

**National Organic Standards Board
Handling Subcommittee Proposal
Marine Algae listings on the National List**

January 17, 2017

I INTRODUCTION

During its recent five year sunset review of almost 200 materials the NOSB and public comment noted that the listings of the nine (9) marine materials on the National List includes overlap in species, and lack of scientific clarity. A discussion document was posted and substantive public comment received in Fall 2016. Based on public comment from a broad cross section of stakeholders this proposal recommends that the marine algae materials be annotated with Latin binomials where possible, or by Class, and that the NOP review the word “kelp” as used in organic production and clarify if marine materials on the List should be classified as agricultural or non-agricultural.

II BACKGROUND

There are nine separate listings for marine materials on the National List, which are the subject of this document. An identical proposal is also brought forward by the Crops Subcommittee:

1. **Aquatic plant extracts** (Technical report 2006) - aquatic plant (algae) extracts are most commonly derived from kelp such as *Ascophyllum* species and *Ecklonia maxima* (Sea Bamboo) as well as other seaweeds harvested from the North Atlantic. *Ascophyllum nodosum*, (Rockweed) is in the *Fucaceae*, a brown seaweed, Class *Phaeophyceae*.
2. **Alginate acid** (TR 2015) is primarily extracted from brown seaweeds, Class *Phaeophyceae*. Major commercial sources are from species that include *Ascophyllum* (North Atlantic), *Laminaria* and *Saccharina* (various northern hemisphere oceans) and *Macrocystis* (California and Mexico), with lesser sources from *Lessonia* (South America), *Durvilea* (Australia), *Ecklonia* (South Africa), *Sargassum*, and *Turbinaria*.
3. **Agar-Agar** (TR 2011) is typically derived from red seaweeds, Class: *Rhodophyceae*. The marine algae that produce agar-agar are widely distributed throughout the world and several different species are utilized for extraction. Most commercial agar-agar is extracted from *Gelidium* and *Gracilaria* species, but other commonly used species include *Pterocladia* and *Gelidiella*. The most important sources worldwide include the coasts of Japan, Spain, Portugal, Morocco, Senegal, Chile, Mexico, the southern United States, India, the Philippines, Madagascar, South Africa, Egypt, and New Zealand although many other countries also supply algae used to make agar-agar. Although most agar-agar is produced from algae that grow in the oceans, *Gracilaria* algae are also cultivated on a commercial scale by some countries.
4. **Carrageenan** (TR 2011) is a generic term for a family of linear polysaccharides derived from species of red seaweeds (*Rhodophyceae*). They can be wild harvested or cultivated. Typical species used are *Chondrus crispus*, *Mastocarpus stellatus*, *Eucheuma cottonii* and *Eucheuma spinosum*, which grow in the warm waters of the Philippines, Indonesia, and Tanzania and produce kappa- and iota-carrageenan, respectively. The Asia-Pacific region has remained the

largest source of carrageen-producing seaweed, supplying over 50% of the market from 1999 through 2009, and the Americas have similarly maintained 16-18% of the global market.

5. **Alginates** are derived from brown seaweeds (See TR 2015). Of the species in the class of brown seaweeds, 41 species are used for extracting alginates, including: *Ascophyllum nodosum* from Ireland, Norway, UK; *Cystoseira barbata* from Egypt; *Durvillaea potatorum* from Australia; *Fucus serratus*, *F. vesiculosus* from Ireland; *Laminaria digitata* from France, Ireland; *Laminaria hyperborea* from Ireland, Norway, Spain, UK; *Laminaria japonica* from China; *Laminaria ochroleuca* from Spain; *Lessonia nigrescens* from Chile, Peru; *Lessonia trabeculata* from Chile; *Macrocystis integrifolia* from Peru; *Sargassum crassifolium*, *S. grammifolium*, *S. henslowianum*, *S. mcclurei*, *S. siliquosum*, *S. vachelliannum* from Vietnam; *Sargassum ilicifolium*, *S. myriocystum*, *S. wightii*, *Turbinaria conoides*, *T. decurrens*, *T. ornata* from India; *Sargassum polycystum* from Indonesia, Thailand.
6. **Beta-carotene from algae** (TR, 2011) is typically derived from green algae, Class: *Chlorophyceae*. The common source of beta-carotene color is derived from the micro-algae *Dunaliella salina* and *Dunaliella bardawil*. These species are cultivated. *Dunaliella* species are commonly observed in salt lakes in all parts of the world from tropical to temperate to Polar Regions where they often impart an orange-red color to the water. In a review article conducted by Dufosse et al. (2005), they concluded that algal forms are the richest source of pigments and can be produced in a renewable manner, since they produce some unique pigments sustainably. The report also stated that the production of β -carotene from *Dunaliella* will surpass synthetic as well as other natural sources due to microalgae sustainability of production and their renewable nature. (TR 2011, 530-545).
7. **Kelp** (TR 2016) is a broad generic term for brown seaweeds, Class *Phaeophyceae*, in the Order *Laminariales*, with at least 30 genera and many species, and in the Order *Fucaceae* such as *Ascophyllum nodosum*.

