programme and verification of cleanliness
- Record of analytical results on the consignment shipped
- Record storage condition in the ship's hold loaded with the fresh mango
- Bill of lading, EU certificate, phytosanitary certificate, and other relevant document of origin.
- Inspection of ship and report of inspection
- Number of hold or space available, quantity loaded per hold, total load bags x unit of weight
- Details of fumigation of ship's hold, date of PPP applied and approval status

**Table 9: Summary of Certification Procedure for Fresh Cut Mango**

No	Certification/ Documents and Relevant Authorities/ Institutions	Procedures/Other requirements	Fees Payable
01	GLOBALGAP (Afrise: certification body)	After complying with all the requirements (food safety and traceability, workers health safety and welfare, ICM, IPC, QMS, HACCP)	Farmers estimated GHc 2,000 every year. However, fees are charged depending on the number of members in the association.
02	FAIRTRADE (Floset: certification body)	After inspecting and ensuring that the product was grown and harvested with care by farmers and workers	GHc 500.00 per ton
03	Ghana Standards Authority (GSA)	Pesticide analysis for fresh mango	GHc 400.00
4	Phytosanitary certificate Plant Protection and Regulatory Service Division (PPRSD)	After the exporter has met all requirement and the product is inspected	Max GHc 200
5	Forwarding/Shipping documents	Bill of Lading, COO etc.	GHc 400 per ton

Source: Information obtained from sampled companies

# 7.0 Guide of Good Practices for Processed Dried Mango for Export- Hs Codes 08045030

A mango that has been subjected to natural or artificial drying to remove a major part of the water content. Dried matured mangoes are naturally and / or artificially dried ripe fruits of *Mangifera indica* (L.) that have been cut into slices or diced and have a colour, odour and taste characteristic of the variety. In order to gain a swift and smooth entry into the European market, the quality of dried mangoes is required to be superb. This can be achieved largely by the use of modern drying technologies. Similarly, food safety certification together with dependable and frequent laboratory test assist to establish trust with the European buyers. Additionally, sustainable and ethically responsible production offers further advantages for emerging suppliers. Summarily, exporters need to abide by two main requirements termed as mandatory requirements (public standards) and de facto mandatory requirements (private standards) as have been discussed below:

## 7.1 Mandatory Requirements (Public Standards)

- **Harmful contaminants:** Dried mango being exported to the EU must follow maximum levels set for certain contaminants in food products such as pesticide residues, microbiological organisms, preservatives and food additives. The case of pesticide residue limit and microbiological organisms for dried mango is similar to that of fresh mango which have been explained in the earlier section.
- **Product composition:** Exporters should note that EU authorities can reject dried mangoes if they have undeclared, unauthorized or too high levels of materials. In this regard, the legislation, Regulation **(EC) No 1333/2008**, must be respected<sup>28</sup>. Particularly, there is specific additives (like colours, thickeners) and flavourings, that lists what E- numbers and substances are allowed to be used. Additives that are permitted are listed in

<sup>28</sup><https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1478597149803&uri=CELEX:02008R1333-20160525>

Annex II to the Food Additives Regulation. More so, annexes of the regulation list food enzymes, flavourings and colorants. Traditionally, dried mangoes are processed with a sulphites treatment (such as sodium metabisulphite). This is used as an antioxidant to prolong the shelf life and retaining the intense bright yellow colour of dried mangoes. Also, potato starch is employed as an additive which enhances the drying process and retain dried mangoes soft. Sugar or concentrated fruit juice is also used in production of dried mango infused with sweeteners. However, two problems that are largely identified with dried mango include too high or undeclared presence of preservatives (mostly sulphites) and too high or undeclared content of food colours. Classic examples are colours E110 - Sunset Yellow used to artificially improve the colour of dried mangoes.<sup>29</sup>

