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CAN/CGSB-32.312-2018

Reaffirmed February 2023

Supersedes CAN/CGSB-32.312-2012



Organic production systems

Aquaculture – General principles, management standards and permitted substances lists

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telephone — 1-800-665-2472
mail — Canadian General Standards Board
140 O'Connor Street, Tower East
Ottawa, Ontario Canada K1A 0S5

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NATIONAL STANDARD OF CANADA

CAN/CGSB-32.312-2018

Reaffirmed February 2023

Supersedes CAN/CGSB-32.312-2012

Organic production systems

Aquaculture – General principles, management standards and permitted substances lists

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS
FRANÇAISE ET ANGLAISE.

ICS 65.150/ICS 67.120.30

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Preface

This National Standard of Canada CAN/CGSB-32.312-2018 has been reaffirmed by the CGSB Committee on Organic Aquaculture in February 2023.

Changes since the previous edition

- Added references to ICS 67.120.30, Fish and fishery products Including aquatic molluscs and other marine products.
- Note: Reference to CAN/CGSB-32.311-2018 Tables 4.2 and 4.3 is now CAN/CGSB-32.311-2021 Table 4.2.

The following definitions apply in understanding how to implement this National Standard of Canada:

- "shall" indicates a **requirement**;
- "should" indicates a **recommendation**;
- "may" is used to indicate that something is **permitted**;
- "can" is used to indicate that something is **possible**, for example, that an organization is able to do something.

Notes accompanying clauses do not include requirements or alternative requirements. The purpose of a note accompanying a clause is to separate explanatory or informative material from the text. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

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Introduction

I. Description

Organic production is a holistic system designed to optimize the productivity and fitness of diverse communities within the ecosystem, including soil, sediment and benthic organisms; crops; livestock and people. The principal goal of organic production is to develop operations that are sustainable and harmonious with the environment.

This standard¹ describes the principles and management standards of organic production systems, and provides lists of substances that are allowed for use in organic production systems.

As is the case with all products sold in Canada, organic inputs—such as, but not limited to, fertilizers, feed supplements, pesticides, soil and water amendments, veterinary treatments, processing additives or aids, sanitizing and cleaning material—and products derived from organic production, such as, but not limited to, feed and food, should comply with all applicable regulatory requirements.

II. General principles of organic production

Organic production is based on the following general principles^{2,3}:

Principle of health – Organic production should sustain and enhance the health of water, soil, plants, animals, humans and the planet as one and indivisible.

Principle of ecology – Organic production should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

Principle of fairness – Organic production should build on relationships that ensure fairness with regard to the common environment and life opportunities.

Principle of care – Organic production should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

III. Organic practices

Neither this standard nor organic products in accordance with this standard represent specific claims about the healthiness, safety and nutrition of such organic products.

Management methods are carefully selected in order to restore and then sustain ecological stability within the operation and the surrounding environment. Biological stability is maintained and enhanced by promoting optimal biological activity within the production unit and the surrounding area. Weeds, pests and diseases are managed using biological and mechanical control methods, crop selection and rotation, recycling of plant and animal residues, water management, augmentation of beneficial organisms for the promotion of biological diversity, and ecologically based pest management.

Under a system of organic production, livestock are provided with living conditions and space allowances appropriate to their behavioural requirements and organically produced feed. These practices strive to minimize stress, promote good health and prevent disease.

¹ References throughout this document to “this standard” refer to CAN/CGSB-32.312, *Organic Production Systems — Aquaculture — General principles, management standards and permitted substances lists*.

² From <http://www.ifoam.org/en/organic-landmarks/principles-organic-agriculture>.

³ For the historical organic principles (from 2012 edition), refer to Annex B.

Organic products are produced and processed under a system that strives to preserve the integrity of the principles in this standard.

Organic practices and this standard cannot ensure that organic products are entirely free of residues of substances prohibited by this standard and of other contaminants, since exposure to such compounds from the atmosphere, benthos, sediment, water and other sources may be beyond the control of the operator. The practices permitted by this standard are designed to ensure the least possible residues at the lowest possible levels.

In the development of the standard, it was recognized that Canada's regional differences require varying practices to meet production needs.

This standard is intended for certification and regulation to prevent deceptive practices in the marketplace. The certification process assesses operational compliance. Certification is granted to compliant product. Certification bodies shall allow a period of up to 12 months after the publication date of an amendment to this standard as well as CAN/CGSB-32.310 and CAN/CGSB-32.311 for an applicant to come into compliance with any changes to the requirements.