NOP 5027 states that kelps are brown algae and are among the most common seaweeds consumed as food. Stationary kelps/seaweeds rooted via a holdfast are wild harvested from the intertidal (eulittoral zone) and deeper (sublittoral zone) waters throughout the world's oceans.

However the term "kelp" as used in fertilizer means ANY macroalgae seaweed, brown (*Phaeophyceae*), red (*Rhodophyceae*) or green (*Chlorophyceae*) (Assoc. of American Plant Food Control Officials (AAPFCO)).

To further confuse the definition of kelp the American Association of Feed Control Officials (AAFCO – as distinct from AAPFCO) approves dried kelp from the families *Laminariaceae* and *Fucaceae* for use as ingredients in livestock feed (see also NOP 5027).

NOTE: Kelp used in organic livestock production must be certified, but for use in processing/handling for humans non-organic kelp is allowed.

The FDA lists 4 species under the definition of Kelp, *Macrocystia pyrifera*, *Laminaria digitata*, *Laminaria saccharina* and *Laminaria cloustoni* (21 CFR 172.365).

OMRI definition of Kelp:

- (1) Crop production- The dried marine algae of the botanical divisions of *Rhodophyta* (red algae) *Phaeophyta* (brown algae and *Chlorophyta* (green algae) (AAPFCO)
- (2) Livestock production – Seaweed of the families *Laminariaceae* and *Fucaceae* (American Association of Feed Control Officials (AAFCO).
- (3) Processing and Handling – The dehydrated, ground product prepared from the brown algae species *Macrocystis pyrifera*, *Laminaria saccharina* , and *Laminaria costoni* (21 CFR 172.365)

Kelp classification: The NOP received comments asserting that kelp is not agricultural and should be permitted only as a nonsynthetic, nonagricultural ingredient in organic livestock feed as per § 205.237(a). This position implies that kelp should not have to be certified organic to be used in organic livestock feed. However, kelp is currently listed as an agricultural product under § 205.606 of the National List of Allowed and Prohibited Substances (National List). Because kelp is listed at § 205.606, the NOP considers kelp an agricultural product and, therefore, kelp must be certified organic to be included in livestock feed. (See comments received in response to publication of draft guidance, NOP 5022 – Wild Crop Harvesting. 70 FR 62693 [October 13, 2010].)

Pacific Kombu, and *Undaria innatifida*, listed separately on the National List, are also Kelp species.

- 8. **Seaweed- Pacific Kombu** is a kelp, often *Laminaria japonica* or *Saccharina japonica*. This species is cultivated in waters of Japan, Korea and China.
- 9. **Wakame- *Undaria pinnatifida*** is a kelp species native to cold temperate coastal waters in Japan, Korea and China, but it has also become an invasive weed species in numerous other locations. *Undaria* is widely cultivated in China and Japan.

III RELEVANT AREAS OF THE RULE, FDA, NOP GUIDANCE, NOP POLICY MEMO, OMRI

§205.601 Synthetic substances allowed for use in organic crop production

In accordance with restrictions specified in this section, the following synthetic substances may be used in organic crop production: Provided that, use of such substances do not contribute to contamination of crops, soil, or water...

(j) As plant or soil amendments.