- **Hygiene of foodstuffs**, Regulation (EC) No 852/2004: This demands that producers and exporters comply with the hygienic standards subjected to the hazard analysis and critical control points (HACCP) obligatory for products above elementary production.<sup>30</sup>

## 7.2 De Facto Mandatory Requirements (Private Standards)

- **Quality requirements:** Prior to exporting, dried mango should be of good quality. This is determined by the permissible percentage

of defective produce, by number or by weight. Although the EU has not defined the specific quality standards for dried mango, the common standard employed regarding the same is published by the United Nations Economic Commission for Europe (UNECE) which is based on document **(ECE/TRADE/C/WP.7/2013/27)**. Primarily, the quality requirements for dried mango as stipulated by the industry are as follows:<sup>31</sup>

- Free from: Fruit free from insects, mould, damages and blemishes.
- Moisture content: for natural dried mangoes, the maximum moisture content is 15%. For dried mangoes treated with preservatives, the maximum moisture content is 20%.
- Quality classification: depending on the presence of defects, dried mangoes can be classified in 3 classes: Extra, Class I and Class II. This classification determines the percentage of defective products by number or weight.
- Styles: dried mangoes may be presented in one of the following styles: Halves, Sliced and Pieces.
- Sizing: Is optional, but when sized, size is determined by diameter of the widest part.
- Softness: softness is not officially defined in the UNECE standard, but it is an important quality characteristic. Dried mangoes in the current offer on the European market are often less soft compared to most other dried fruit. Although the softness of the

<sup>29</sup><https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/dried-mango/market-entry>

<sup>30</sup>[https://www.fsai.ie/uploadedFiles/Consol\\_Reg852\\_2004.pdf](https://www.fsai.ie/uploadedFiles/Consol_Reg852_2004.pdf)

<sup>31</sup><https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/dried-mango/market-entry>

products increased over the years, many consumers find it more difficult to chew dried mangoes, especially organically produced dried mangoes. Therefore, the improvement of product quality in terms of softness, taste and colour will be one of the important competitive advantages for emerging suppliers.

- **Food safety certification:** Food certification is not mandatory under the EU legislation, however, it has become a requisite for virtually all European food importers. Hence, most European buyers will demand for the Global Food Safety Initiative (GFSI) recognized certification. Concerning dried mango, the most approved certification programmes accepted by GFSI include the following:
  - International Featured Standards (IFS)
  - British Retail Consortium Global Standards (BRCGS)
  - Food Safety System Certification (FSSC 22000)
  - It should however be noted that, the list provided above is not exhaustive and food certification systems are constantly developing. Also majority of food safety certification programmes are complementary with ISO standards like ISO 22000
- **Corporate social responsibility:** Adherence to corporate social responsibility has become a strong requirement by many importing companies in the EU. The said requirements differ from one company to another. Some companies will demand adherence to their code of conduct,

sticking to common standards like Supplier Ethical Data Exchange (SEDEX), Ethical Trading Initiative (ETI) or the Business Social Compliance Initiative code of conduct (BSCI).<sup>32</sup> It is therefore imperative for dried mango exporters to check with the importing company regarding the specific requirement.

### Requirements for niche markets

- **Organic certification:** Dried mango that have been organically produced must possess an electronic certificate of inspection (eCOI) before they can be exported to European market. Thus, growing and processing facilities must be audited by an accredited certifier before an exporter is permitted to place the European Union's organic logo on the product. The electronic certificate of inspection has to be generated via Trade Control and Expert System (TRACES).<sup>33</sup>
- **Ethnic certification:** Religious demands impose certain requirements on dried mango exporters. For example, the Islamic dietary laws (Halal) and the Jewish dietary laws (Kosher) impose specific dietary restriction. Hence, those who desire to target Jewish or Islamic ethnic niche markets should consider implementing Halal or Kosher certification schemes.<sup>34</sup>
- **Sustainability certification:** Fair Trade International has set up standard for prepared and preserved fruit and vegetables for small-scale producer organisations. Amid other criteria, the standard explains a Fairtrade Minimum Price for fresh mango, aimed at processing for many regions.<sup>35</sup>

