

3 May, 2024

# QUALITY ASSURANCE OF SPICES – ASTA & AGMARK

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# Defining Quality

- Authenticity can be defined as freedom from adulteration, most obviously in the sense of absence of foreign bodies or extraneous matter, but it also suggests freedom from impurities in the product itself.
- A more appropriate term is quality which can be defined in the case of herbs and spices as 'fit (and customary) for the purpose intended'.
- Various Phrases for Quality in practice:
  - 'Wholesomeness'
  - 'Degree of Excellence'
  - 'Doing the right things in a right way'

# Defining Quality contd.

- “Composite of those characteristics of an individual unit which have significance in determining the degree of acceptability by the buyer/consumer”
- Quality Control – “Continuous Assessment of Continuing Operations”
- Quality Assurance – “Farm-to-Fork” concept
- Evolution of Quality Concept :



# Need for Statutory Provisions

Statutory Provisions came into existence for a number of reasons:

- To maintain the quality of food produced in the country
- To prevent exploitation of the consumers by the sellers
- To safeguard the health of the consumers
- To establish criteria for quality of food products, since more and more foods were eaten in processed form rather than in natural forms. This has resulted in the inability of consumer to identify the quality of the contents that could be identified easily.

# Major International Quality Standards

- Two major international standards are those set by the United States and those set by the European Union (EU).
- Standards relying on the same general parameters also exist in those countries responsible for growing herbs and spices, for example the Indian Spices Board and the Pepper Marketing Board.
- These standards are influenced by those set by the major importing countries.

# Various types of test which make up the range of international standards

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- **Cleanliness.** This is a measure of the amount of foreign and extraneous matter, for example insect contamination, excreta or foreign bodies. Measurement is by physical determination (using microscopic analysis (x 30)) of contamination within aliquots (samples) of the product.
- **Ash level.** This is a measure of the level of impurities in a product, obtained by burning off the organic matter and measuring the residue of ash. This measurement is carried out by incinerating the herb or spice at 550°C to constant weight. Characteristic maximum figures exist for most herbs and spices.

# Tests included in International Standards contd.

- **Acid insoluble ash (AIA) (or sand content):** This is a classic determination of the cleanliness of the herb or spice. The measure is usually made in conjunction with the ash content by boiling the ash in 2N HCl and incinerating the residue (again at 550°C) to a constant weight. Again maximum figures exist for most herbs and spices. Prosecutions have in the past been based on high acid insoluble ash (AIA) levels within Europe, which are seen as indicating an unacceptably dirty product.
- **Volatile oil (V/O) determination.** This measure helps to identify whether the herb or spice has been adulterated, perhaps by addition of foreign materials, low quality or spent amounts of the herb or spice in question. The herb or spice is boiled under reflux conditions with water where the oil separates on top of the water and can be read off in a volume proportional to the mass of the product under test. Minimum percentage levels of oil exist for most major herbs and spices.



# Tests included in International Standards contd.

- **Moisture content.** This measure of the amount of moisture is important since moisture content determines weight, and weight is used in pricing.
- With highly priced commodities traded on weight, a 1% moisture increase in the product as shipped can result in increased weight and increased profits for the original exporter.
- Maximum moisture contents are set for all herbs and spices, based on the maximum allowable amount of moisture for the product to remain stable.
- Moisture content is generally determined within the herb and spice industry using the Dean & Stark methodology. This involves re-fluxing a known weight of the herb or spice in petroleum spirit and measuring the water that condenses at the bottom of the reflux chamber from the known weight of herb or spice. Generally the level is 12% max.

# Tests included in International Standards contd.

- **Water availability.** In recent years moisture content has been related to the  $a_w$  or the water availability of the herb or spice.
- The level of 0.6  $a_w$  is generally accepted as a figure at and below which mould or microbial growth cannot occur.
- However, this figure is increased in several herbs and spices without problem due to the preservative effect of the oils contained within the spices.
- Examples are cinnamon, oregano and cloves where the oils have very strong anti-microbial effects.

# Tests included in International Standards contd.

- **Microbiological measures.** There is a range of techniques available for counting the numbers of a pathogen in a sample.
- **Pesticide levels.** Pesticide levels are assessed by either gas chromatography (GC) or high performance liquid chromatography (HPLC), depending on the pesticide in question.
- **Mycotoxin levels.** Mycotoxins, specifically aflatoxin and ochratoxin A, have been of concern within the last few years in the industry.
- Legislation governing the aflatoxin content of capsicum species, piper species, nutmeg, ginger and turmeric will be enacted in 2001 within the European Union at 10ppb total, 5ppb B1. With the USA the limit is currently 20ppb.
- HPLC is likely to be the reference methodology employed for these determinations.

# Tests included in International Standards contd.

- ***Bulk density/bulk index.*** This is an important measure, particularly in filling retail containers of herbs and spices.
- The herb or spices must be sifted or ground to give a certain density so that retail units appear satisfactorily full and comply with the declared weight.
- Densities may be measured packed down, e.g. after tapping the product so that it assumes a minimum density, or untapped: as it falls into the container without compression.
- This measure is usually defined as grams/litre or ml/100g.

