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World Health Organization

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Agenda Item 8 **CX/CF 15/9/8-Add.1**
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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

9th Session
New Delhi, India, 16 – 20 March 2015

PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF ARSENIC CONTAMINATION IN RICE

Comments at Step 3 submitted by Argentina, Chile Egypt, El Salvador, Kenya, Nicaragua, Thailand, USA, AU and FoodDrinkEurope

ARGENTINA

There are no comments on this document.

CHILE

Chile supports work on this COP.

EGYPT

Egypt supports the recommendations of EWG.

EL SALVADOR

General comments:

The revised content in the proposed draft code is not limited specifically to the prevention and reduction of arsenic in rice in the production and processing levels, as is claimed in the introduction. If the processing and cooking measures will be included, this needs to be stated in the introduction and involve the consumer in the scope of action (Scope).

We ask the EWG to clarify the following phrase in the context of the introductory paragraph: “Implementation of measures that are likely to result in insufficient supply of rice to the market should be avoided.”

Specific Comments:

- 1 INTRODUCTION

The effectiveness of measures in the Code of Practice can vary depending on local environmental conditions (e.g. soil properties, management regimes and temperature). Ideally, ~~[~~large scale~~]~~ field studies ~~[could]~~[should~~]~~ be conducted to identify measures that are feasible and effective for local or regional conditions. If possible, the field studies should be conducted across crop years because arsenic uptake in rice crops is highly variable from year to year.

- Replace the text: “...national or relevant food control authorities” with “competent authorities”.

- 2. SCOPE

2.1 The Code intends to provide ~~national or relevant food control~~ **competent** authorities, producers, ~~manufacturers~~ **processors, consumers** and other relevant bodies with all possible guidance to prevent and reduce arsenic contamination in rice as follows:

i. Source directed measures;

ii. Agricultural measures; and

iii. Processing and cooking measures.

2.2 The Code also includes guidance on monitoring and risk communication.

- ~~3.4 [~~**Aerobic condition**~~ of soil in a paddy field where rice is grown is a condition that a paddy field is more aerobic than flooded condition.] [Aerobic rice technology~~ is a production system in which rice is grown in well-drained, non-puddled, and nonsaturated soils.]
- 4.3 Processing and Cooking Measures

4.3.1 Competent ~~National relevant food control~~ authorities should share the following information with ~~distributors,~~ **processors** and consumers and encourage them to implement the practices, which would reduce arsenic concentration during processing and cooking.

- During polishing process more arsenic is removed from husked rice that contains higher concentration of arsenic and that husked rice polished at the higher polishing rate results in polished rice with lower arsenic concentration. Polished rice contains less inorganic arsenic than husked rice, because polishing removes inorganic arsenic in the bran layer. ~~[~~Thus, husked rice containing high concentration of arsenic can be distributed and safely consumed after it is appropriately processed into polished rice.~~] [~~However, there are also health benefits associated with consumption of husked rice.~~]~~

KENYA

Kenya supports the development of the Code of Practice for prevention and reduction of Arsenic contamination in rice.

NICARAGUA

1. INTRODUCTION

Soil ~~of rice paddy fields~~ **by nature** ~~naturally~~ contain arsenic and also can be polluted by arsenic from anthropogenic sources, such as mining and smelting, through irrigation water, rain and air and materials for agricultural and livestock production. Rice plants absorb arsenic from soil, especially when soil is in **[reducing conditions]**, and accumulate it in grain and straw. Rice may contain inorganic arsenic (arsenite and arsenate) and organic arsenic (monomethylarsonic acid and dimethylarsinic acid).

The effectiveness of measures in the Code of Practice can vary depending on local environmental conditions (e.g. properties **and use** of the soil, ~~management regimes~~ and temperature). Ideally, [large scale] field studies **[would possibly]** ~~[should]~~ be conducted to identify measures that are feasible and effective for local or regional conditions. If possible, the field studies should be conducted across crop years because arsenic uptake in rice crops is highly variable from year to year. Implementation of measures that are likely to result in insufficient supply of rice to the market should be avoided.

Note: The term "large scale" needs definition.

