



**Food and Agriculture
Organization of
the United Nations**



**World Health
Organization**

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Agenda Item 20(b)

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

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DISCUSSION PAPER ON THE ESTABLISHMENT OF A MAXIMUM LEVEL FOR AFLATOXIN B1 AND TOTAL AFLATOXINS IN NUTMEG AND ASSOCIATED SAMPLING PLAN

(Prepared by Indonesia)

Background

Nutmeg (*Myristica fragrans* Houtt) or fragrant nutmeg is an important commodity widely used in Food Industry and medicine and one of the oldest traded commodity in the world. Nutmeg is used in oleo-chemical industry, natural food flavoring in breads, syrups, beverages, and candy. It is used extensively in the form of whole, crushed, powdered and essential oils for the food industry, medicine, and cosmetics.

Nutmeg is native to the Moluccas Islands of Indonesia, but it is also grown in Penang Island of Malaysia, the Caribbean (particularly Grenada), southern state of Kerala in India, Sri Lanka and the island of Zanzibar. Consumption and total import of Nutmeg are expected to increase along with the increase of world population and economic. Nutmeg is widely consumed in the United States as meat sauce, flavoring for candies, cakes and seafood sauce. In India, the Middle East, Japan and Europe nutmeg is used for flavoring in cooking meat or fish and sauce.

Table 1. Nutmeg products and their uses

Nutmeg Product	Uses
1. Dried whole, ground nutmeg	Flavoring in food industry: meat & dairy products (sausages, soups, spice mixes, baked products, eggnog, ice cream etc.)- both domestic and industrial use.
2. Nutmeg oil	Flavoring of processed foods and beverages
3. Mace – Dried, whole, ground	Domestic culinary uses, Industrial culinary uses as flavorings for sweet foods, cakes, doughnuts, dairy products, cigarettes.
4. Mace oil	Flavorings in processed foods and baked products Extract used in perfumes, scented soaps, denture creams and chewing gum
5. Industrial by-products – shells, pods, protein, cellulose, pentosans, starch, resin, mineral elements.	The shells are used in mulches and as fuel. The pods are used in the agro-processing industry

Nutmeg is one of the most traded spices in the world. Indonesia, Sri Lanka, India and Grenada are main producing and exporting countries. European Union, United States, Japan, United Arab Emirates and Vietnam are main importing countries. And Netherlands, Singapore, United Arab Emirates and Vietnam are main re-export countries. Total import of nutmeg in 2010 was US\$ 115.000 with European Union is the largest importer (GTIS “World Trade Atlas”).