<sup>32</sup>ibid

<sup>33</sup>ibid

<sup>34</sup>ibid

<sup>35</sup>ibid

### 7.3 The Ghana Quality Requirement for Processed Dried Mango

Dried mango shall be free from living insects, mites, moulds and bacteria and shall be practically free from dead insect, insect fragments and rodent contamination visible

to the naked eye (corrected, if necessary, for abnormal vision) or with such magnification as may be necessary in any particular case and when tested by the appropriate methods of test, shall comply with the quality characteristics specified as follows;

**Table 10: Quality Characteristics for Dried Mango**

Quality characteristics	Permissible limits
Moisture content	12 – 20 % (m/m)
Residual sulphur content	0.1 – 0.20 % (m/m)
Ash insoluble	1.0 g/kg

Source: GSA

#### Microbiological Requirements

When tested by appropriate methods. Dried mango shall not contain any substances originating from micro-organisms in amounts

which may present a health hazard. Dried mango shall conform to the mycotoxin limits in Table 11.

**Table 11: Mycotoxin Limits for Dried Mango**

Mycotoxins	Maximum levels (µg/kg)
Aflatoxins B1	2
Total aflatoxins B1, B2, G1, G2	4

Source: GSA

## Classes of Dried Mangoes

### Extra class

Dried mangoes in this class shall be of superior quality. They shall be characteristic of the variety and/or commercial type. They shall have uniform colour. They shall be practically free from defects, provided that these do not affect the general appearance of the product, the quality, or its presentation in the package. Dried mangoes in this class shall not exceed the allowable percentages for the various defects given in Table 12.

### Class I

Dried mangoes in this class shall be of good quality. They shall be characteristic of the variety and /or commercial type. They shall satisfy the requirements given in Table 12.

The following slight defects are allowed, provided that these do not affect the general appearance of the product, quality, the keeping quality, or presentation in the package: (i) slight defects in shape and (ii) slight defects in colour:

### Class II

This class includes dried mangoes which do not qualify for inclusion in the higher classes but which satisfy the requirements specified in Table 12. The following defects are allowed, provided that the dried mangoes retain their essential characteristics, general appearance, quality and presentation:

**Table 12: Classification of Dried Mangoes**

Class	Pestinfested dried mango* %(m/m) max.	Spoiled dried mango %(m/m) max.	Broken dried mango pieces %(m/m) max.	Colour	Deviation from main colour %(m/m) max.	Extraneous matter %(m/m) max.	Residual Sulphur Dioxide content % (m/m)
Extra	nil	nil	5	Light and characteristic of the variety	2	0.5	0.1
Class I	1	2	10	Light and characteristic of the variety, with slight browning of cut edges.	5	1.0	0.15
Class II	2	3	15	Light brown	10	1.5	0.20

Source: GSA

## 7.4 Packaging and Labelling Requirements for Dried Mango

Dried mango shall be packed in clean, dry food grade containers. If wooden boxes are used, they shall be lined with a suitable paper. For direct consumption, small consumer packages may be used. The container shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the dried mango. Packaging material shall be free of odours.

- Exporters should know that there is no common rule for the packaging size of exported dried mango. However, the most acceptable type of export packaging is plastic bags or plastic liners placed in carton boxes of different sizes. Ideally, the following instructions must be followed:<sup>36</sup>
  - Packed products should be transported on EURO pallets (80x120 cm) and further transported in containers.
  - Twenty-foot containers may contain 1,600 cartons of 12.5kg or 2,000 cartons of 10kg.
  - The use of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue
  - Packaging is often formed in a square shape in order to effectively use the pallet and container space
  - Dimensions can be different but compatible with standard pallet and container dimensions

- Dried mango does not require a special temperature during transport or storage. However, extremely low or high temperatures should be avoided. At high storage temperatures, fruit sugar particles may form on the surface of the product, hardening and discolouring them.