Compliance with this standard is voluntary until such time as it is incorporated by reference into a regulatory instrument, at which time compliance will become a regulatory requirement.

IV. Notes and examples in this standard

In this standard, notes and examples are used for giving additional information intended to assist the understanding or use of the document and are not a normative part of the standard.

Organic production systems

Aquaculture – General principles, management standards and permitted substances lists

1 Scope

1.1 This standard applies to the following organic products:

- a) unprocessed crop and crop products, livestock and livestock products, to the extent that the principles of production and specific verification rules for them are described in the standard;
- b) processed crop and livestock products intended for human consumption or use and derived from the items mentioned in 1.1 a);
- c) livestock feed;
- d) processed crop and livestock products intended for animal consumption or use and derived from the items mentioned in 1.1 a).

1.2 Organic products referenced in this standard are derived from a production system that:

- a) seeks to nurture ecosystems through its management practices in order to achieve sustainable productivity;
- b) provides weed, pest and disease control through enhancement of biodiversity, recycling of plant and animal residues, crop selection and rotation, water management, and fallowing.

1.3 In the event of any conflict or inconsistency between this standard and CAN/CGSB-32.310 or CAN/CGSB-32.311, this standard will take precedence.

1.4 Prohibited substances, materials or techniques in organic production and preparation

If producing or preparing organic products, the following substances, materials or techniques are prohibited since they are incompatible with the general principles of organic production:

- a) all products of and materials from genetic engineering (GE), as defined and specified in this standard, except for vaccines;
- b) all products, materials or processes intentionally using nanotechnology, as defined in this standard, with the following exceptions:
 - 1) naturally occurring nano-sized particles or those produced incidentally;
 - 2) contact surfaces, such as equipment, work surfaces, or packaging, where transference of nano-sized particles to organic crops, livestock or products is unintended and unlikely to occur;
- c) irradiation, as defined in this standard, for the treatment of organic products and inputs used in the production of organic products, except as specified in clause 11;
- d) soil, sediment, benthic, and water amendments, such as fertilizer or composted plant and animal material, that contain a substance not listed in clause 11;
- e) sewage sludge;

- f) synthetic crop production aids and materials, except as specified in clause 11;
- g) synthetic growth regulators;
- h) cloned livestock and its descendants;
- i) synthetic allopathic veterinary drugs, including antibiotics and parasiticides, except as permitted by this standard;
- j) synthetic substances used in organic product preparation, such as ingredients, food additives and processing aids, including sulphates, nitrates and nitrites, except as specified in clause 11;
- k) equipment, harvest and storage containers, storage facilities and packaging materials treated with synthetic fungicides, preservatives, fumigants and pesticides;
- l) substances that are not listed in clause 11, except as permitted in this standard.

1.5 Units of measure

Quantities and dimensions in this standard are given in metric units.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this National Standard of Canada. The referenced documents may be obtained from the sources noted below.

Note: The contact information provided below was valid at the date of publication of this standard.

An undated reference is to the latest edition or revision of the reference or document in question, unless otherwise specified by the authority applying this standard. A dated reference is to the specified revision or edition of the reference or document in question.

2.1 Canadian General Standards Board (CGSB)

CAN/CGSB-32.310 – *Organic production systems – General principles and management standards*

CAN/CGSB-32.311 – *Organic production systems – Permitted substances lists*

2.1.1 Contact information

The above may be obtained from the Canadian General Standards Board. Telephone: 1-800-665-2472. E-mail: ncr.cgsb-ongc@tpsgc-pwgsc.gc.ca. Web site: www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html.

2.2 Health Canada

Food and Drugs Act (R.S.C., 1985, c. F-27)

Food and Drug Regulations (C.R.C., c. 870)

Pest Control Products Act (S.C. 2002, c. 28)

Pest Control Products Regulations (SOR/2006-124)

2.2.1 Contact information

The above may be obtained from Health Canada at www.hc-sc.gc.ca or from Justice Laws Web site at <http://laws-lois.justice.gc.ca>.

2.3 Canadian Food Inspection Agency (CFIA)

Feeds Act (R.S.C., 1985, c. F-9)

Feeds Regulations, 1983 (SOR/83-593)

Health of Animals Act (S.C.1990, c.21)

Health of Animals Regulations (C.R.C., c. 296)

Safe Food for Canadians Act (S.C. 2012, c. 24)

2.3.1 Contact information

The above may be obtained from CFIA at <http://www.inspection.gc.ca/> or from Justice Laws Web site at <http://laws-lois.justice.gc.ca>.

