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CIRCULAR

Circular No. 3/2024-25

dated 7th May, 2024

Sub: Comprehensive guidelines on preventing Ethylene Oxide (ETO) contamination in spices exported from India.

Kind attention is invited to the subject cited above. In this regard, the Spices Board, in consultation with the stakeholders, has prepared the comprehensive guidelines on preventing Ethylene Oxide(ETO) contamination in spices exported from India, which is attached as Annexure-I.

All exporters of spices and spice products are advised to follow the comprehensive guidelines and to exercise due diligence, to address ETO residue in spices and spice products exported from India.

This circular is issued in supersession of the earlier circular No.2/2024-25 dated 30th April, 2024.

Director (Marketing)

To

All exporters of spices and spice products/Exporters Associations.

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(Hindi version follows)

Comprehensive Guidelines on Prevention of Ethylene Oxide (EtO) contamination in Spices Exports

1. Background:

Ethylene oxide (EtO) is a flammable, colorless gas at room temperature. When used directly in the gaseous form or in non-explosive gaseous mixtures with nitrogen or carbon dioxide, EtO serves as a disinfectant, fumigant, sterilizing agent, and insecticide. The major use of EtO is the sterilization of medical equipment. 2-Chloroethanol or ECH is a degraded product of EtO. EtO has also been reported to be produced from natural sources. In certain plants, ethylene (a natural plant growth regulator) is degraded to EtO. The industrially polluted environment can also contribute to the EtO contamination in agriculture produces. International Agency for Research on Cancer under WHO has reported EtO as type 1 Carcinogen.

2. Regulations on ETO:

In order to control the risks of food safety, it is necessary for both the regulatory authorities and food manufacturers to monitor ETO in foods. The MRLs of ETO for spices & herbs for various countries is attached as Appendix-1 & 2.

3. Preventive measures for ETO contamination:

- 3.1. Exporters shall take adequate measures to ensure the absence of EtO and its metabolites in spices and spice products throughout the supply chain.
- 3.2. Exporters shall identify EtO as a hazard and incorporate critical control points to prevent EtO in their Hazard Analysis Critical Control Points (HACCP) and Food Safety Plan (FSP) in their Food Safety Management System (FSMS).
- 3.3. Exporters shall avoid the use of EtO in spices as a sterilizing/fumigating agent or any other application.
- 3.4. Exporters shall test raw materials, processing aids, packaging materials and finished goods for EtO contamination. On instances of EtO detection, at any stage of the supply chain, the exporters shall perform a root cause analysis and implement appropriate preventive control measures to avoid future recurrence and maintain such records.
- 3.5. Exporters shall ensure that transporters, storage/warehouses, packaging material suppliers etc., do not use EtO at any stage.

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- 3.6. Exporters of organic spices shall follow the guidelines/ advisories on prevention of EtO contamination in organic products issued by APEDA / Organic Certification Bodies under NPOP.
- 3.7. Awareness programmes for preventing EtO contamination in spices and spice products shall be imparted to all the stakeholders in the supply chain of spices and spice products including raw material suppliers, traders, processors and other relevant stakeholders.

4. Alternate methods of Sterilization:

Exporters of spices are encouraged to use alternate methods of sterilization as suitable.

- a) Steam Sterilization
- b) Irradiation (not applicable to organic products under NPOP)
- c) any other methods approved by FSSAI.

5. Guidelines on reduction of microbial contamination:

Exporters are advised to adhere to the following guidelines in processing of spices to reduce microbial contamination.

- a) Codex General Principles of Food Hygiene (CXC1-1969)
- b) Code of Hygienic Practices for Low Moisture Foods (CAC 75-2015)-Annexure-3
- c) Requirements of Schedule IV of Food Safety and Standards (Licensing and Registration of Food Businesses) FSSAI Regulations 2011.

5.1 Incoming material requirements

- 5.1.1. Spices, herbs and their source plants shall not be accepted by the establishment if they are known to contain microbial contaminants which will not be reduced to acceptable levels by normal processing procedures, sorting or preparation.
- 5.1.2. Precautions shall be taken to minimize the chances for cross-contamination of the spices from other contaminated products and raw materials.
- 5.1.3. Special precautions shall be taken to reject spices and herbs showing signs of pest damage/infestation or mould growth, so as to eliminate the potential hazard of mycotoxins such as aflatoxins.
- 5.1.4. Raw materials shall be inspected (for foreign matter, odour and appearance, visible mould contamination etc.), cleaned if needed and sorted prior to

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processing. Laboratory tests, e.g. for moulds or pathogens such as *Salmonella*, shall be conducted when necessary.