# Tests included in International Standards contd.

- **Mesh/particle size.** Many spices and herbs are ground to give easier dispersion in the final food product. This process also aids the dispersion of flavour.
- Particle size is generally specified and is carried out using standardised sieves. Aperture sizes give a particle size, the products being ground to pass a certain sieve, and coarse matter recycled through the mill until it finally passes through the sieve.
- Sieves are characterised in micron sizes and typical requirements will be a 95% pass on a specified size of sieve. The older method of measuring sieve (hole) sizes was that of mesh which related to the number of holes per inch. However, confusing differences exist between American and British mesh sizes.
- The mesh size (number of holes per inch) depends on the diameter of the wire making up the sieves and this differs between nations. Thus a 25 mesh US sieve is equivalent to a 30 mesh BS (UK) sieve and both are equivalent to a 500 micron aperture size. Tables are available giving the relationships between national sieve sizes and micron sizes.

# The American Spice Trade Association

- ASTA, the voice of the U.S. spice industry, works to ensure clean, safe spice and shape public policy on behalf of the global industry.
- The most popular specification for spices and herbs the world over is the "ASTA Cleanliness Specifications for Spices, Seeds and Herbs".
- The unified ASTA, USFDA Cleanliness Specifications for Spices, Seeds and Herbs was made effective from 1-1-1990.
- Major producing countries have built up their facilities to meet the requirements as per ASTA Cleanliness Specification.
- The importing countries where they do not have specifications for spices, used to request the exporting countries to supply spices as per the ASTA Specification.

# ASTA contd.

- ASTA was started by 1907 in New York and now it is changed to Washington.
  
- Strategic Objectives 2009-2012:
  1. Influence Legislation and Regulations: Utilize coalition memberships when possible to maximize impact on legislation and regulations and identify and respond independently to issues specific to the spice industry.
  2. Quality through Education: Ensure clean, safe spice throughout the supply chain by providing key audiences education or access to education.
  3. Food Safety: Provide resources to support industry efforts to ensure food safety.

# ASTA contd.

- ASTA produced this guidance document to assist the spice industry in developing programs that minimize risk for contamination during growing, harvesting, drying, transport, processing, and post-processing storage, helping industry firms to provide clean, safe spices to their industrial, food service and consumer customers.



All spices imported into the U.S. are required to meet federal regulatory requirements for safety and cleanliness





# ASTA- Recommendations for clean and safe spices

- Minimize risk for introduction of filth throughout the supply chain
- Prevent environmental contamination, cross-contamination, and post-processing contamination during processing and storage
- Use validated microbial reduction techniques
- Perform post-treatment testing to verify a safe product
- Test to verify a clean and wholesome manufacturing environment



Filth can  
be minimized  
in  
spice  
processing  
and storage  
facilities  
through  
number  
of measures



# Cleanliness Specifications provided by ASTA

- The ASTA Cleanliness Specifications were designed to meet or exceed the United States Food and Drug Administration (FDA) Defect Action Levels (DAL).
- ASTA's Cleanliness Specifications establish limits for macroscopic extraneous matter for domestic and imported spices, seeds and herbs coming into the United States.
- The Cleanliness Specifications also include microscopic filth limits (e.g. insect fragments, rodent hairs) for specific products that are also addressed by the FDA DALs.

# Cleanliness Specifications provided by ASTA contd.

- The Cleanliness Specifications do not address microbiological contamination of spices or the adulteration of spices through the inclusion of food dyes or other materials not permitted in spices. In the United States such instances are governed by the Federal Food, Drug, and Cosmetic Act and the relevant regulations and policies of the Food and Drug Administration.
- The ASTA Cleanliness Specifications are widely recognized within the spice industry and members are encouraged to apply them in transactions between buyers and sellers of spices, including instances when an ASTA contract is utilized.
- Table 1.1 depicts ASTA Cleanliness Specifications for Spices, Seeds, and Herbs