- Dried mango being exported to the EU market need to follow the established labeling requirements. The name of the product must be indicated on the label. Additional trade names concerning form, can be used together with ‘dried mango’, for example ‘dried mango halves. Also, it is common for export package labels to include the name of the variety, crop year and type of drying (such as “sun dried” or “tunnel dried”). More so, information about bulk packaging needs to be indicated either on the packaging or in accompanying document. Similarly, bulk package labels must include the following information:<sup>37</sup>
  - Name of the product;
  - Lot identification;
  - Name and address of the manufacturer, packer, distributor or importer; Storage instructions
  - Lot identification and the name and address of the manufacturer, packer, distributor or importer may be replaced by an identification mark.

<sup>36</sup>ibid

<sup>37</sup><https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/dried-mango/market-entry>

Exporters considering the retail market should consider the following: Retail packaging, product labelling must adhere to the European Union Regulation on the provision of food information to consumers (**REGULATION (EU) No 1169/2011**).<sup>38</sup> Such regulation describes nutrition labelling, origin labelling, allergen labelling and clear legibility (minimum font size for mandatory information). Although, dried mango is not included in the regulation's allergen list, sulphites must be marked as potential allergens if they are used as preservatives. Furthermore, starting April 15th 2020, all food in retail packs in Europe must be labelled with the indication of origin. For example, if dried mangoes are packed in the Netherlands, the package still needs to indicate the origin of the fruit. This can be done by indicating a country (for example, Ghana), or by indicating "non-EU" or by declaring "dried mango does not originate from the Netherlands"<sup>39</sup>. The product shall be labelled according to the provisions of GS CODEX STAN 1:2005; General Standard for the Labelling of Prepackaged Foods.

## 7.5 Manufacturing Process of Dried Mango for Export

### 7.5.1 Fruit Washing

All raw materials entering the factory must be washed and sanitised before processing. The washing of the fruits reduces risk of contamination of the product and makes processing faster and easier. Rinse the tank

before filling with fresh water. Fill the tank to the necessary level with clean pipe water. Water is to be changed after each fruit type or after washing 15 tons of fruits. Fruits should remain in the bath for a minimum duration of 3 minutes in order to ensure proper sanitation. Fruits are placed in the washing tank and then slowly moved to conveyor which takes the fruits to the intake area. Washing of fruits is done in fruit washing room and intake area and supervised by operations manager who ensures that fruit washing records are kept.

### 7.5.2 Peeling and Cutting

Peeling and cutting of dried mango is done manually and with the help of the mango cutting conveyor. During the peeling and cutting it is important that all hygiene requirements are observed. It is key to remove all fruit peel residues in order to enable quick packing. Fruit pieces should also be cut to the necessary dimension to achieve the correct size for the dry product. Peeling and cutting follows the following procedures: (i) Peel completely to remove all skin and blemishes (ii) Cut in four pieces (two cheeks and two small slices) (iii) Put the small slices in a separate tray (iv) Put the cheeks on the mango cutting conveyor in longitudinal direction. The instruments for this process include cutting tables and gravity rollers, mango cutting conveyor, fruit crates and processing crates, chopping boards and knives, peelers and decorers. Peeling and cutting is carried out in the main processing room and supervised by operations manager.

<sup>38</sup><https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R1169&from=EN>

<sup>39</sup><https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/dried-mango/market-entry>

### 7.5.3 Drying

The dryers are stuffed with approximately 2,000 kg of cut fruits per cycle. Out of this weight we get about 300 kg of dry product after an 20 h drying cycle. This means that the dryer has to evaporate 1,700 kg of water out of the fruits. The high evaporation rate can only be achieved when the dryer settings are chosen correctly.