5.1.5. Because of the diversity of production practices for spices and herbs, it is important to understand the controls in place for production of the incoming material. Spices and herbs shall be obtained from approved suppliers. An approved supplier is one that can provide a high degree of assurance that appropriate controls have been implemented to minimize the possibility of chemical, physical and microbiological contamination.

5.1.6. If the control measures used to produce the spices and herbs are not known, frequency of verification activities such as inspection and testing shall be increased.

5.2 Measures to prevent microbiological cross-contamination

5.2.1. Effective measures shall be taken to prevent cross-contamination of spices and herbs by direct or indirect contact with potentially contaminated material at all stages of the processing. Raw products that may present a potential hazard shall be processed in separate rooms, or in areas physically separate from those where end-products are being prepared/stored.

5.2.2. Spices and herbs that have undergone a microbial reduction treatment shall be processed and stored separately from untreated spices and herbs.

5.2.3. Exporters shall ensure that the external storage areas comply with the requirement of having separate storage spaces for ETO treated and non-treated materials to avoid cross contamination.

5.3 Packaging

5.3.1 Non-porous bags/containers shall be used to protect the spices and herbs from contamination, occurrence of moisture and infestation of insects and rodents. In particular, the re-absorption of ambient moisture shall be prevented. Contamination shall be prevented by the use of liners where appropriate.

5.3.2 It is recommended that new bags or containers be used for food contact packaging and are in good condition

5.3.3 Spices and herbs, e.g. dried chilli peppers, shall not be sprayed with water to prevent breakage during packing. This may result in growth of moulds and microbial pathogens.

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5.3.4 Finished products may be packed in air tight containers preferably under inert gases like nitrogen or under vacuum in order to retard possible microbial growth.

5.4 Transportation

- 5.4.1 Prior to bulk transport, the products must be dried to a safe moisture level to prevent the growth of mould and pathogens.
- 5.4.2 Vehicles used for transportation must be clean, dry, odor-free and free from infestation, and prevent cross contamination from previously transported products.
- 5.4.3 While moving the commodity into or out of the warehouse, adequate care shall be taken to ensure protection from any of the external adverse environmental factors like rain, high temperature, humidity etc. During transportation, attention shall be given to avoid exposure to water/moisture and to ensure that pests or debris do not contaminate the commodity.
- 5.4.4 Regular checks shall be made to ensure that the transporting vehicle is covered, that there are no rips in the covers and no leaks on the undersides of vehicle which could allow water from the road to get into the vehicle.
- 5.4.5 Bags shall preferably be placed on pallets to avoid contact with the floor. The pallets and frames used for transportation shall not be treated with ETO and shall be hygienic and dry.
- 5.4.6 Spices absorb moisture quickly if the bags get wet, resulting in considerable increase in moisture content. For products that require a longer period for transportation, temperature and humidity shall be monitored using calibrated gadgets, where appropriate.
- 5.4.7 Fully ventilated containers are preferable for transporting spices in bags, especially if shipped from a high humidity region. Desiccants like calcium chloride may be used for added protection.
- 5.4.8 Care shall be taken not to damage the dry-bags packed with spices, and any spillages shall be cleaned immediately.
- 5.4.9 Ample space shall be maintained between bags and the roof of the vehicle. Use of the saddle stow method, which minimizes side contact and maximizes airflow between the bags, is recommended.
- 5.4.10 While transporting spices and herbs in bulk (E.g. by ship or rail), care shall be taken to ensure adequate ventilation, so as to prevent moisture condensation, resulting from respiration, movement of vehicle from a warmer to a cooler region or from day to night etc

6. Sample handling and testing:

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- 6.1 Adequate care shall be taken while handling samples for testing so as to eliminate the possibility of cross contamination from gloves, sampling equipment etc.
- 6.2 Appropriate testing methods shall be employed for testing of ETO in spices.

