

# CODEX ALIMENTARIUS COMMISSION



Food and Agriculture  
Organization of the  
United Nations



World Health  
Organization

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**TO** Codex Contact Points  
Contact Points of international organizations having observer status with Codex

**FROM** Secretariat,  
Codex Alimentarius Commission,  
Joint FAO/WHO Food Standards Programme

**SUBJECT** Request for comments at step 8 on the draft standard for quinoa

**DEADLINE** 31 May 2018

**COMMENTS** **To:** Secretariat  
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## BACKGROUND

1. The 40<sup>th</sup> Session of the Codex Alimentarius Commission<sup>1</sup> (CAC40) adopted the proposed draft Standard for Quinoa at Step 5 and also agreed to establish an electronic working group (EWG), chaired by Plurinational State of Bolivia and co-chaired by the United States of America, to continue the work and address the outstanding issues. The EWG would work in English and Spanish.
2. Guidelines for comments is provided in Annex I. The draft Standard is attached as Annex II. The report of the EWG is attached as Annex III. The Reference is provided as Annex IV. The list of participants is given in Annex V.

## REQUEST FOR COMMENTS

3. Codex members and observers are invited to send their comments at Step 8 on the draft Standard for Quinoa. Specifically, please comment on whether the proposed 0.12% maximum limit for saponin content in Section 3.2.6 of the draft Standard for Quinoa can be supported for adoption at Step 8.
4. Comments should be submitted through the Codex Contact Point or recognized international organizations having granted observer status with the Codex Alimentarius Commission. Comments should be formulated in accordance with the relevant general guidelines and presented in a Word file for easy analysis and compilation.

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<sup>1</sup> REP17/CAC para 81

**GENERAL GUIDELINES FOR COMMENTS**

1. In order to facilitate the collection of comments and to prepare a useful document with all of them, Members and Observers are kindly requested to submit comments under the following headings:

(I) General comments

(li) Specific comments

2. In specific comments, a reference to the section / paragraph of the document in question should be included.

3. Members and observers are requested, when proposing amendments to specific paragraphs, to accompany their proposed amendment with the appropriate technical basis. Additional texts should be underlined / bold and deletions crossed out.

4. In order to facilitate the work of the Secretariats, we kindly ask you to avoid texts with colors or shading, nor to use the change control, since the documents are printed in black and white, and the marks usually disappear when copying and pasting the comments in the compiled document.

5. In order to reduce the volume of translations and save paper, members and observers are requested to avoid reproducing the full document, but only those parts of the text in which changes and / or amendments are proposed.

**DRAFT STANDARD FOR QUINOA**  
**(At Step 8)**

**1 Scope**

1.1 This standard applies to quinoa (*Chenopodium quinoa* Willd.) processed as defined in Section 2.2, suitable for human consumption, packaged or in bulk.

1.2 It does not apply to quinoa used as seeds for propagation, products derived from quinoa (e.g., flour, flakes).

**2 Description****2.1 Quinoa**

Quinoa is the grain obtained from *Chenopodium quinoa* Willd.

**2.2 Processed Quinoa**

Processed quinoa are quinoa grain (*Chenopodium quinoa* Willd) that have been subjected to cleaning, removing saponin-containing pericarp and sorting (by color and size).

**3 Essential Composition and Quality Factors****3.1 Quality factors - general**

3.1.1 Quinoa shall be safe and suitable for human consumption.

3.1.2 Quinoa shall be free from abnormal flavours and odours.

3.1.3 Quinoa shall be free from living insects and mites.

3.1.4 Processed Quinoa color should be characteristic, where the most common are white (pearly, pale, grayish), black and red, among others.

**3.2 Quality factors - specific**

**3.2.1 Moisture content.** 13.5% maximum.

**3.2.2 Extraneous matter**

3.2.2.1 Extraneous matter is all organic and inorganic materials other than quinoa.

3.2.2.2.1 Organic extraneous matter includes husks, stem parts, impurities of animal origin, other seed species, and leaves. 0.1% maximum.

3.2.2.2.2 Inorganic extraneous matter includes stones. 0.1% maximum.

**3.2.3 Defect****3.2.3.1 Definition of defect**

**3.2.3.1.1 Broken Grains** are pieces of grains with sizes less than three quarters of the whole grain, resulting from mechanical action.

**3.2.3.1.2 Damaged Grains** are grains that differ from others in their form or structure, because they have been altered by physical, chemical or biological agents.