Figure 1. Export form Major producing Countries

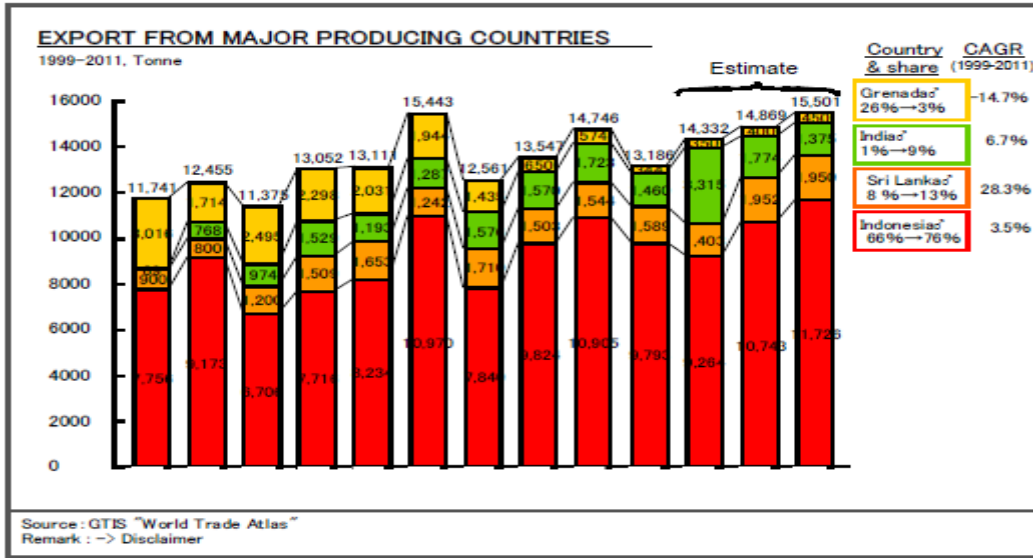


Figure 2. Re-Export form Major Trading Countries

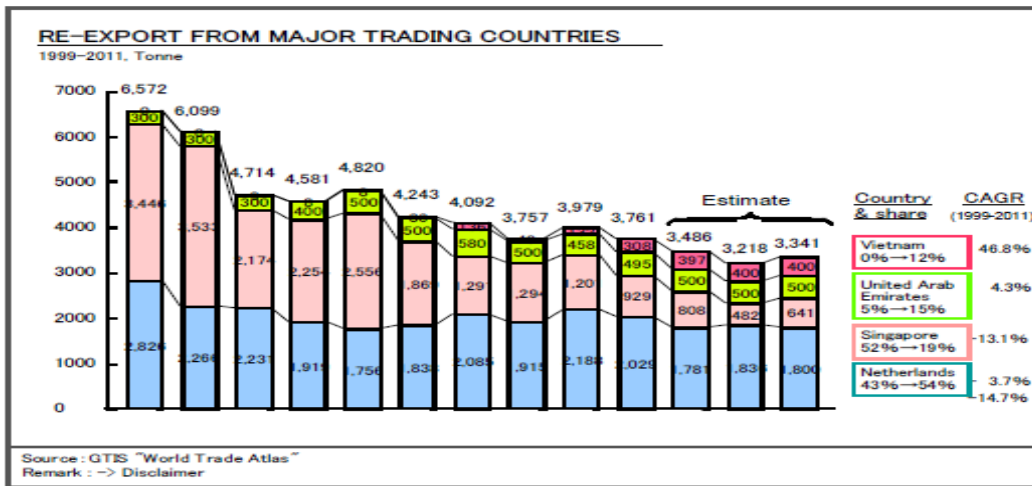
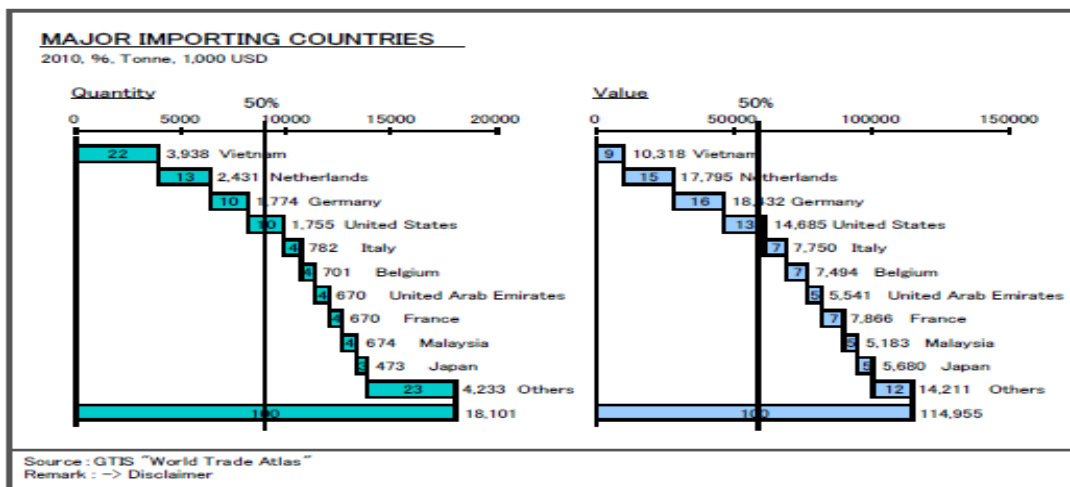


Figure 3. Major Importing Countries



Most of nutmeg producing countries lay in the tropical zone. The humid tropical climate strongly supports the growth of mycotoxin-producing moulds. *Aspergillus flavus* (*A. flavus*) is an Aflatoxin-producing mould that usually occur in nutmeg and dangerous to human health. One of the aflatoxin compound produced by *A. flavus* is aflatoxin B1 (AFB1), a carcinogenic compounds to human liver. Nutmeg can be infested by mycotoxin-producing mould during the harvesting, drying and storage stages.