2.4 International Federation of Organic Movements (IFOAM)

Principles of Organic Agriculture

2.4.1 Contact information

The above may be obtained from the IFOAM Web site at <http://www.ifoam.bio/en/organic-landmarks/principles-organic-agriculture>.

3 Terms and definitions

For the purposes of this National Standard of Canada, the following terms and definitions apply.

3.1

allopathic

use of allopathy.

3.2

allopathy

method of treating disease with substances that produce a reaction or effects different from those caused by the disease itself.

3.3

annual seedling

young plant grown from seed that will complete its life cycle or produce a yield and be able to be harvested within the same crop year or season in which it was planted.

3.4

antibiotic

various substances that contain any quantity of any chemical substance produced by a micro-organism, like penicillin, and that are used to inhibit or destroy the growth of micro-organisms to prevent or treat disease.

3.5**aquaculture**

cultivation of crops or livestock in a controlled or managed aquatic environment.

3.6**aquaculture product**

crops and livestock, or a product wholly or partly derived therefrom, cultivated in a controlled or managed aquatic environment. The products of fishing of wild animals are not considered part of this definition.

3.7**aquaponics**

production system that combines the cultivation of crops and livestock in a symbiotic relationship.

3.8**broodstock**

livestock kept for the production of gametes.

3.9**buffer zone**

clearly defined and identifiable boundary area that separates an organic production unit from adjacent non-organic areas.

3.10**cloned animals**

identical animals resulting from human manipulation of embryos and embryo transfer, using techniques such as somatic cell nuclear transfer, embryonic cell nuclear transfer or embryo splitting.

3.11**commercially available**

documented ability to obtain a production input or an ingredient in an appropriate form, quality, quantity or variety, irrespective of cost, in order to fulfil an essential function in organic production or preparation.

3.12**commingling**

mixing of or physical contact between bulk, unbound or unpackaged organic products and non-organic products during production, preparation, transportation, or storage.

3.13**compost**

product of a carefully managed aerobic process by which non-synthetic materials are digested by micro-organisms.

3.14**derogation**

exemption from the practices in this standard.

3.15**ecosystem**

system consisting of the form, function, interaction and equilibrium of the biotic and abiotic elements present within the environment of a given operation.

3.16**exception**

substance otherwise prohibited by this standard.

3.17**feed additive**

substance added to feed in small quantities to fulfil a specific nutritional need. Examples are essential nutrients in the form of amino acids, vitamins and minerals, and non-nutritive additives such as anticaking agents and antioxidants.

3.18**feed supplement**

feed that is used in conjunction with other feed to improve the nutritive balance of the total and that is intended to be:

- a) fed undiluted as a supplement to other feeds;
- b) available separately and offered free choice, along with other parts of the ration; or
- c) further diluted and mixed to produce a complete feed.

Note: In Canada, the *Feeds Act* requires that the resulting feed is acceptable for registration.

3.19**fertilizer**

single or blended substance composed of one or more recognized plant nutrient(s).

3.20**food-grade**

designation used to identify that a substance (for example, a cleaning material, gas, etc.) or material (for example, a counter, containers, a conveyor, etc.) may come in contact with food, food contact surfaces and/or is safe for human consumption.

3.21**genetic engineering**

refers to techniques by which the genetic material of an organism is changed in a way that does not occur naturally by multiplication and/or natural recombination. Examples of the techniques used in genetic engineering include, but are not limited to:

- a) recombinant DNA (rDNA) techniques that use vector systems;
- b) techniques involving the direct introduction into the organism of hereditary materials prepared outside the organism;
- c) cell fusion (including protoplast fusion) or hybridization techniques that overcome natural physiological, reproductive or recombination barriers, where the donor cells/protoplasts do not fall within the same taxonomic family.

Unless the donor/recipient organism is derived from any of the above techniques, examples of techniques not covered by this definition include:

- a) in vitro fertilization;
- b) conjugation, transduction, transformation, or any other natural process;
- c) polyploidy induction;
- d) cell fusion (including protoplast fusion) or hybridization techniques where the donor cells/protoplasts are in the same taxonomic family.

3.22**ingredient**

substance, including a food additive, used in the manufacture or preparation of a product. The substance is present in the final product, possibly in a modified form.

3.23**input**

substance used in production or preparation. Examples include fertilizers, feed supplements, pesticides, water and benthic zone amendments, veterinary treatments, processing aids, sanitizing and cleaning materials.