- (1) Aquatic plant extracts (other than hydrolyzed) –Extraction process is limited to the use of potassium hydroxide or sodium hydroxide; solvent amount use is limited to that amount necessary for extraction.

§205.605 Nonagricultural (nonorganic) substances allowed as ingredients in or on processed products labeled as “organic” or “made with organic (specified ingredients or food groups).”

(a) *Nonsynthetics allowed:*

- Acids (Alginic; ...).
- Agar-agar.
- Carrageenan.

(b) *Synthetics allowed:*

- Alginates.

§205.606 Nonorganically produced agricultural products allowed as ingredients in or on processed products labeled as “organic.”

(d) Colors derived from agricultural products-must not be produced using synthetic carriers and solvent systems or any artificial preservative.

(2) Beta-carotene extract color derived from carrots or algae (pigment CAS 1393-61-1).

(l) Kelp – for use only as a thickener and dietary supplement.

(t) Seaweed, Pacific Kombu.

(x) Wakame Seaweed (*Undaria pinnatifida*).

§205.207 Wild-crop harvesting practice standard.

(a) A wild crop that is intended to be sold, labeled, or represented as organic must be harvested from a designated area that has had no prohibited substance as set forth in §205.105, applied to it for a period of 3 years immediately preceding the harvest of the wild crop.

(b) A wild crop must be harvested in a manner that ensures that such harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the wild crop.

205.237 (a) § 205.237 Livestock feed.

(a) The producer of an organic livestock operation must provide livestock with a total feed ration composed of agricultural products, including pasture and forage, that are organically produced and handled by operations certified to the NOP, except as provided in § 205.236(a)(2)(i), except, that, synthetic substances allowed under § 205.603 and nonsynthetic substances not prohibited under § 205.604 may be used as feed additives and feed supplements, Provided, That, all agricultural ingredients included in the ingredients list, for such additives and supplements, shall have been produced and handled organically

21 CFR 172. 365 – FDA, Title 21, Food for Human Consumption – Kelp

Kelp may be safely added to a food as a source of the essential mineral iodine,The food additive kelp is the dehydrated, ground product prepared from *Macrocystis pyrifera*, *Laminaria digitata*, *Laminaria saccharina* and *Laminaria cloustoni*.

21 CFR 172.620 – FDA- Carrageenan – (a) The food additive is the refined hydrocolloid prepared by aqueous extraction from the following members of the families *Gigartinaeae* and *Solieriaceae* of the class *Rhodophyceae* (red seaweed): *Chondrus crispus*, *Chondrus ocellatus*, *Euchemma cottonii*, *Euchemma spinosum*, *Gigartina acicularis*, *Gigartina pistillata*, *Gigartina radula*, *Gigartina stellate*.

21 CFR184.1115 – FDA – Agar-Agar (a) A dried, hydrophylic, colloidal polysaccharide extracted from one of a number of related species of red algae (class *Rhodophyceae*).

NOP 5022, effective July 22, 2011, Guidance- Wild Crop Harvesting, provides details to clarify 205-207.

NOP 5027, March 4, 2013, The Use of Kelp in Organic Livestock Feed. This guidance establishes that kelp are brown algae and may be certified organic as a wild crop under 7 CFR § 205.207 and must be certified organic if used as an ingredient in livestock feed per § 205.237.

NOP 5020, effective 1/15/16, Guidance: Natural Resources and Biodiversity Conservation. Purpose; To clarify organic regulations at 7 CFR 205.200, which states “to maintain or improve the natural resources of the operation....”.

NOP Policy Memo 12-1, Production and Certification of Aquatic Plants, issued September 12, 2012

provides further clarification, as follows:

This policy memorandum is issued as a reminder that aquatic plants and their products may be certified under the current USDA organic regulations. Certifiers and their clients may use the USDA organic regulations, including the National List of Allowed and Prohibited Substances at 7 Code of Federal Regulations (CFR) 205.601-205.602, as the basis for the production and certification of cultured and wild crop harvested aquatic plants.

