Dried Raw Seaweed – Specification
Foreword

The Philippine National Standard (PNS) for Dried Raw Seaweed (BAFPS/PNS 85) was established and adopted in 2010. However, the major industry players, thru the Seaweed Industry Association of the Philippines (SIAP), moved for its immediate revision. Thus, a meeting with the SIAP members composed of seaweed processors, suppliers and traders was conducted in Cebu on April 27, 2012 in order to fine-tune the requirements of the PNS.

The new requirements and other revisions made are based from the consensus and local practice of the industry. The following significant changes have been made with respect to previous edition:

1. In the scope, footnotes were added signifying the local trade names of seaweed which have been covered by the standard;
2. Specifications, classification according to quality, and definition of defectives for dried raw seaweed were modified in harmony with the industry requirements; and
3. Test methods for determination of moisture content, sand, salt as sodium chloride (KCl) and impurities were also corrected.

The PNS for Dried Raw Seaweed aims to provide common understanding on the scope of the standard, quality requirements, classification according to quality, tolerances, contaminants, hygiene, packaging, marking or labeling, sampling, and definition of defectives.

This standard cancels and replaces PNS/BAFPS 85:2010, and subject for review/revision every three (3) years or as necessary.
1  Scope

This standard prescribes quality specifications and safety requirements of dried raw seaweed of the class Rhodophyceae (red seaweed) such as but not limited to \textit{Kappaphycus spp.}\textsuperscript{1} and \textit{Eucheuma spp.}\textsuperscript{2}

2  References

The references referred to in this standard are listed in the back cover.

3  Definitions

For the purpose of this standard, the following definitions shall apply:

3.1 class
shall refer to the designation of dried raw seaweed quality according to the established government standard thereof

3.2 clean anhydrous seaweed (CAS)
seaweed removed of moisture, salt, sand and impurities

3.3 contaminants
any biological or chemical agent, foreign matter, or other substances not intentionally added to dried raw seaweed which may compromise food safety and suitability

3.4 impurities/debris
other seaweed, plastic, wood, dirt and other foreign matters other than sand and salt

3.5 seaweed
a loose colloquial term encompassing macroscopic, multicellular, benthic marine algae. The term includes some members of the red, brown and green algae

4  Requirements

4.1 Dried raw seaweed must be of one species only.

4.2 Dried raw seaweed must be mature, having a culture period of sixty (60) to seventy-five (75) days.

4.3 Dried raw seaweed must meet the following criteria as shown in Table 1.

\textsuperscript{1} Hereafter refers to the trade name “\textit{cottonii}.”

\textsuperscript{2} Hereafter refers to the trade name “\textit{spinosum}.”
Table 1 – Specifications for dried raw seaweed

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Kappaphycus spp.</th>
<th>Eucheuma spp.</th>
<th>Test methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture content (MC), (% max)</td>
<td>40</td>
<td>38</td>
<td>Annex A</td>
</tr>
<tr>
<td>Clean anhydrous seaweed (CAS), (% min)</td>
<td>30</td>
<td>40</td>
<td>Annex B</td>
</tr>
<tr>
<td>Impurities, (% max)</td>
<td>3</td>
<td>3</td>
<td>Annex C</td>
</tr>
<tr>
<td>Salt as KCl, (% max)</td>
<td>25</td>
<td>20</td>
<td>Annex D</td>
</tr>
<tr>
<td>Sand, (% max)</td>
<td>1</td>
<td>1</td>
<td>Annex D</td>
</tr>
<tr>
<td>Color</td>
<td>Definitely not black</td>
<td>Definitely not black</td>
<td></td>
</tr>
</tbody>
</table>

5 Classification according to quality

A. Kappaphycus spp.

<table>
<thead>
<tr>
<th>Class</th>
<th>MC (% max)</th>
<th>CAS (% min)</th>
<th>Impurities (% max)</th>
<th>Salt as KCl (% max)</th>
<th>Sand (% max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>35</td>
<td>35</td>
<td>3</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>38</td>
<td>33</td>
<td>3</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>40</td>
<td>30</td>
<td>3</td>
<td>25</td>
<td>1</td>
</tr>
</tbody>
</table>

B. Eucheuma spp.

<table>
<thead>
<tr>
<th>Class</th>
<th>MC (% max)</th>
<th>CAS (% min)</th>
<th>Impurities (% max)</th>
<th>Salt as KCl (% max)</th>
<th>Sand (% max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>33</td>
<td>45</td>
<td>3</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>35</td>
<td>43</td>
<td>3</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>38</td>
<td>40</td>
<td>3</td>
<td>20</td>
<td>1</td>
</tr>
</tbody>
</table>

6 Tolerances

In all classifications, 70% from the sample sizes shall pass the analyses for moisture content, clean anhydrous seaweed, impurities, salt (as KCl), and sand in order for a lot to be allowed for each shipment.