3.24**integrated multi-trophic aquaculture**

farming, in proximity, of species from different trophic levels, and with complementary ecosystem functions, in a way that allows one species' uneaten feed and wastes, nutrients and by-products to be recaptured and converted into fertilizer, feed and energy for the other crops, and to take advantage of synergistic interactions between species.

3.25**irradiation**

treatment with ionizing radiation (see B.26.001 of the *Food and Drug Regulations*).

3.26**livestock**

any domestic or domesticated animal raised for food or used in the production of food. The products of hunting or fishing of wild animals are not included in this definition.

3.27**manure**

livestock feces, urine and other excrement, including bedding, used or soiled by livestock.

3.28**microgreens**

edible young plants that are harvested later than sprouts, generally when cotyledons are fully formed or when two or four true leaves are present.

3.29**nanotechnology**

manipulation of matter at atomic, molecular, or macromolecular dimensions typically between 1 and 100 nm to create materials, devices and systems with fundamentally new properties and functions. Nanoscale chemical substances, or nanomaterials, behave differently from their macroscale counterparts, exhibiting different mechanical, optical, magnetic or electronic properties.

3.30**non-synthetic**

substance derived from mineral, plant or animal matter that has not been chemically altered.

3.31**operation**

farm, company or organization that produces or prepares an organic product; an operation may have multiple production units (see 3.44 *production unit*).

3.32**operator**

person, company or organization that produces or prepares with a view to the subsequent marketing of products referred to as organic.

3.33**organic integrity**

maintenance of the inherent organic qualities of a product from the receipt of ingredients through to the end consumer.

3.34**organic product**

any commodity or output produced by a system compliant with this standard.

3.35**organic production**

method of production in compliance with this standard.

3.36**parallel production**

simultaneous production or preparation of organic and non-organic crops (including transitional crops, livestock and other organic products) of the same or similar, visually indistinguishable varieties.

3.37**perennial crop**

crop, other than a biennial crop, that can be harvested from the same planting for more than one crop year or that requires at least one year after planting before harvest.

3.38**pest**

organism causing damage to humans or to resources used by humans, such as some viruses, bacteria, fungi, weeds, parasites, arthropods and rodents.

3.39**pesticide**

substances used, directly or indirectly, to attract, prevent, destroy, repel or mitigate pests; or to alter the growth, development or characteristics of plants. Includes any organism, substance or mixture of substances and devices such as lures or traps.

3.40**planting stock**

plant or plant tissue, other than annual seedlings, used in plant production or propagation. Examples are rhizomes, shoots, leaf or stem cuttings, roots or tubers, bulbs or cloves.

3.41**preparation**

includes, with respect to an organic product, post-harvest handling, manufacturing, processing (fresh or frozen fish or shellfish), treatment, preservation (including canning, salting, drying, pickling or marinating), and slaughter.

3.42**processing**

see 3.41, *preparation*.

3.43**processing aids**

substances added to food during processing, for a technological effect, but are not present in the finished product or at insignificant and non-functional levels.

3.44**production unit**

identifiable portion of an operation in which production or preparation of an organic product occurs.

3.45**prohibited substances**

substances prohibited by 1.4 and/or not listed in clause 11.

3.46**records**

information in written, visual or electronic form that documents the activities undertaken by an operator in the production or preparation of organic products.

3.47**removal event**

procedure performed prior to organic production runs, batches or loads, to prevent organic product from coming into contact with prohibited substances or commingling with non-organic products. Examples of removal events are rinsing with potable water, letting surfaces drip-dry, and purging a system with organic product.

3.48**salt**

sodium chloride, sea salt, or low-sodium and sodium-free substitutes that serve the purpose of providing salt flavour, nutrition or microbial control in a product. Used as a water conditioner for aquatic systems.

3.49**sewage sludge**

solid, liquid or semisolid residues generated by municipal or industrial sewage treatment facilities. Sewage sludge includes but is not limited to: domestic septage; scum or solids removed in primary, secondary or advanced wastewater treatment processes; or material derived from sewage sludge.

3.50**sustainable fisheries**

wild-capture fisheries, managed by a state that is a signatory to the FAO Code of Conduct for Responsible Fisheries.

3.51**synthetic substance**

manufactured substance, including petrochemicals, formulated by a chemical process or by a process that chemically alters compounds extracted from plant, micro-organisms, animal or mineral sources. This term does not apply to compounds synthesized or produced by physical processing or biological processes, which may include heat and mechanical processing. However, minerals altered through chemical reactions caused by heating or burning are classified as synthetic.