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Appendix I

MRLs of ETO for spices & herbs specified in the Commission regulation (EU) 2015/868

Code number	Groups and examples of individual products to which the MRLs apply	ETO (sum of ETO & 2-chloro-ethanol expressed as ETO) in mg/kg	
0800000	SPICES		
0810000	(i) Seeds	0.10	
0810010	Anise		
0810020	Black caraway		
0810030	Celery seed (Lovage seed)		
0810040	Coriander seed		
0810050	Cumin seed		
0810060	Dill seed		
0810070	Fennel seed		
0820000	(ii) Fruits and berries		0.10
0820010	Allspice		
0820020	Sichuan pepper (Anise pepper, Japan pepper)		
0820030	Caraway		
0820040	Cardamom		
0820050	Juniper berries		
0820060	Pepper, black, green and white (Long pepper, pink pepper)		
0820070	Vanilla pods		
0820080	Tamarind	0.10	
0820990	Others		
0830000	(iii) Bark		
0830010	Cinnamon (Cassia)	0.10	
0830990	Others		
0840000	(iv) Roots or rhizome	0.10	
0840010	Liquorice		
0840020	Ginger ²		
0840030	Turmeric (Curcuma)		
0840040	Horseradish		
0840990	Others		
0850000	(v) Buds	0.10	
0850010	Cloves		
0850020	Capers		
0850990	Others		
0860000	(vi) Flower stigma	0.10	
0860010	Saffron		
0860990	Others		
0870000	(vii) Aril		

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0870010	Mace	0.10
0870990	Others	
0231020	Peppers (Chilli peppers)	0.02
0220010	Garlic	0.02
0256030	Celery leaves	0.05
0256040	Parsley	0.05
0256050	Sage	0.05
0256060	Rosemary	0.05
0256070	Thyme (Marjoram, oregano)	0.05
0256080	Basil (Balm leaves, mint, peppermint, holy basil, sweet basil, hairy basil, edible flowers (marigold flower and others), pennywort, wild betel leaf, curry leaves)	0.05
0256090	Bay leaves	0.05
0256100	Tarragon (Hyssop)	0.05
0401080	Mustard seed	0.05
0163050	Pomegranate	0.02

Appendix 2

Sl No.	Country	Crop group	Crop	MRL - ETO (sum of ETO & 2-chloro-ethanol expressed as ETO) in mg/kg (ppm)
1	CANADA	VEG: FRUIT-SOLANACEAE	PEPPER-CHILLIES-YELLOW (<i>Capsicum baccatum</i>)	7
		SPICES		7
2	EU-MRLS-HARMONIZED	VEG: FRUIT-SOLANACEAE	PEPPER-CHILLIES (<i>Capsicum frutescens</i>)	0.02
			PEPPER-BELL/SWEET (<i>Capsicum annuum</i>)	0.02
		SPICES	GINGER: DRY (<i>Zingiber officinale</i>)	0.02
			HORSERADISH: DRY (<i>Armoracia rusticana</i>)	0.02
			Others	0.10
3	GREAT BRITAIN (GB)	VEG: FRUIT-SOLANACEAE	PEPPER-CHILLIES (<i>Capsicum frutescens</i>)	0.02
			PEPPER-BELL/SWEET (<i>Capsicum annuum</i>)	0.02
		SPICES	GINGER: DRY (<i>Zingiber officinale</i>)	0.02
			Others	0.10
4	HONG KONG	SPICES		N.D.

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5	NORWAY	VEG: FRUIT-SOLANACEAE	PEPPER-CHILLIES (<i>Capsicum frutescens</i>)	0.02
			PEPPER-BELL/SWEET (<i>Capsicum annuum</i>)	0.02
		SPICES	HORSERADISH: DRY (<i>Armoracia rusticana</i>)	0.02
			GINGER: DRY (<i>Zingiber officinale</i>)	0.02
			Others	0.10
6	SINGAPORE	SPICES	SPICES: OTHERS (Spices other)	50
7	SWITZERLAND	VEG: FRUIT-SOLANACEAE	PEPPER-CHILLIES (<i>Capsicum frutescens</i>)	0.02
			PEPPER-BELL/SWEET (<i>Capsicum annuum</i>)	0.02
		SPICES	Others	0.10
8	THAILAND	VEG: FRUIT-SOLANACEAE	PEPPER-BELL/SWEET (<i>Capsicum annuum</i>)	N.D.
		SPICES		N.D.
9	TURKEY	VEG: FRUIT-SOLANACEAE	PEPPER-CHILLIES (<i>Capsicum frutescens</i>)	0.02
			PEPPER-BELL/SWEET (<i>Capsicum annuum</i>)	0.02
		SPICES	HORSERADISH: DRY (<i>Armoracia rusticana</i>)	0.02
			GINGER: DRY (<i>Zingiber officinale</i>)	0.02
			Others	0.10
9	USA	SPICES	N/A	7 940 (ECH)
			N/A	

N.D.– Not Detected or < LOQ (0.01 ppm)

N/A – Not Applicable

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