2. SCOPE

2.1 The Code intends to provide national or relevant food control authorities, producers, manufacturers andother relevant bodies with all possible guidance to prevent and reduce arsenic contamination in rice as follows:

i. Source directed measures;

ii. Agricultural measures; and

iii. Processing and cooking measures.

2.2 The Code also includes guidance on monitoring and risk communication.

3. **DEFINITIONS** [to be added/reconsidered in respond to the discussion in the following sections if necessary]

3.1.1 ***Paddy rice*** (rice grain) is rice (species *Oryza sativa L*.) which has retained its husk after threshing (GC 06491).

3.1.2 ***Husked rice*** (brown rice or cargo rice) is paddy rice from which the husk only has been removed. The process of husking and handling may result in some loss of bran (CM 0649[1]).

3.1.3 ***Polished Rice*** (milled rice or white rice) is husked rice from which all ~~or part~~ of the bran and germ have been removed by milling (CM 12051).

Justification: When rice contains a part of bran it is classified as husked rice.

3.2.1 ***Arsenic*** is a metalloid and is found in the environment both from natural occurrence and from anthropogenic activity.

[1] Classification of Foods and Animal Feeds (CAC/MISC 4-1993).

Note: In this paper, the term “arsenic” refers to inorganic and organic arsenic.

3.2.2 ***Organic arsenic*** is an arsenic compound that contains carbon.

3.2.3 ***Inorganic arsenic*** is an arsenic compound that does not contain carbon including As(III) and As(V).

3.3 ***Flooded condition*** of a paddy field where rice is grown is a condition that a paddy field is filled or covered with water during growth.

3.4 [***Aerobic condition*** of soil **or rainfed** in a paddy field where rice is grown is a condition that a paddy field is more aerobic than flooded condition.] [Aerobic rice technology is a production system in which rice is grown in well-drained, non-puddled, and nonsaturated soils.]

3.5 ***[Intermittent ponding*** means a variety of possible water management practices in which a paddy field is alternately in flooded and aerobic/non flooded condition.]

3.6 **Production under irrigation**: **Include definition**.

4. MEASURES TO PREVENT AND REDUCE ARSENIC CONTAMINATION

[Please note that further work is necessary for elaboration of the following sections so as to reflect new findings. Comments submitted in the EWG will be considered later.]

4.1 Source directed measures

4.1.1 Sources of arsenic in the environment are: 1) natural sources, including volcanic action, ~~elution~~ **solution** from soil or sediment such as Holocene sediments, geogenic weathering and low temperature volatilization; and (2) anthropogenic sources, including emission from industries, especially from mining and smelting of non-ferrous metals; burning of fossil fuels; use of arsenic pesticides; and disposal of timber treated with copper chrome arsenate (CCA). In the paddy environment, use of soil amendments and fertilizers contaminated with significantconcentration of arsenic are also sources of arsenic.[2]

4.1.2 National or relevant food control authorities should consider implementation of source directed measures in the *Code of practice on applicable measures in the origin to reduce the contamination of food with chemicals* (CAC/RCP 49-2001). In particular, authorities can consider whether measures in the following areas are appropriate for their countries:

- Irrigation water;
  - Identification of irrigation water with high arsenic concentration
  - ~~Elimination~~ **Reduction** of arsenic from irrigation water with high arsenic concentration **adjusting to permitted limits.**
  - Avoidance of **use of** of irrigation water with high arsenic concentration for rice production
- Soil;
  - Identification of paddy fields in which arsenic concentration in soil is high and/or rice produced from that soil has high inorganic **[or organic]** arsenic concentrations.

Justification: organic rice shouldn’t be excluded.

- **[Atmospheric emissions]** and waste water from industries;
- Materials used in agricultural and livestock production such as pesticides, veterinary medicines, feed, soil amendments and fertilizers; and
- Waste containing arsenic, such as timber treated with copper chrome arsenate.