When the dryer has reached the 4th phase it is necessary to turn all the trolley around by 180°. This is to ensure that both sides of the trolleys will dry at the same time. From the beginning of the 5th drying stage of the drying cycle it is necessary to start checking the fruits for their dryness. This is done by pressing the fruit pieces between the fingers. If the fingers can be squeezed and the fingers can still be rubbed against each other, then the fruit is not yet dry enough. When the friction inside the fruit becomes greater and the rubbing of the squeezed fingers is no more possible fruits are ready. A check can also be made by analysing the moisture and the water activity. For fruits the moisture content should be between 14 and 16 % but the water activity should always be under 0.65. Depending on the dryness of the fruits, there may be the need to extend the duration of the last phase. This can be done by resetting the dryer and by setting the time in the first four phases of the cycle to 0. Then the duration of the last cycle can be adjusted as required. In most cases it may also be necessary to sort fruits. In this case dry fruits should be removed and the moist part should be put back into the dryer for redrying. Keep daily extraction form.

### 7.5.4 Removing and Sorting

After the drying, the dry fruits have to be removed from the drying trays and packed for temporal storage before packing. It is important to ensure hygienic conditions and to avoid cross contamination of the product. It is also key that traceability can be maintained. Whilst removing a basic check for moisture content and quality issues are carried. There need to be a feedback to drying and peeling and cutting from the removing team in case of issues.

Before removing, the dry fruits have to be checked manually and visually for their dryness. During the removing, wet pieces or pieces with discolouration have to be removed. It is normal that at the ideal stage for removing, there would still be some pieces which are not completely dried, and which have to be sent back to the dryer for re-drying. The removed fruits have to be packed and weighed in bins or plastic bags and sealed. The bags have to be labelled with removing date, processing code and fruit variety. Each bag is to be recorded on the removing record and redrying record sheet. Whilst the standard and stock of all fruits are recorded on the standard and stock control record sheet. Prior to mango removing, the sieving machine have to be cleaned and vacuumed and disinfected with flavonin. Removing personnel must wash and sanitize their hands before and after putting on gloves.

## 7.5.5 Packaging

The packing covers the sorting and trimming of the semi-finished product. After this, the fruits are starched, weighed and sealed into the bags. The sealing is followed by metal detection, boxing and palletizing. The packing is the last stage in which the product can be inspected. Therefore, it is key to pack only fruits that meet the specifications and to avoid any form of contamination (physical, chemical, microbiological). Packaging of dried mangoes involves the following processes;

### **(i) Sorting**

The products have to be sorted according to the specification. All foreign matter like peel or other residues have to be removed. Sorting also to be done according to colour. Most products have to be sorted and grouped according to colours. Products which are outside the acceptable colour range have to be removed. Also, small pieces which are outside the size specifications have to be removed.

### **(ii) Starching**

Depending on customer requirement starch or another free flow agent may have to be applied. The starch is to be measured according to specifications. The usual application rate is 10 g/2.5kg. The product to be treated is to be measured into the application container. The starch is strained and heated for 15 minutes prior to its usage. Then the starch has to be measured. This can be done with a standardized spoon. The starch is distributed

with a strainer on the product and thoroughly mixed. It is key to distribute the starch very well in order not to create the impression that mould is on the product

### **(iii) Weighing**

After the application of the starch the product is weighed into the bulk bags. A one percent margin has to be added to make room for weighing mistakes (eg for 2.5 kg bags 25 g is to be added). The bag is then sealed, metal detected and boxed.

### **(iv) Labelling**

Labels are part of the products that end up at the customers doorstep. Therefore, label information is to be sourced from the product specification label reference. Approval must be sorted for all labels before use. Onsite approvers of product labels are the operations manager, quality manager and the lab supervisor. Where provenance and identity claims are made on products such as organic and Fairtrade, labels must reflect such claims based on such standards.

### **(v) Boxing and Palletizing**

The packed bags are to be arranged in the boxes one on top of the other or horizontally. The boxes are then sealed with cello tape and labelled with the approved label. The boxes are then palletized by stacking them regularly on the pallet and putting corners and strapping tape. The pallets are then labelled.