Table 1.1 ASTA Cleanliness Specifications for Spices, Seeds, and Herbs

Name of spice, seed, or herb	Δ Whole insects, dead	Excreta, mammalian	Excreta, other	Mold	Insect defiled/infested	Extraneous/foreign matter
	By count	By mg/lb	By mg/lb	% By Weight	% By Weight	% By Weight
Allspice	2	5	5.0	2.00	1.00	0.50
Anise	4	3	5.0	1.00	1.00	1.00
Sweet basil	2	1	2.0	1.00	1.00	0.50*
Caraway	4	3	10.0	1.00	1.00	0.50
Cardamom	4	3	1.0	1.00	1.00	0.50
Cassia	2	1	1.0	5.00	2.50	0.50
Cinnamon	2	1	2.0	1.00	1.00	0.50
Celery seed	4	3	3.0	1.00	1.00	0.50
Chillies	4	1	8.0	3.00	2.50	0.50
Cloves*	4	5	8.0	1.00	1.00	1.00
Coriander	4	3	10.0	1.00	1.00	0.50
Cumin seed	4	3	5.0	1.00	1.00	0.50
Dill seed	4	3	2.0	1.00	1.00	0.50
Fennel seed	SF <sup>(2)</sup>	SF <sup>(2)</sup>	SF <sup>(2)</sup>	1.00	1.00	0.50
Ginger	4	3	3.0	SF <sup>(3)</sup>	SF <sup>(3)</sup>	1.00
Laurel leaves**	2	1	10.0	2.00	2.50	0.50
Mace	4	3	1.0	2.00	1.00	0.50
Marjoram	3	1	10.0	1.00	1.00	1.00*
Nutmeg (broken)	4	5	1.0	SF <sup>(4)</sup>	SF <sup>(4)</sup>	0.50
Nutmeg (whole)	4	0	0.0	SF <sup>(5)</sup>	SF <sup>(5)</sup>	0.00
Oregano***	3	1	10.0	1.00	1.00	1.00*
Black pepper	2	1	5.0	SF <sup>(6)</sup>	SF <sup>(6)</sup>	1.00
White pepper****	2	1	1.0	SF <sup>(7)</sup>	SF <sup>(7)</sup>	0.50
Poppy seed	2	3	3.0	1.00	1.00	0.50
Rosemary leaves	2	1	4.0	1.00	1.00	0.50*
Sage**	2	1	4.0	1.00	1.00	0.50
Savory	2	1	10.0	1.00	1.00	0.50*
Sesame seed	4	5	10.0	1.00	1.00	0.50
Sesame seed, hulled	4	5	1.0	1.00	1.00	0.50
Tarragon	2	1	1.0	1.00	1.00	0.50*
Thyme	4	1	5.0	1.00	1.00	0.50*
Turmeric	3	5	5.0	3.00	2.50	0.50

Table 1.1 ASTA Cleanliness Specifications for Spices, Seeds, and Herbs contd.

Spices	Whole equivalent insects	Insect fragments	Mites	Other insects	Rats/mouse hairs	Animal hairs
Ground paprika		Average of more than 75 fragments/ 25 g			Average of more than 11 rodent hairs/25 g	

\* Microanalytical methods for paprika and ground capsicums can be found in the "Analytical Procedures" section of the ASTA Cleanliness Specifications for Spices, Seeds, and Herbs (Appendix 5).

# Cleanliness Specifications - Footnotes:

- \* **Ginger:** More than 3% moldy pieces and/or insect infested pieces by weight.
- \* **Broken Nutmeg:** More than 5% mold/insect defiled combined by weight.
- \* **Whole Nutmeg:** More than 10% insect infested and/or moldy pieces, with a maximum of 5% insect defiled pieces by count.
- \* **Black Pepper:** 1% moldy and/or infested pieces by weight.
- \* **White Pepper:** 1% moldy and/or infested pieces by weight.
- **Whole Insects, Dead:** Cannot exceed the limits shown.
- **Extraneous Matter:** Includes other plant material, e. g. foreign leaves

# Cleanliness Specifications - Footnotes:

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- \* **Clove Stems:** Less than (<) 5% allowance by weight for unattached clove stems over and above the tolerance for Other Extraneous Matter is permitted.
- \* **Laurel Leaves:** "Stems" will be reported separately for economic purposes
- \***Sage:** pass/fail criteria.
- \***Oregano: Sumac negative-**Analysis for presence of Sumac shall not be mandatory if samples are marked "Product of Mexico."
- \* **White Pepper:** "Percent Black Pepper" will be reported separately for economic purposes and will not represent a pass/fail criteria.
- \* **Fennel Seed:** In the case of Fennel Seed, if 20% or more of the subsamples contain any rodent, other excreta or whole insects, or an average of 3 mg/lb or more of mammalian excreta, the lot must be reconditioned.

# US-FDA Definition of 'Safe Spice'

Specifically, FDA states:

- *“Safe or safety means that there is a reasonable certainty in the minds of competent scientists that the substance is not harmful under the intended conditions of use”*. It is impossible in the present state of scientific knowledge to establish with complete certainty the absolute harmlessness of the use of any substance (21 CFR 170.3[i]).
- Therefore, with specific reference to the potential presence of pathogens in spices, FDA’s standard can be interpreted to require a reasonable certainty that active pathogens will not be present in spices as spices are entered into interstate commerce with focus on consumption of spices either as constituents of processed foods or applied to foods by consumers in the home without cooking — the definition of ready-to-eat.



# Pathogens in Spices

- Due to the environments in which they are grown, spices and herbs often harbour bacteria and fungi. These include potential spoilage organisms and organisms of public health significance.
- Although a number of microorganisms are killed during the drying of spices and herbs, many bacteria and fungi can survive.
- If the products are not stored and shipped properly, mold may grow or pathogens may be introduced.
- If water activity is kept below 0.75, most fungi and bacteria will not grow in the spice **Table 1.2**.
- However, if bacteria are present in low levels and the product is incorporated in intermediate or high moisture foods, such as processed meats or dairy products, the foods may be capable of supporting growth of the microorganisms.