7 Contaminants

The product shall comply with the maximum residue levels established by the Codex Alimentarius Commission and/or authority for this commodity.

8 Hygiene

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 Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1 – 1969, Rev.4-2003) and other relevant Codex texts.
9 Packaging

Seaweed shall be packed in appropriate containers that will adequately protect the product from normal hazards of transportation and handling.

10 Marking or labeling

Each container shall be legibly labeled with the following information, if appropriate.

10.1 Name of the product;
10.2 Class, variety name;
10.3 Net weight in kilograms;
10.4 Lot/Batch number or code number;
10.5 Name and address of producer/packer/distributor; and
10.6 The words “Product of the Philippines”.

11 Sampling

Sampling method to be used for ascertaining conformance to the requirements of this specification shall be in accordance with Annex E.

12 Definition of defectives

The sample unit shall be considered as defective when it exhibits any of the properties defined below.

12.1 Impurity

The presence in the sample unit of impurity other than salt and sand of more than 3%.

12.2 Higher moisture content

The presence in the sample unit of moisture content of more than 40% for *Kappaphycus spp.* and 35% for *Eucheuma spp.*

12.3 Higher salt (as KCl) content

The presence in the sample unit of salt (as KCl) of more than 25% for *Kappaphycus spp.* and 20% for *Eucheuma spp.*

12.4 Higher sand content

The presence in the sample unit of sand of more than 1%.
Annex A

Determination of moisture of seaweed

A1 Method A – Determine moisture of seaweed by direct reading using the moisture meter.

A2 Method B – Oven Drying

A2.1 Apparatus: Thermally controlled drying oven

A2.2 Procedure:

a) Weigh one hundred grams of seaweed laboratory sample in a pre-weighed moisture dish. Record weight as \( w_o \);

b) Dry dish plus sample to constant mass at a temperature of 60°C-65°C for *Eucheuma spp.* and 80°C-85°C for *Kappaphycus spp.* in 12 to 16 hours. Record weight as \( w_f \); and

c) Calculate Percent Moisture using the following formula:

\[
\text{Percent Moisture} = \frac{w_o - w_f}{w_o} \times 100
\]

where:

- \( w_f \) weight of the seaweed after drying
- \( w_o \) weight of the seaweed before drying
Annex B

Calculation for clean anhydrous seaweed (CAS)

B1  Percent Clean Anhydrous Seaweed is obtained by the formula:

\[
\frac{\text{CAS}}{\text{W}_0} \times 100
\]

where:

- CAS is the mass of clean anhydrous seaweed in grams
- \( W_0 \) is the original mass of seaweed taken for analysis in grams
Annex C

Determination of impurities/debris

C1 Weigh 250 grams laboratory sample. Record weight as $W_O$;

C2 Remove debris and other foreign material by hand.

C3 Weigh the impurities/debris and other foreign materials. Record weight as $W_D$; and

C4 Calculate Percent Impurities/Debris by the formula:

$$\text{\% Impurities/debris} = \frac{W_D}{W_O} \times 100$$

where:

$W_D$ is the mass of debris/impurities and other foreign materials in grams

$W_O$ is the mass of laboratory sample taken for analysis in grams
Annex D

Determination of salt (as KCl) and sand

I. Salt as KCl

D1 Get a one (1) kilogram representative sample of the seaweed raw material;

D2 Weigh 250 g into a 2-L beaker;

D3 Add about 900 ml of distilled water, soak the seaweed overnight to remove the sand and salt. Remove the seaweed, stir the solution very well to completely dissolve the salt;

D4 Decant the solution into a 1-L volumetric flask and dilute to volume distilled water. Save the sand for further analysis;

D5 Mix the solution well and measure a 50 ml aliquot into a 250-ml volumetric flask;

D6 Dilute to volume with distilled water. Mix well and measure a 10 ml aliquot into an Erlenmeyer flask;

D7 Add 5 drops of K₂CrO₄ and titrate with standard 0.100 N AgNO₃ to end point (tinge of orange brown);

D8 Calculate % salt (as KCl) using the following formula:

\[
\frac{74.50 \times V \text{AgNO}_3 \times N \text{AgNO}_3 \times \frac{100}{1000}}{rac{50}{250} \times \frac{10}{1000} \times \frac{1}{250}} \times 100
\]

% salt (as KCl) = .................................