**3.2.3.1.3 Germinated Grains** are grains that show development of the radicle (embryo).

**3.2.3.1.4 Coated Grains** are grains that retain the shell (perigone) or part of the flower attached to the grain.

**3.2.3.1.5 Immature Grains** are grains that have not reached physiological maturity, characterized by small size and greenish coloration.

**3.2.4 Defective Grain**

Requirements	Maximum Limit %
Broken Grains	3.0%
Damaged grains	2.5%
Germinated Grains	0.5%
Coated Grains	0.3%
Immature Grains	0.9%

**3.2.5 Protein Content**

Requirements	Minimum Content %
Protein	10.0% on a dry matter basis

**3.2.6 Saponin Content**

Requirements	Maximum Limit %
Saponin	0.12%

**3.2.7 Size**

Grain Size	Range mm
Extra Large	Greater than 2.0 mm
Large	Greater than 1.7 to 2.0 mm
Medium	1.4 to 1.7 mm
Small	Less than 1.4 mm

**4 Food additives**

The use of food additives is not permitted.

**5 Contaminants**

**5.1** The product covered by this standard shall comply with the maximum levels of the *General Standard for Contaminants and Toxins in Food and Feed* (CXS 193-1995).

**5.2. Pesticide residues**

The product covered by this standard shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

**6 Hygiene**

**6.1** It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CXC 1-1969) and other relevant Codex texts such as codes of hygienic practice and codes of practice.

**6.2** The product should comply with any microbiological criteria established in accordance with the *Principles and Guidelines for the Establishment and Application of Microbiological Criteria related to Foods* (CXG 21-1997).

**7 Packaging**

**7.1** Quinoa shall be packaged in containers which will safeguard its hygienic, nutritional, technological, and organoleptic qualities.

**7.2** The packaging shall be safe and suitable for the intended use and shall not transfer toxic materials, odours or flavours to the product. All the materials used inside the packaging shall be of food grade, clean, new and of an adequate quality so as not to cause damage to the product.

**8 Labelling**

The product covered by this standard shall be labelled in accordance with the *General Standard for the Labelling of Pre-packaged Foods* (CXS 1-1985).

**8.1 Name of the Product**

The product name appearing on the label shall be "quinoa" or "processed quinoa". Optional information, such as product origin, quality, color, may be included.

## 8.2 Non-retail containers

Information on product for non-retail shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer or packer shall appear on the container. However, lot identification, and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

## 9 Methods of analysis and sampling<sup>2</sup>

For checking the compliance with this standard, the methods of analysis and sampling contained in the *Recommended Methods of Analysis and Sampling* (CXS 234-1999) relevant to the provisions in this standard, shall be used.

	Method	Principle	Type <sup>3</sup>
Moisture content	ISO 712	Gravimetric	1
Saponin Content	To Be Determined		
Protein Content (N x 6.25) Dry weight basis	ISO 1871	Titrimetry, Kjeldahl	1

<sup>2</sup> The listing of methods of analysis and sampling will be removed when the standard is adopted by CAC and included in CXS 234-1999.

<sup>3</sup> CAC Procedural Manual, 25<sup>th</sup> Edition, page 77.

## ELECTRONIC WORKING GROUP REPORT FOR THE DEVELOPMENT OF THE DRAFT STANDARD FOR QUINOA

1. A total of 13 member countries and two observer organizations registered to participate in the electronic working group (EWG). The list of participants is given in Annex V.
2. In November 2017, the first draft was sent to the members of the EWG for a first round of comments. Five member countries and one observer organization submitted comments on the draft.
3. The Chair and Vice-Chair reviewed the comments submitted and modified the draft as appropriate.
4. In January 2018, the second draft was sent to the members of the EWG for another round of comments. Five member countries submitted comments on the second draft.
5. The Chair and Vice-Chair reviewed the comments submitted and modified the draft as appropriate.
6. In addition, a specific consultation was made to members of the EWG.
7. In March 2018, the summary report of the EWG and the draft standard were submitted to the Codex Secretariat for circulation for comments at Step 8 to Codex members and observers.

### Reviews and modifications

8. Comments received from members of the EWG were about the scope, definitions, color, moisture content, extraneous matter, size, saponin content and method for saponin content.
9. The wordings were improved and formal changes were made in sections 1.1, 2.2, 3.2.2.2.1, 3.2.5, 4, and 8.2, according to the suggestions of the EWG members.
10. Section 3.1.4. Color, it was widely discussed, especially regarding to the use of the terms "species" and "variety" and a clearer wording was constructed which considers the comments of all members.
11. Section 3.2.1. Two members of the EWG requested to establish a value of 12.5% for moisture content, 1 member proposed to establish two values and 1 member requested to establish a value of 13.5%. Two member countries supported 13.5% and one observer organization supported 13.5% and suggested including a text as indicated other cereals Codex standards. The EWG finally concluded to adopt the value of 13.5% based on the safety factors per comments by a member country, and in accordance with other Codex standards.
12. Section 3.2.6. One member country requested deletion of saponin content as a requirement.