# Pathogens in Spices contd.

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- A number of variables affect the extent of microbial contamination in spices. These factors affect survival and multiplication of pathogens and generally fall into one of four categories:
  - Intrinsic physical characteristics and composition at each step of preparation
    - Water activity **Table 1.2.**
    - Typical microbial content when stored in clean, sealed containers
    - Antimicrobial constituents
  - Characteristics of the microbial population
    - Ability to form spores
    - Adaptability to dry conditions
    - Oxygen dependence (aerobic versus anaerobic)
  - Handling and storage at every stage from farm to consumer possession
    - Agricultural and harvesting practices (e.g., handling practices, pest control)
    - Sanitation (e.g., water, equipment) and worker hygiene
    - Temperature and humidity
    - Isolation methods (e.g., packaging, storage containers)
  - Use of microbial reduction processes (e.g., irradiation, ethylene oxide, propylene oxide, steam)
    - Reduces microbial load, but post-processing controls are required to prevent recontamination

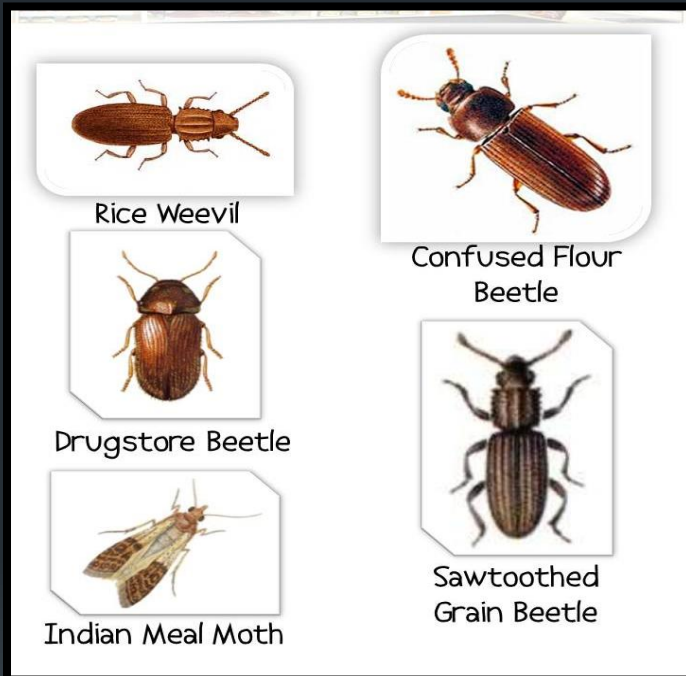
# Pathogens in Spices contd.

- The bacterial and fungal species in spices include aerobic spoilage organisms, spore-forming bacteria, high heat stable toxin producing bacteria, proteolytic and gas-producing bacteria, and mycotoxin-producing microorganisms.
- Of all the spices, black pepper typically has the highest aerobic plate counts, usually in excess of  $10^6$  cfu/g.
- Paprika, celery seed, coriander, turmeric, thyme, basil and other spices can also have plate counts in the millions per gram.
- Microorganisms that may be found in spices are listed in **Table 1.2.**

Table 1.2. Microorganisms that may be found in spices

Bacteria	Minimum water activity for growth ( $A_w$ )
<i>Salmonella</i>	0.93–0.94
<i>C. perfringens</i>	0.97
<i>C. botulinum</i>	0.94
<i>Bacillus cereus</i>	0.93
<i>E. coli</i>	0.95
<i>Listeria monocytogenes</i>	0.92
<i>Halobacterium halobius</i>	0.75
<i>Staphylococcus aureus</i>	0.82
Fungi, Yeast and Molds	Minimum water activity for growth ( $A_w$ )
<i>Aspergillus flavus/parasiticus</i>	0.80
<i>Botrytis cinerea</i>	0.97
<i>Penicillium ssp.</i>	0.79–0.82
<i>Saccharomyces cerevisiae</i>	0.90
<i>Rhizopus stolonifer</i>	0.89
<i>Zygosaccharomyces rouxii</i>	0.62
<i>Xeromyces bisporus</i>	0.61

# Pest Infestation in Storage Premises



<http://www.google.co.in/imgres?q=spices+insects&start=111&um=1&hl=en&biw=1366&bih=634&tbn=isch&tbnid=70ACOCOdBjHJ1M:&imgrefurl=http://callcraig.com/tag/beetles/&docid=UrZ0Qbo9O1qmkM&imgurl=http://callcraig.com/wp-content/uploads/2011/12/Pantry-Pests.jpg&w=720&h=960&ei=9fx5UbarE4TmiwLy4oCACw&zoom=1&ved=1t:3588,r:16,s:100,i:52&iact=rc&dur=1857&page=6&tbnh=168&tbnw=126&ndsp=24&tx=76&ty=76>

<http://www.google.co.in/imgres?q=common+insects+in+spices&um=1&hl=en&biw=1366&bih=634&tbn=isch&tbnid=yagIAIWWpVHgBM:&imgrefurl=http://lancaster.unl.edu/pest/resources/pantrypests304.shtml&docid=fz9OMR-5x2bo0M&imgurl=http://lancaster.unl.edu/pest/images/beetles/CigBeetlesx450.jpg&w=450&h=210&ei=ift5UfTXEaaCiQfJqYGgBQ&zoom=1&ved=1t:3588,r:3,s:0,i:89&iact=rc&dur=2746&page=1&tbnh=153&tbnw=329&start=0&ndsp=17&tx=149&ty=63>