People are exposed to aflatoxins primarily by consuming aflatoxin-contaminated food. Aflatoxin-producing mould commonly grow on corn and other grains, peanut, tree nuts, and cottonseed meal, meat, egg, milk, and other edible products from animal that consumes aflatoxin-contaminated feed (Asim *et al.* 2011). Aflatoxins have a high degree of acute toxicity and immunosuppressive, mutagenic, teratogenic activity and carcinogenic potential (Plasencia, 2005).

Aflatoxin effects on human health are divided into two categories, i.e. acute aflatoksikosis and sub chronic aflatoksikosis. Acute aflatoksikosis can result in death and acute illness such as cirrhosis of the liver. Sub chronic toxicity can cause cancer, increased toxicity in human with positive HBV, immune disorders and nutritional disorders.

Some countries has established allowable amount of aflatoxin in food. For example, the United States Food and Drug Administration (2000) set maximum limit for total aflatoxins in food is 20 ppb. The European Union sets maximum limit for AFB1 is 5 ppb and 10 ppb for total aflatoxins in spices commodity, such as paprika, nutmeg, etc. While the maximum limit for peanuts, nuts, dried fruit, cereals and processed food products directly consumed is 2 ppb for AFB1 and 4 ppb for total aflatoxins (Jackson dan Al-Taher, 2008).

Standard for maximum limit of Aflatoksin on nutmeg products set by various countries differ from one country to another. Meanwhile, there is no international standard for aflatoxin in nutmeg products may lead to ineffective protection of the consumers' health and potentially unfair trade.

Figure 4. Mace and Nutmeg



At the first session of the Committee on Spices and Culinary Herbs (CCSCH), the Committee discussed the proposal for new work on nutmeg and agreed to request the originators of the proposals (Indonesia) to revise and resubmit the project documents for consideration at its next session. In line with the proposal for new work on standard for nutmeg submitted to the CCSCH, Indonesia would like to propose a Project Document Proposal on the Establishment of a Maximum Levels for Aflatoxin B1 and Total Aflatoxins in Nutmeg (*Myristica Fragrans* Houtt) and Associated Sampling Plan as attached in the Appendix to be considered as a new work by the 8th session of the Committee on Contaminants in Foods (CCCF). Indonesia also seeks support, data and information from member countries to improve this discussion paper.

PROJECT DOCUMENT

PROPOSAL FOR NEW WORK ON THE ESTABLISHMENT OF A MAXIMUM LEVELS FOR AFLATOXIN B1 AND TOTAL AFLATOXINS IN NUTMEG (*Myristica fragrans* Houtt) AND ASSOCIATED SAMPLING PLAN

1. The Purpose and Scope of the Standard

This project aims to establish maximum levels for aflatoxin B1 and total aflatoxins in nutmeg and mace from *Myristica fragrans* Houtt of the Myristica family.

2. Relevance and Timeliness

Aflatoxins were evaluated by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) at its 31st, 46th, 49th and 56th meetings. The JECFA, during its 49th meeting held in 1997, considered estimates of the carcinogenic potency of aflatoxins and the potential risks associated with their intake. International Agency for research on Cancer (IARC), an intergovernmental agency forming part of World Health Organization had classified aflatoxins (except aflatoxin M1) into Group 1, which is carcinogenic to humans.

In recent times, Nutmeg became a universal commodity and consumed by millions of people as well as a number of industry segments such as food, drugs and cosmetics. Nutmeg is one of the most traded spices in the world with a total volume of export from producing countries such as Indonesia, Sri Lanka, India and Grenada were 11.741 tonnes (1999), 12.455 tonnes (2000), 11.375 tonnes (2001), 13.052 tonnes (2002), 13.111 tonnes (2003), 15.443 tonnes (2004), 12.561 tonnes (2005), 13.547 tonnes (2006), 14.746 tonnes (2007), 13.180 tonnes (2008), 14.332 tonnes (2009), 14.869 tonnes (2010) and 15.501 (2011). In 1999-2011, Indonesia export market share was 66-76%, Sri Lanka was 8-13%, India was 1-9% and Grenada was 26-3%. Major importing countries of nutmeg are European Union (Netherlands, Germany, Italy, Belgium and France), United States, Japan, United Arab Emirates and Vietnam. In 2010, total market size of import nutmeg was US\$ 115.000 with European Union as the largest importers.