The EWG agreed to a saponin content of 0.12% as a requirement. If this requirement is adopted by CAC41 at Step 8, a request for advice on suitable testing methods for quinoa can be sent to CCMAS.

It should be noted that the EWG and the CCCPL have identified saponin as a quality requirement for the following reasons:

Quinoa was widely cultivated in the Andean region by pre-Columbian cultures and its grains have been used in the diet of the inhabitants to date. Quinoa contains saponins that are contained in the shell and are responsible for the bitter taste<sup>1</sup>.

Saponins are found in many plant species, for example in spinach, asparagus, alfalfa, soybeans. The saponin content in quinoa varies between 0.1 and 5%<sup>1</sup>.

For human consumption, quinoa must go through a process that removes the bitter saponin from the outer shell (pericarp) of the grain<sup>2</sup>.

Quinoa can be classified as "bitter" or "sweet" varieties that reflect the saponin content, i.e., sweet varieties<sup>3</sup> contain lower saponin levels than bitter varieties. Based on reported saponin content, most quinoa varieties are classified as bitter (saponins > 0.11%)<sup>4</sup>.

Countries traditionally producers Quinoa such as Bolivia, Peru and Ecuador eliminate saponin through the removal of the pericarp and subsequent washing to remove the bitter taste, in this sense the "Andean Standard NB 0038 for processed quinoa" establishes a maximum limit of 120 mg / 100g for the saponin content as a quality organoleptic parameter, which is measured through the foam method indicated in this Standard<sup>5</sup>.

It is important to consider that countries as Bolivia, where historically the consumption of quinoa is habitual and even is part of the School Breakfast Program, prenatal and lactation subsidy, in the last 15 years have not been reported outbreaks or cases of poisoning due to quinoa consumption according to the information provided by the National Monitoring System of the Ministry of Health<sup>6</sup>.

According to scientific studies, quinoa contains saponins of the triperenoid type, on which biological and pharmacological properties have been found as anti-inflammatory, immunomodulatory, antifungal, antimicrobial, anticancer and antioxidant, these compounds being of great pharmacological interest.<sup>7,8,9</sup>

13. Section 3.2.7. Two countries requested that the "extra-large" size be eliminated. A member country requested to maintain it, presented its livelihood, which indicates that they have varieties of quinoa with a size greater than 2 mm in the trade, as well as it is established by its current regulations NTA 0038: 2007 GRANOS ANDINOS. QUINUA IN GRAIN. CLASSIFICATION AND REQUIREMENTS.

However, other EWG members did not comment on this requirement.

Considering that it is an inclusive international standard for worldwide marketing practices, the "extra-large" size was not removed from the proposed standard.

14. Section 9. There is no internationally validated method for the determination of saponin content. Although there is a foam method, a traditional semiquantitative method that is applied by the member countries of the CAN according to regional regulations and is based on an FAO document, it does not have an international validation.

In this section the method for saponin was maintained and the phrase "to be determined" was included.

### **Consultations**

15. The Chair and Vice Chair of the EWG conducted a consultation within the EWG as described below:

16. First question – method for saponin content

*"We kindly request if you could send us a validated and appropriate method to determine saponin level in quinoa and the detailed information of this method, to be included in the quinoa standard. Please, this information should be sent before December 1st at the latest."*

Two member countries responded indicating that they had the methods for the determination of saponin, however these did not contain information on the validation of the method. The two member countries were asked to send this information to include the methods proposed in the standard and send it to the CCMAS for approval. However, there was no response.

According to the above, the EWG concludes that there is no method validated internationally for the determination of saponins in quinoa.

## REFERENCES

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7. Girma Moges Woldemichael, Michael Wink, Identification and Biological Activities of Triterpenoid Saponins from *Chenopodium quinoa*, *J. Agric. Food Chem.* 2001, 49, 2327–2332
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9. Ozgur Kivilcim Kilinc<sup>1</sup>, Senay Ozgen<sup>1</sup> and Zeliha Selamoglu<sup>2</sup>, Bioactivity of Triterpene Saponins from Quinoa (*Chenopodium Quinoa* Willd.), e-ISSN:2322-0066.



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