# Establishing Safety in the Growing and Manufacturing Processes <sup>30</sup>

- Steps need to be taken at every step throughout the process of growing, harvesting, drying, and processing spices to ensure that clean, safe spice is ultimately delivered to the consumer. There are a number of specific guidelines that should be followed :
- **Good Agricultural Practices (GAPs)**
- **Good Manufacturing Practices (GMPs)**
- **Hazard Analysis Critical Control Point (HACCP)**

# Establishing Safety in the Growing and Manufacturing Processes contd.<sup>31</sup>

## **Good Agricultural Practices:**

- Steps should be taken during the growing and harvesting of spices to minimize the potential for contamination of spices by heavy metals, mycotoxins, pesticide residues, mammalian excreta, rodent hair, insect fragments and other foreign materials. Good agricultural practices should also provide guidelines on handling and storage of the materials to minimize the contamination risk.

## **Good Manufacturing Practices:**

- Manufacturing facilities involved in the processing of spices need to manage their operations following the general requirements listed in 21 CFR part 110. These cover facility construction and design, maintenance of the grounds, equipment design and manufacturing, sanitation, production and processing controls of raw materials and pest control.

# Establishing Safety in the Growing and Manufacturing Processes contd.<sup>32</sup>

## HACCP:

- HACCP is a key tool to ensure food safety at all stages of the food chain. An effective HACCP study allows for the identification of specific hazard(s) (i.e., any biological, chemical, or physical property that adversely affects the safety of the food) and specifies measures for their control.
- A HACCP plan consists of the following seven basic principles (NACMCF, 1998):
  - Principle 1: Conduct a hazard analysis
  - Principle 2: Identify Critical Control Points
  - Principle 3: Establish Critical Limits for Each CCP



## Establishing Safety in the Growing and Manufacturing Processes contd.

- Principle 4: Establish Monitoring Procedures
- Principle 5: Establish Corrective Actions
- Principle 6: Establish Recordkeeping Procedures
- Principle 7: Establish Verification Procedures

HACCP reduces the risk of food safety hazards in finished products by identifying the potential risks in the process. Each spice manufacturer should develop product- and process-specific HACCP plans as outlined in the ASTA HACCP Guide for Spices and Seasonings (Appendix 11).

## Establishing Safety in the Growing and Manufacturing Processes contd.

- *Benefits of use of HACCP*

- Can be applied to receipt, decontamination (cleaning and microbial reduction), blending, packaging, storage, and distribution processes

- Cost effective, preventative approach that reduces product losses

- Approved by U.S. regulatory and international authorities as a means of controlling food borne illnesses

- Compliments other quality control systems and prerequisite programs (e.g., GMPs)

## Establishing Safety in the Growing and Manufacturing Processes contd.

- **Microbial Reduction Techniques:** The climatic conditions required to grow most spices means that they are typically grown in developing countries lacking the infrastructure for modern food production.
- As a result of conditions in the growing regions, spices are particularly susceptible to microbial contamination such as *Salmonella* and *E. coli*.
- A variety of microbial reduction techniques, including fumigants, steam and irradiation should be applied to spices to ensure that they are free of pathogens.
- ASTA has worked with the FDA to validate these microbial reduction techniques and members can obtain details of these validation processes by contacting the ASTA office.
- **Supply Chain Management:** Managing the supply chain is key to ensuring clean, safe spice. Suppliers should provide necessary documentation on traceability of product and on their implementation and use of GAP, GMP and HACCP programs. Overseas facilities should be audited on a routine basis to ensure compliance and prevent food safety problems.

# Control Flow chart provided by “The American Spice Trade”

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- The American spice trade relies heavily on worldwide sourcing. Spices are produced in a number of nations including India, China, Mexico, and Indonesia, where farmers sell raw materials to collectors, who, in turn, sell them to processors.
- Overseas processors may or may not clean and treat spices before selling them to U.S. buyers.
- Once imported to the U.S., buyers store, treat, process, and package spice products for sale to their customers.
- Extraction of spices to isolate oleoresins or essential oils may be performed prior to import or by U.S.-based manufacturers. U.S. spice companies may sell finished product to individual consumers, retail stores, restaurants, institutions, or food manufacturers.
- **Figure 1** illustrates transport and processing options, and potential control points for most spices imported into the U.S. Other options exist, including treatment after packaging if product has not been treated.