### 7.5.6 Storage and Transport

The dried mango products should be stored and transported under such conditions as to prevent the contamination or development of pathogenic or toxicogenic microorganisms and protect against rodent and insect infestation and deterioration of the product or of the container. (a) The product should be stored under suitable conditions of time, temperature, humidity, and atmosphere, to prevent significant deterioration. (b) Where dried fruits are stored under conditions in which they may become infested by insects and mites, appropriate methods of protection should be used regularly. Dried fruits should be stored in such a manner, that they can be fumigated in situ or so stored that they can be removed elsewhere for fumigation in special facilities (e.g. fumigation chambers, steel barges, etc.). Cold storage can be used, either to prevent infestation in localities where

insects are likely to be present in ordinary storage or to prevent insects damaging the fruit. The product shall be stored in dark areas at low temperatures and relative humidity in accordance with CAC/RCP 3-1969 Recommended International Code of Hygienic Practice for Dried Fruits.

### 7.5.7 Export of Dried Mangoes

All products leaving the export room has to be agreed to by the Administration Manager/ MD, after the production have completed the volume of an order and quality control have verified same as properly produced and packed according to such an order. Prior to the loading, some checks and documentations are to be made on the on the shipping readied products.

**Table 13: Export Proceeds and Quality Requirement for Dried Mango Exports**

Boxes	The stability of the boxes with the product is very crucial and in situations that boxes are found not to be stable and could not endure shipping they should be changed without hesitation
Labels	Labels on boxes are verified as per order and spec. Batch codes/traceability are to be recorded in tally manner on the Pallet Export Sheet as per ULD loaded on.
Unit Load Devices (ULDs)	ULDs are the foreign supports that are employed to make the export/ dispatched products secured and safe until its arrival at the preferred destination. ULDs consist of the wooden pallets, strapping tapes and pins shrink wrappers
Truck/Container Check list	The truck or container is valuable components in the dispatch of products from the company. Checks are to be conducted against the container/truck checklist sheet.

Customs landing Account	The customs landing account is a regulatory document that secures the products in road transit and at the ports of loading from interference from government and other related agencies. All exports are therefore very important to be covered by thus.
Export waybills	Export waybills permit products to go out of the company premises. The waybill for export products are to be issued and signed by the proper officer from the administration department or the managing director (MD). Waybills are to be issued in duplicates, security endorses and stamps before product exit, driver carries original along and duplicate stays in security files for easy reference.

Source: HPW Fresh & Dry- Ghana, 2021



## Main risk

- Risk of biological contamination by low temperatures making the survival of pathogenic microbes possible
- Presence high numbers of microbial load due to prolong use of water without changing on time. Also, contamination coming from water used during washing of fruits.
- chemical residue on fruits with broken skin
- Risk of contamination due to workers hands and sweat whilst handling fruit
- Risk of biological contamination by germ multiplication in circulating weighing crates
- Physical contamination through broken peeling blade edge and knife and loose torn gloves pieces
- Risk of chemical contamination as a results of ethylene residues due to excessive use
- Spoilage of fruits may occur due to direct sunlight, rain water, unclean crates used for sorting, infected, blemished, over ripened fruits, delayed in sorting, workers handling microbial growth will be high leads to Spoilage of fruits
- Risk of physical contamination as a result of f injuries and bruises of mango fruits from the field
- Risk of microbiological contamination due to pest and disease infestation such as Bacterial Black Spots (BBS), anthracnose, stone weevil and stem end rot which may lead to poor quality of product
- Risk of biological contamination due to inappropriate maturity/low maturity/low sugar content

- Risk of chemical contamination due improper application of fertilizers affecting which may affect the raw material quality
- Risk of chemical contamination due to high pesticides specifically those banned by EU
- Risk of chemical contamination by chlorates and perchlorate levels
- Risk of chemical contamination by mineral oil hydrocarbons from lubricants used on machinery
- Risk of biological contamination by mycotoxins including aflatoxins and ochratoxins