4.2 Agricultural Measures

4.2.1 **Competent** ~~national or~~ relevant food control authorities should educate rice producers about practices to prevent and reduce arsenic concentration in rice. Education programmes may include:

- Publishing and disseminating technical guidance on rice cultivation techniques to reduce arsenic in rice.
- Establishing farmer field schools

[2] Many fertilizers contain arsenic residues. “Contaminated” should not be interpreted as equivalent to arsenic residues.

4.2.2 Aerobic conditions or intermittent ponding during rice production, instead of flooded conditions, may reduce arsenic concentration in rice.

~~[If the risk from cadmium in rice is of concern in the region, risk managers should be careful that implementation of the measure would not result in posing risk from cadmium as the measure may increase cadmium concentration in rice7. If appropriate, risk managers may also consider implementation of source directed measures for cadmium in soil, water or fertilisers used for rice production].8~~

Implementation of aerobic or intermittent ponding conditions may result in decrease of rice production in some areas. Aerobic growth may also have to be balanced with the use of flooding for weed control or temperaturecontrol in cooler areas.

[4.2.3 National or relevant food control authorities may identify rice cultivars that ~~contain~~ **absorb** arsenic at low concentration ~~in husked and/or polished rice~~ and/or encourage public research institute and/or private nursery developer to develop rice cultivars that result in husked and/or polished rice with low arsenic concentration. Producers could select such rice cultivars, if available and suitable.]

4.3 Processing and Cooking Measures

4.3.1 **Competent** ~~National or~~ relevant food control authorities should share the following information with distributors andconsumers and encourage them to implement the practices, which would reduce arsenic concentration during processing **and** cooking.

- During polishing process more arsenic is removed from husked rice that contains higher concentration ofarsenic and that husked rice polished at the higher polishing rate results in polished rice with lower arsenicconcentration. Polished rice contains less inorganic arsenic than husked rice, because polishing removes inorganic arsenic in the bran layer. ~~[~~Thus, husked rice containing high concentration of arsenic can bedistributed and safely consumed after it is appropriately processed into polished rice~~.] [~~However, there are also health benefits associated with consumption of husked rice~~]~~
- Arsenic concentration in polished rice can be reduced by washing polished rice, “rinse-free” 9 treatment or cooking with large amounts of water followed by discarding excess wate

“Rinse-free” rice, also known as *musenmai*, is rice whose bran that may remain on the surface after polishing is completely removed and thus it is not necessary to wash before cooking.

4.3.2 When water used for cooking is highly contaminated with arsenic, national or relevant food control authorities should inform consumers to avoid using such water for washing and cooking rice, since rice absorbs arsenic in water, and encourage use of water that contains less arsenic instead.

5. **MONITORING**

5.1 The effectiveness of measures should be monitored by arsenic concentration in rice.

5.2 If agricultural land or ground waters used for growing rice are widely contaminated by natural sources, non-point source or past activities, monitoring arsenic concentration in soil and/or irrigation water may also be necessary.

6. RISK COMMUNICATION

6.1 **Competent** ~~National or~~ relevant food control authorities should share information on risks and benefits of consumingpolished and/or husked rice among stakeholders in the light of arsenic concentrations and nutrientcomponents [noting that there are health benefits associated with consumption of husked rice.]

7. COMPLEMENTARY INFORMATION FOR FURTHER CONSIDERATION OF MEASURES

The results of ongoing or further research studies on the effectiveness of measures to prevent and reduce arsenic concentration in rice should be considered to develop the Code. Research on the following topics may help in developing a better Code of Practice:

- Effects of soil amendments and fertilizers (e.g. silicates, phosphates and organic materials) on arsenic concentrations in rice, including the effects of applying different amounts or applying the materials with different timing and frequency (e.g. one-off or repeated use in each season);
- Side effects (e.g. change of yield, cadmium concentration in rice) of implementing the measures to reduce arsenic concentrations in rice;
- Effects of applying flooded/aerobic conditions with different timing and duration in the rice growth period;
- Estimation of arsenic concentration in rice from the arsenic concentration in soil and/or other factors affecting arsenic concentration in rice (e.g. iron, silicates, phosphates etc.) before cultivation; and
- Efficiency and cost of removing arsenic in soil using agricultural crops that absorb and accumulate arsenic from the soil or using chemical compounds that absorb arsenic and are easily separated from the soil.