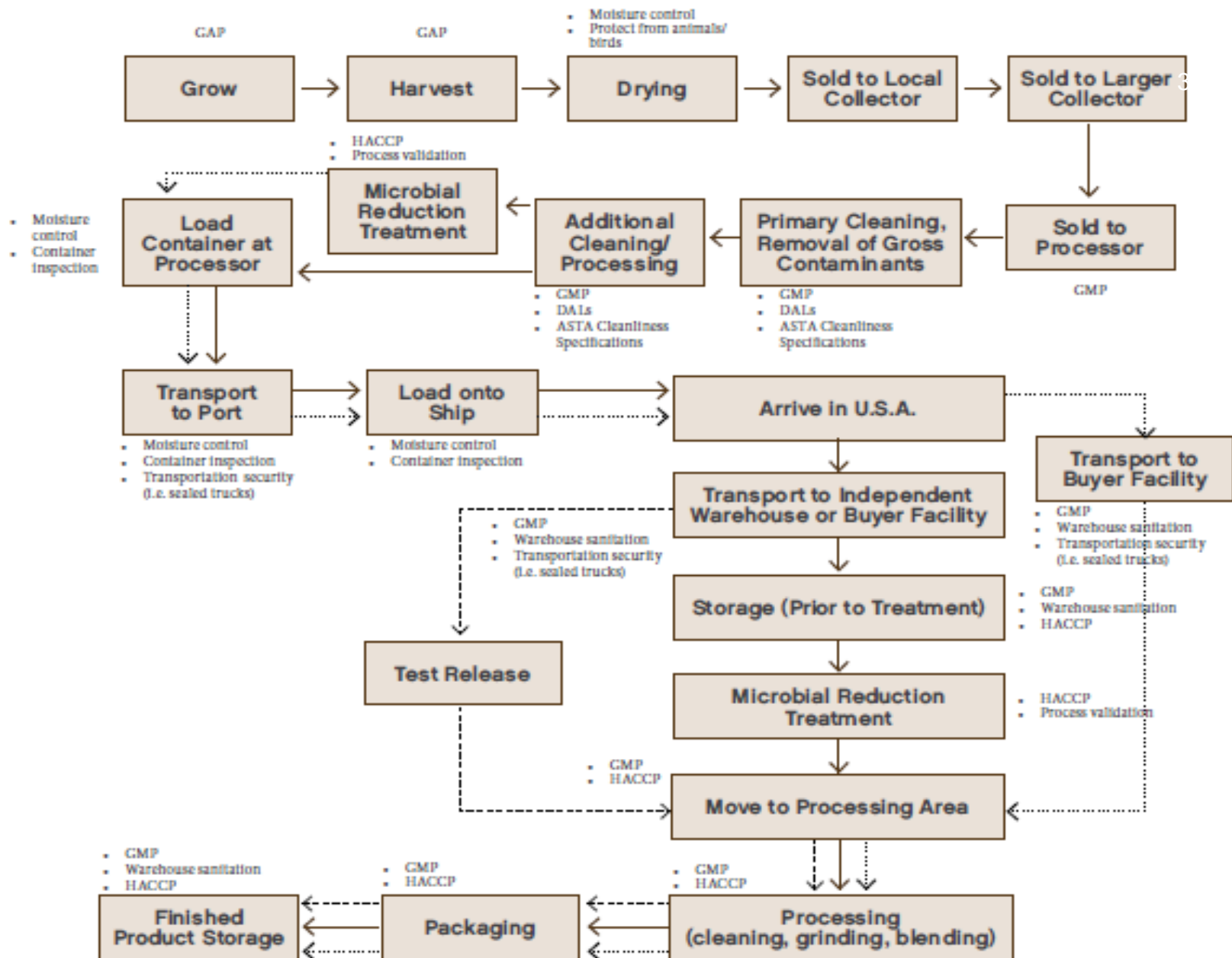


Figure 1. Transport and Processing Options and Control Points

# Agricultural Produce (Grading and Marking Act 1937)

- This is one of the oldest Food Laws promulgated in the country to provide for quality control of agricultural produce through grading and marketing.
- This act provides compulsory standards for export and voluntary standards for vegetable oils, ghee, butter, cream, essential oils, guar, egg, groundnuts, potatoes, fruits, pulses, rice, condiments, spices, etc.
- These standards are formulated on the basis of physical and chemical characteristics of food, both the natural as well as those acquired during processing.

# AGMARK contd.

- This act is administered by the Directorate of Marketing & Inspection with Agricultural Marketing Advisor to the Government of India, Faridabad, as its chairman.
- “Agricultural Produce” includes all produce of Agriculture or Horticulture & all articles of food or drink wholly or partly manufactured from any such produce.
- A number of Grading standards have been brought about by AGMARK.
- The AGMARK seal issued by the Directorate of Marketing and Inspection of Government of India is thus a stamp of good quality. The Directorate of Marketing & Inspection operates a certification scheme under AGMARK for scheduled articles covered under ACT.

# AGMARK contd.

- Any organisation or packer who wants to use 'AGMARK' symbol on the label of the sample containers can apply to the authorities.
- The authorities after inspection and ensuring that the necessary facilities like equipment, laboratory, etc., are available, allows them to use AGMARK symbol which ensures that the quality standards laid down for that product under AGMARK have been compiled with.
- This gives a sort of quality assurance to the consumers and at the same time a fair return to the farmers.