### What you need to know

- Sort mango fruits to remove material which should not be used for human consumption
- Contamination can also occur as a result of previous transportation of hygienically hazardous substances and other merchandise such as cements, fertilizer, agrochemicals
- Dispose of any rejected material in a hygienic manner
- Care should be taken to prevent deterioration and spoilage through appropriate measures which may include controlling temperature, humidity, and/or other controls.
- There must be a written contract covering the state of hygiene of the vehicle
- Effective measures should be taken to protect against the entrance into the premises and the harbourage on the premises of insects, rodents, birds or other vermin.
- Vegetative and spore forming microbes can contaminate dried mango during storage
- Physical contamination from damage of pack due to mishandling
- Avoid pest access and harbourage to warehouse of dried mango
- Provide an environment which minimizes the deterioration of dried mango (such as by temperature and humidity control).

<b>What you need to do</b>	<b>Requirement level</b>
Have a written contract with the transporter with provisions for relevant procedures on food hygiene and safety	<b>Major</b>
Ensure that the vehicle is clean, dry, odour free and well maintained to prevent contamination	<b>Major</b>
Ensure that all employee observe proper entrance procedure	<b>Major</b>
Provide evidence that the vehicles used in the transport of dried mango has been cleaned	<b>Minor</b>
Train or instruct drivers and loaders on the need to observe personal hygiene and cleanliness.	<b>Minor</b>
All employees are trained in personal hygiene	<b>Major</b>



### **What you need to register**

- Packing record
- Record of reception checks
- Training records-safety, food safety, hygiene
- Proper handling of chemicals
- Pallets Export Sheets are file in the order folder for easy access to traceability
- Shipping documents could be filed separately when a consolidated shipment (shipping different orders together on a single ship to minimise handle and cost) is made.
- Input details on Pallet Export Sheet in the production report file for easy research access.
- Record of last chemical application.
- Provide proof of Supplier assessment report
- Record of Residue analysis for pesticides
- Removing and redrying record sheet
- Standard and stock control record sheet
- Daily Extraction Form
- Fruit washing records

**Table 14: Summary of Certification Procedure for Dried Cut Mango**

<b>No</b>	<b>Certification/ Documents &amp; Involved Institutions/ Authorities</b>	<b>Procedures/Other requirements</b>	<b>Payable Fees</b>
1.	Ghana Standards Authority (GSA)	Pesticide analysis: Dried mango (Quarterly)	GHc 400.00
2.	Ghana Standards Authority (GSA)	Aflatoxins (Quarterly)	GHc 250
3.	Food and drugs authority- Ghana	Facility and product registration	GHc 600 for 1 year for 1 Product, GHc 900 for 3 years
4.	Ghana Standards Authority (GSA)	Product microbiology	GHc 420
5.	Phytosanitary certificate	For exports (PPRSD)	Max GHc 200
6.	Forwarding/Shipping documents	Bill of Lading, COO etc.	GHc 4000

*Source: Information obtained from sampled companies*

## 8.0 Conclusion

The manual identifies the good practices of safety and hygiene procedures of mango products (fresh whole mango and dried mango) for export to European Union. The study is done at all stages of the mango value chain/product marketing circuit (production, harvesting, transport, cutting, drying, packaging and export) through the understanding and monitoring of the various stakeholders involve in mango sectors in Ghana. The manual is based on findings from studies conducted along selected mango products to promote the competitiveness of SMEs so that they can

better leverage the Europeans Union market opportunities. We identify several disjointed institutions responsible for implementation of SPS measures along the mango value chain in Ghana. These lead to inefficiency in implementation of these measures. The study further revealed that producers, harvesters, storage personnel and transporters lacked the required knowledge in SPS requirements. We recommend training for all actors along the mango value chain on SPS requirement for mango export.