THAILAND

Thailand supports the Working Group's recommendation to gather more information from research studies on the effectiveness of measures to prevent and reduce arsenic concentration in rice before finalisation of the COP. We also have started the project on this matter and the results may be ready in early 2016.

We generally support the detailed in document CX/CF 15/9/8, Appendix I. However, we have specific comments as followed;

1. Introduction

- We are not in favor of adding "large scale" in front of "field studies" because it is difficult to specify how large the scale is. It also depends on situations and pattern of rice production in each country.
- We support the recommendation suggesting that field studies should be conducted across crop years.

2. Scope

- We support the scope of the COP including sections on monitoring and risk communication.

4.2 Agricultural Measure

- We think that the guidance in section 4.2.2 and 4.2.3 is not a general guidance to all rice producing area, but should be applied only to arsenic contaminated area.

6. Risk communication

- We agree to the Working Group that the COP should consider the way to communicate and advise consumer in order to consume rice safely but avoid misleading. Information should be balance between health risks and benefits.

USA

- The U.S. supports the development of a code of practice as it would be helpful to governments, farmers, industry and consumers in reducing arsenic levels in rice.
- The U.S. recommends that the COP addresses the differences between inorganic and total arsenic, and how flooding/aerobic growth may affect each differently. The most important goal is to reduce inorganic arsenic which should be addressed throughout the document.
- The U.S. agrees with para 14 under the "Discussion" section of the document stating that the COP should not recommend processing husked rice into white rice, and that it would be appropriate to note that the goal of the COP is not to remove husked rice from the marketplace, as well as to include the information on the benefits of consumption of husked rice in the section on risk communication.

AFRICAN UNION

RECOMMENDED AFRICAN POSITION	**RATIONALE**
AU supports the development of the COP.	The CCCF 7 considered a discussion paper which identified management practices which were readily available to be used for the development of a COP. The 8th session of CCCF agreed to initiate new work for the development of the Code of Practice AU supports this COP because: • Inorganic arsenic has been classified as Group 1 skin and lung carcinogen. • Arsenic may be naturally present in the soil or as a result of mining and smelting activities. • It can also be released into paddy fields from irrigation water, rain and air and through the use and disposal of agricultural materials containing arsenic • Rice plants are able to absorb arsenic from the soil after which it is accumulated in rice grains and straws. • The COP will provide national and relevant food control authorities, manufacturers and other relevant bodies with guidance to prevent or reduce arsenic contamination in rice

RECOMMENDED AFRICAN POSITION	RATIONALE
AU agrees with the outline which has been presented in the document. It is the opinion of the Experts Group that the document is incomplete and requires further elaboration.	The outline for the COP covers the following sections: • Introduction • Scope which is expected to cover source directed measures, agricultural measures as well as processing and cooking measures • Definitions • Measures to prevent and reduce arsenic contamination • Monitoring • Risk communication Though the outline for the COP has been presented, there is indication (Page 4) that further work is required for the elaboration of the Section on "Measures to prevent and reduce arsenic contamination"
AU agrees with the recommendation of the EWG to re-establish the EWG for additional collection of information and data for further elaboration of the proposed draft COP.	Although the EWG has collected data on several practices to prevent and reduce arsenic contamination in rice, it is aware of several on-going studies in some countries, the results of which would help improve the COP.

FOODDRINKEUROPE

FoodDrinkEurope remarks on Step 3 on the proposed draft Code of practice for the prevention and reduction of arsenic contamination in rice

Definition;

The CoP defines **"organic arsenic"** as an **arsenic compound that contains carbon** and "**inorganic arsenic**" as an **arsenic compound that does not contain carbon.** This is a theoretical definition. However, in practice it is the sample preparation (acid?) of the analytical method which determines what is "inorganic arsenic" or "organic arsenic". For this reason, the definition should be related to the analytical methods/analytical principles of the method and not only be based on theoretical thoughts. Other poor examples with similar problems in the past have been e.g. dietary fiber and reducing and non-reducing sugars