# AGMARK Grade Specifications

- Quality has been a tradition in the spice trade of India and to maintain this tradition and to be in keeping with modern developments in the field of standardization of agricultural produce.
- The government of India has prescribed standards for almost all spices pepper. Dry ginger. Cardamom. Dry chillies. Turmeric. Garlic. Coriander. Fennel. Fenugreek. Cumin and celery seeds and curry powder are graded compulsorily under law before export.
- The grades adopted for various spices are those prescribed under the agricultural produce (grading and marking act 1937); and these grades are popularly known as Agmark grades.
- The scheme of compulsory quality control and pre-shipment inspection on certain spices was introduced by the government of India in 1963 and from then on.
- The scheme is being introduced to cover all the spices in a phased programme. The pre-shipment inspection scheme is operated by the directorate of marketing inspection. Ministry of agriculture. Government of India.

# AGMARK Grade Specifications contd.

(Design of Agmark insignia)



Name of Commodity.....

Grade.....

## AGMARK Grade Specifications contd.

- The grade specifications have been drawn up on the basis of age-old and familiar trade names such as Malabar Pepper. Alleppey Green Cardamom. Snnam Chillies. Alleppey Finger Turmeric. Cochin Dry Ginger etc.. so as not to disturb the traditional terms.
- Detailed specifications have been prescribed in the rules taking into account the individual characteristics of the spices concerned and broadly based on physical characteristic. colour. size. density. moisture content. presence of extraneous matter. damaged produce etc.
- Importers of spices from India would be well advised to place orders on the basis of agmark grades or ascertain from the exporters the specific agmark grades of the spices proposed to be exported.
- In orders being placed on the basis of samples also. the specific grade under which such goods will be graded could be ascertained so that importer is assured of the quality characteristics of the spices for which orders are placed.

## AGMARK Grade Specifications contd.

### ▪ Method of packing

(1) Spices (whole and powder) shall be packed in gunny bags/jute bags, polywoven bags, poly pouches, cloth bags or other suitable packages which shall be clean, sound, free from insects, fungal infestation and the packing material shall be as permitted under the Prevention of Food Adulteration Rules, 1955 made under Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954).

(2) Suitable lining of food grade polypropylene/polyethylene shall be used for packing of Spices (whole and powder) in gunny bags/jute bags, polywoven bags, cloth bags, paper bags and cardboard cartons;

(3) Containers and packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavor to the product;

## AGMARK Grade Specifications contd.

- They shall apply to following spices (whole and powder), namely:-
  - (a) Turmeric (*Curcuma longa* L.)
  - (b) Chillies/Capsicums/Paprika (*Capsicum annum* L.)
  - (c) Pepper (*Piper nigrum*)
  - (d) Cardamom (*Elettaria cardamomum*)
  - (e) Large Cardamom (*Amomum subulatum* Rozburg)
  - (f) Coriander (*Coriandrum sativum* L.)
  - (g) Ginger (*Zingiber officinale*)
  - (h) Cumin (*Cuminum cyminum* L.)
  - (i) Fennel (*Foeniculum vulgare*)
  - (j) Fenugreek (*Trigonella foenum graecum* L.)
  - (k) Celery seed (*Apium graveolens* L.)

## AGMARK Grade Specifications contd.

- (4) Spices (whole and powder) shall be packed in pack sizes as per the instructions issued by the Agricultural Marketing Adviser from time to time;
- (5) Each package shall contain Spices (whole and powder) of the same type and of the same grade designation;
- (6) Graded material of small pack sizes of the same lot/batch and grade may be packed in a master container with complete details thereon along with grade designation mark;
- (7) Each package shall be securely closed and sealed.

# AGMARK Grade Specifications contd.

- **Method of Marking:-**

(1) A grade designation mark shall be securely affixed to or printed on each package in a manner approved by the Agricultural Marketing Adviser or an officer authorized by him in this behalf in accordance with Rule 11 of the General Grading and Marking Rules, 1988;

(2) In addition to the grade designation mark, following particulars shall be Clearly and indelibly marked on each package:-

- (a) Name and address of the packer;
- (b) Place of packing/manufacturing;
- (c) Date of packing;
- (d) Lot/batch number;
- (e) Grade;
- (f) Season of harvest (in case of chillies only);
- (g) Net weight;
- (h) Maximum retail Price;
- (i) Best before-----month-----year.

## AGMARK Grade Specifications contd.

The ink used for marking on packages shall be of such quality which may not contaminate the product;

The authorized packer, may, after obtaining prior approval of the Agricultural Marketing Adviser or an officer authorized by him in this behalf, mark his private trade mark or trade brand on the graded packages provided that the same do not indicate quality other than that indicating by the grade designation mark affixed to the graded packages in accordance with these rules.



## AGMARK Grade Specifications contd.

**Special conditions of certificate of authorization:-** In addition to the conditions specified under the sub-rule(8) of rule 3 of the General Grading and Marking Rules, 1988, the following shall be the special conditions of every certificate of authorization issued for the purpose of these rules:-

(1) The authorized packer shall either set up his own laboratory or have access to an approved grading laboratory for testing of Spices (whole and powder);

(2) The premises shall be maintained in hygienic and sanitary conditions with proper ventilations and well lighted arrangement. The personnel's engaged in these operations shall be in sound health and free from any infectious, contagious or communicable diseases;

(3) The premises shall have adequate storage facilities with pucca floor and free from rodent and insect infestation;

(4) The authorized packer and the approved chemist shall observe all instructions regarding testing, grading, packing, marking, sealing and maintenance of records which may be issued by the Agricultural Marketing Adviser or any other officer authorized by him in this behalf from time to time.