While current USDA organic regulations specifically exclude aquatic animals from organic certification, no such exclusion exists for aquatic plants. Further, some parts of the USDA organic regulations specifically address aquatic plant production. For example, some aquatic plants, such as kelps and seaweeds, are listed in 7 CFR 205.606 of the USDA organic regulations, allowing their use in non-organic form when certified organic forms are not commercially available. Producers and certifiers are required to comply with the USDA organic regulations when producing or certifying cultured and wild crop harvested aquatic plants.

The use of ground and surface waters, ponds, streams, or other waterways for aquatic plant production may be regulated by Federal, State or local authorities. Aquatic plant producers should consult with Federal, State and local authorities to ensure compliance with all applicable laws, in addition to the USDA organic regulations, regarding the use of synthetic substances and other materials in ponds and waterways. Also, under 7 CFR 205.200, aquatic plant producers must ensure, and certifying agents must verify, that production practices maintain or improve the natural resources of the operation, including soil and water quality.

OMRI definition of kelp:

- (1) Crop production- The dried marine algae of the botanical divisions of *Rhodophyta* (red algae) *Phaeophyta* (brown algae and *Chlorophyta* (green algae) (AAPFCO)
- (2) Livestock production – Seaweed of the families *Laminariaceae* and *Fucaceae* (AAFCO)
- (3) Processing and Handling – The dehydrated, ground product prepared from the brown algae species *Macrocystis pyrifera*, *Laminaria saccharina*, and *Laminaria costoni* (21 CFR 172.365)

IV DISCUSSION:

The NOSB submitted brief information on each of the nine materials and posed seven questions for the limited scope TR in 2016. Questions were posed to the public in the subsequent NOSB discussion document (November 2016), and thousands of pages of public comment and peer reviewed scientific research articles were received, providing the NOSB with a substantive body of documented research from a number of perspectives.

Public comment included concerns for the following:

- Lack of clarity as to which species are allowed on the National list and confusion over names used.
- Desire to encourage organic cultivation and wild harvesting of marine materials.
- Need for clarification of which species can or are being cultivated.
- Clarification of wild harvesting techniques.
- Feasibility of harvesting by individual species selection as opposed to multi-species harvesting by littoral or marine zone
- Extraction methods.

- Sequestration of metals or other contaminants in some wild and cultivated algal species.

Public comment from all sectors strongly supported a proposal to clarify and annotate the marine algae listing through use of Latin binomials as far as possible, and recommended NOP Guidance.

V PROPOSAL:

1. Motion to annotate the marine algae listings as follows, shown in underline:

§205.605 Nonagricultural (nonorganic) substances allowed as ingredients in or on processed products labeled as “organic” or “made with organic (specified ingredients or food groups).”

- (a) *Nonsynthetics allowed:*

Acids (Alginic; ...). Derived from brown seaweeds, class Phaeophyceae

Agar-agar. Derived from red seaweeds, class Rhodophyceae

Carrageenan. Derived from red seaweeds, class Rhodophyceae.

- (b) *Synthetics allowed:*

Alginates. Derived from brown seaweeds, class Phaeophyceae.

§205.606 Nonorganically produced agricultural products allowed as ingredients in or on processed products labeled as “organic.”

- (d) Colors derived from agricultural products-must not be produced using synthetic carriers and solvent systems or any artificial preservative.

(2) Beta-carotene extract color derived from carrots or algae (pigment CAS 1393-61-1). Derived from green algae, class Chlorophyceae.

(l) Kelp – for use only as a thickener and dietary supplement. Derived from *Macrocystis pyrifera*, *Laminaria digitata*, *Laminaria saccharina* and *Laminaria cloustoni*.

- (t) Seaweed, Pacific Kombu, derived from *Laminaria japonica*, class Phaeophyceae

- (x) Wakame Seaweed (*Undaria pinnatifida*).

Vote in Handling Subcommittee:

Motion by: Jean Richardson

Seconded by: Harold Austin

Yes: 9 No: 0 Abstain: 0 Absent: 0 Recuse: 0

2. Motion to recommend that the NOP develop Guidance to clarify the term “kelp” as used in organic production and wild harvesting.

Motion by: Jean Richardson

Seconded by: Harold Austin

Yes: 9 No: 0 Abstain: 0 Absent: 0 Recuse: 0

Approved by Lisa de Lima, Subcommittee Chair, to transmit to NOSB, January 17, 2017