II. Sand

D9 Wash the sand from step B4 with distilled water 3 times;

D10 Put the sand into a pre-weighed porcelain crucible;

D11 Dry in the oven at 105°C to constant mass. Record weight as \( W_d \); and

D12 Calculate % sand using the following formula:

\[
\frac{W_d}{250} \times 100
\]

% sand = .................................

where:

\( W_d \) is the weight of the dried sand in grams
Annex E

Method of sampling

E1. Definition of terms

For the purpose of this method, the following definitions shall apply:

E1.1 bulk sample – the quantity of seaweed obtained by combining and mixing the primary sample taken from a specific lot.

E1.2 consignment – the quantity of seaweed dispatched or received at one time and covered by a particular contract or shipping document. It may be composed of one or more lot.

E1.3 laboratory sample – the quantity of seaweed removed from the bulk sample and is intended for analyses or other examination.

E1.4 lot – composed of seaweed belonging to the same species intended to be uniform in characteristics regarding post harvest treatment.

E1.5 primary sample – a small quantity of seaweed taken from a bag/bale from a lot.

E2. Sample size

The size of the sample (n) which is the number of bags/bales to be taken from a lot depends on the size of the lot (N) and shall be in accordance with Table 2.

<table>
<thead>
<tr>
<th>Lot size (N)</th>
<th>Size of the sample (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5 bags/bales</td>
<td>All bags/bales</td>
</tr>
<tr>
<td>6 to 49 bags/bales</td>
<td>5 bags/bales</td>
</tr>
<tr>
<td>50 to 199 bags/bales</td>
<td>10% of the bags/bales</td>
</tr>
<tr>
<td>200 bags/bales or more</td>
<td>$\sqrt{n} + 1$</td>
</tr>
<tr>
<td></td>
<td>where $n =$ number of bags/bales</td>
</tr>
</tbody>
</table>

E3. Sampling procedure

The sample shall be taken at random from the lot and in order to achieve this, a random number table agreed upon between the buyer and seller should be used. If such table is not available, the following procedure shall be adopted:
a) Starting from any bag/bale, count the bags/bales as 1, 2, 3… etc. up to \( r \) and so on. Withdraw from the lot every \( r \)th bag/bale thus counted for sampling, the value of \( r \) is equal to

\[
N
r = \frac{N}{n}
\]

where:

- \( N \) is the total number of bags/bales in the lot;
- \( n \) is the number of bags/bales to be taken (see Table 2)

b) If \( r \) is a fractional number, its value shall be taken as equal to the integral part of it.

E3.1 When the product is in movement, samples may be taken at the time of loading or unloading of the bags/bales. For this purpose, the number of bags/bales to be taken shall also be in accordance with Table 2. The value of \( r \) shall be calculated as indicated above, and every \( r \)th bags/bales counted during loading or unloading shall be removed for sampling.

E3.2 Take primary samples, by means of an appropriate sampling instrument, from different parts of each bags/bales selected.

E3.3 A series of primary samples should be taken from different positions in the lot.

E4 Bulk sample

E4.1 Thoroughly mix all the primary samples taken as described above to form the bulk sample.

E4.2 The size of the bulk sample shall be more than three (3) times the quantity of sample required to carry out all the tests required in the specification.

E5 Laboratory samples

E5.1 Divide the bulk sample into three (3) or more equal parts. Each part thus obtained constitutes a laboratory sample; one (1) of these samples is intended for the buyer and another for the seller. The third sample, bearing the seals of the buyer and of the seller (or of their representatives) if they were present at the time of sampling or of the person who sampled the lot, shall constitute the reference sample to be used in case of dispute between buyer and seller; it shall be kept at a place acceptable to both parties.

E5.2 Samples for test shall be one (1) kilogram.
References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.


Palma, Hector A. Seaweed Farming Systems. 2nd Mindanao Seaweed Congress. Zamboanga City. April 25-26, 2001

Philippine Fisheries Profile.

http://en.wikipedia.org/wiki/Seaweed
Department of Agriculture  
Bureau of Agriculture and Fisheries Product Standards

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