International Trade of Nutmeg

Year	Import		Export	
	Quantity (Tons)	Value (US\$ Thousand)	Quantity (Tons)	Value (US\$ Thousand)
2009	19.135	119.190	20.890	109.361
2010	102.656	147.310	20.489	134.234
2011	24.073	259.188	23.767	253.285
2012	3.891	37.944	4.936	50.040

Source: ITC, Geneva

International Trade of Mace

Year	Import		Export	
	Quantity (Tons)	Value (US\$ Thousand)	Quantity (Tons)	Value (US\$ Thousand)
2009	3014	24.489	5109	31.370
2010	3648	44.849	4996	53.123
2011	4620	70.797	5026	70.469
2012	636	10.070	429	5.502

Source: ITC, Geneva

A number of countries that put aflatoxins as food safety requirement has significantly increase over the years, But only few countries has established maximum levels for aflatoxin B1 and total aflatoxins in nutmeg, such as European Union and Switzerland, while international standard for allowable aflatoxin in nutmeg products is not established yet. Therefore, the establishment of maximum level for aflatoxin B1 and total aflatoxins in nutmeg and mace are necessary.

The establishment of maximum levels for aflatoxin B1 and total aflatoxins in nutmeg and mace from *Myristica fragrans* Hoult of the Myristica family will be used as reference in consumer's health protection and facilitate fair trade in accordance with international agreements.

Maximum Limits of Aflatoxins in Spices and Nutmeg

No.	Country	Product	Maximum Level (µg/kg)	
			Aflatoxin B1	Aflatoxins Total
1	Bulgaria*	Spices	2	5
2	Croatia*	Spices	30	-
3	European Union*	Nutmeg (<i>Myristica fragrans</i>)	5	10
4	Serbia Montenegro*	Spices	30	-
5	Switzerland*	Nutmeg	10	20
6	Indonesia**	Spices Powder	15	20

Source: *Worldwide regulations for mycotoxins in food and feed in 2003 (FAO)

** NADFC Regulation on Maximum Level of Microbial and Chemical Contaminants in Foods in 2009

3. Main aspects to be covered

Toxicological evaluation of aflatoxin in nutmeg by JECFA and recommendation on maximum level for aflatoxin B1 and total aflatoxins in nutmeg and mace.

4. Assessment against the Criteria for the Establishment of Work Priorities

General criterion

- Consumer protection from the point of health, food safety, ensuring fair trade practices and taking into account the identified needs of developing countries.
- Quality of the produce to meet consumer needs and the minimum requirements of food safety.
- The establishment of maximum level for aflatoxin B1 and total aflatoxins in nutmeg and mace are very beneficial for many countries.

5. Diversification of national legislations and apparent resultant or potential impediments to international trade.

The result of this work wil assist in promoting sound regulatory frameworks in international trade by using scientific knowledge. To overcome the resultant or potential impediments to international trade, it is essential to incorporate all existing different levels in a single improved comprehensive level acceptable across board internationally. This work also will help establish risk management options based upon scientific evaluation.

6. Information on the relation between the proposal and other existing Codex documents

This proposal is for a new global standard and has no relation to any other existing Codex text on this item, except that this standard will make reference to relevant standards and related texts developed by general subject Committees.

7. Identification of any requirement for and availability of expert scientific advice

Scientific Risk Assessment by JECFA would be required.

8. Identification of any need for technical input to the standard from external bodies so that this can be planned for.

None anticipated at this stage

9. Proposed Time Schedule

Subject to approval by Codex Alimentarius Commission, the proposed draft maximum level for aflatoxin B1 and total aflatoxins in nutmeg and mace will be considered by the 9th Session of the CCCF with a view to its adoption in 2016 or 2017.