# AGMARK Grade Specifications contd.

## SCHEDULE I

(see rules 3 and 4 )

Grade designations and quality of Turmeric  
(whole)

Grade Designation	Quality				
Special Characteristics					
Organic-extraneous matter, % (m/m) (Max.)	Inorganic extraneous matter, %(m/m) (Max.)	Defective rhizomes, (m/m) (Max.)	rhizomes, %	Moisture, % (m/m) (Max.)	Curuminoid content % (m/m) ( Min.)
(1)	(2)	(3)	(4)	(5)	(6)
Special	0.8	0.2	3.0	12.0	2.0
Standard	1.5	0.5	5.0	12.0	Not specified

## AGMARK Grade Specifications contd.

- (1) Turmeric shall be primary or secondary rhizomes commercially called bulbs or fingers respectively of the plant *Curcuma longa* L;
- (2) Rhizomes may be in natural state or polished;
- (3) They shall not be artificially colored;
- (4) They shall be free from mould growth, living insects and practically free from dead insects, insects, insect fragments and rodent contamination;
- (5) They shall comply with restrictions in regard to Aflatoxins, Metallic Contaminants, Insecticide or Pesticide residue, Poisonous metals, naturally occurring Contaminants, Microbial load etc as specified by the Codex Alimentarius Commission or as per buyers requirements for Export purposes and the Prevention of Food Adulteration Rules, 1955 for domestic trade.
- (6) Lead chromate test shall be negative.

# AGMARK Grade Specifications contd.

## Definitions:

“Defective rhizomes” means shriveled rhizomes, internally damaged, hollow or porous rhizomes, rhizomes scorched by boiling and other types of damaged rhizomes.

“Inorganic extraneous matter” includes stones, particles of soil, dust, mud. and the like;

“Organic extraneous matter” includes all vegetable matter other than rhizomes.

Note: When fingers are graded separately, it shall not contain more than -

(1) 2% and 7% (m/m) of pieces of rhizomes (of length less than 15 mm and fragments) in special grade and standard grade respectively;

(2) 2% and 5% (m/m) of bulbs in special grade and standard grade respectively;

# AGMARK Grade Specifications contd.

## SCHEDULE II

(see rules 3 and 4 )

Grade designations and quality of Turmeric Powder

Grade Designation		Quality			
Special Characteristics					
Moisture % (m/m) (Max.)		Total ash % (m/m) (Max.)	Acid insoluble ash ,% (m/m) . (Max.)	Curcuminoid content % (m/m) (Min.)	Starch % (m/m) (Max.)
(1)	(2)	(3)	(4)	(5)	(6)
Special	10	7.0	1.5	2.0	60
Standard	12	9.0	1.5	Not specified	60

## AGMARK Grade Specifications contd.

- (1) Turmeric powder shall be prepared by grinding clean, dry Turmeric (*Curcuma longa* L) rhizomes.
- (2) It shall be ground to such a fineness that 98% of the product passes through a 300 micron sieve. It shall be labeled “Coarse Ground” when 98% of the product passes through 800 micron sieve.
- (3) It shall have its characteristic taste, flavour and free from musty odour.
- (4) It shall be free from any colouring matter, foreign starch and any other adulterant.
- (5) It shall be free from mould growth, living insects and practically free from dead insects, insect fragments and rodent contamination.
- (6) It shall comply with restrictions in regard to Aflatoxins, Metallic Contaminants, Insecticide or Pesticide residue Poisonous metals, naturally occurring Contaminants or as per buyers requirements for export purposes and the Prevention of Food Adulteration Rules, 1955 for domestic trade.
- (7) Lead chromate test shall be negative.

# Summary

- ***Manufacturer/Packer should focus on Quality Assurance rather than just inspection.***
- ***For Establishing Safety in the Growing and Manufacturing Processes Stringent Steps need to be taken at every step throughout the process of growing, harvesting, drying, and processing spices to ensure that clean, safe spice is ultimately delivered to the consumer.***
- ***There are a number of specific guidelines that should be followed such as GAPs, GMPs, HACCP to ensure overall quality assurance to the consumers.***
- ***All spices imported into the U.S. are required to meet federal regulatory requirements for safety and cleanliness under ASTA unified US-FDA regulations.***
- ***AGMARK ensures consumers that they are purchasing “right product with right quality”***
- ***Quality Management System gives a feel of Quality environment within the premises.***

# References

- Clean, Safe Spices- Guidance from the American Spice Trade Association
- Rules published in the Gazette of India, Part II, Section 3, sub-section (i) dated 21-7-2005 vide G.S.R. 257. Dated 30-7-2005.
- Peter K. V. 2001. “Quality specifications for herbs and spices”, In : Handbook of herbs and spices Volume 1. Woodhead Publishing Ltd.
- [http://www.indianspices.com/html/spices\\_board.html](http://www.indianspices.com/html/spices_board.html)





THANK YOU  
FOR  
YOUR  
KIND  
ATTENTION!!!