3.52**traceability**

ability to track product, backwards and forwards, through all stages of production and preparation.

3.53**transitional period**

period of time between the start of an organic management program and the attainment of organic status by a production unit or operation.

3.54**veterinary biologic**

helminth, protozoa or micro-organism; or a substance or mixture of substances derived from animals, helminths, protozoa or micro-organisms; or a substance of synthetic origin that is manufactured, sold or represented for use in restoring, correcting or modifying functions in animals or for use in the diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal physical state, or the symptoms thereof, in animals. Veterinary biologics include vaccines, bacterins, bacterin-toxoids, immunoglobulin products, diagnostic kits and any veterinary biologic derived through biotechnology.

3.55**veterinary drug**

substance or mixture of substances represented for use or administered in the diagnosis, treatment, mitigation or prevention of disease, disorder, abnormal physical state or its symptoms in animals; restoring, correcting or modifying functions in animals.

3.56**water quality**

observable indicators of the physical, chemical, or biological conditions of water, including the presence of environmental contaminants.

3.57**wild crop**

crop collected or harvested in their natural habitat.

4 Organic plan

4.1 The operator shall prepare a written organic plan that details how the operator will comply with this standard. The plan should include the details of transition, management practices, production, and preparation.

4.2 The organic plan shall be updated annually to address changes to the plan or management system, problems encountered in executing the plan, and measures taken to overcome such problems.

4.3 The organic plan shall include a description of the internal record-keeping system, with documents sufficient to meet traceability requirements as specified in 4.4.2 and other record-keeping requirements.

4.4 Record keeping and identification

4.4.1 The operator shall maintain records and relevant supporting documentation such as visual aids (for example, maps, work-flow charts) concerning inputs and details of their use, production, preparation and transport of organic products. The operator shall maintain the organic integrity of products and shall fully record and disclose all activities and transactions in sufficient detail to be easily understood and sufficient to demonstrate compliance with this standard.

4.4.2 Records shall make it possible to trace:

- a) the origin, nature and quantity of organic products that have been delivered to the production unit or operation;
- b) the nature, quantity and consignees of products that have left the production unit;
- c) any other information for the purposes of verification, such as the origin, nature and quantity of ingredients, additives and manufacturing aids delivered to the unit, and the composition of processed products;
- d) activities or processes that demonstrate compliance with this standard.

4.4.3 An identification system shall be implemented to distinguish organic and non-organic products (for example, general appearance, colour, variety and types).

4.4.4 The operator shall design and implement a risk management plan to prevent GE contamination which may include strategies such as physical barriers, delayed planting, testing of seeds, isolation distances and equipment and storage sanitation protocols.

4.4.5 Records shall be maintained for at least five years beyond their creation.

4.4.6 If pest and disease control substances that are not listed in this standard or in CAN/CGSB-32.311 are used under any mandatory government program, the operator shall monitor and document their use.

Note: In the event of an emergency pest or a disease treatment, Canadian operators are required to notify their certification body immediately of any change that may affect organic product certification.

5 Crop production

5.1 Water quality and environment

5.1.1 Operations shall be situated in locations where water is not subject to contamination by products or substances not authorized for organic production, or pollutants that would compromise the organic nature of the products.

5.1.2 The operator shall detail the environmental effects of the operation and the environmental monitoring to be undertaken, and list measures to be taken to minimize negative impacts on the surrounding aquatic and terrestrial environments.

5.1.3 For seaweed harvesting, a once-off biomass estimate shall be undertaken at the outset.

5.1.4 Retired equipment used in growing crops shall be re-used or recycled where possible.

5.2 Transition of crop production units to organic production

5.2.1 The following transitional periods for crop production units shall apply for the following types of aquaculture:

- a) for facilities that cannot be drained and cleaned, a transitional period of 36 months, including their existing crops;
- b) for facilities that can be drained or have been fallowed, a transitional period of 12 months, including their existing crops;
- c) for facilities that have been drained, cleaned, disinfected and rinsed, no transitional period for new stock and a transitional period of 12 months for existing crops;
- d) for open-water facilities, a transitional period of at least 12 months or one production cycle, whichever is less, during which time equipment and apparatus are cleaned.

5.2.2 Any documented period in which the facilities and crops were not treated or exposed to substances prohibited or not permitted by this standard may be included in the transitional period.

5.2.3 When new production units are added to an existing organic operation, the operator shall provide records to show that prohibited substances have not been used for the appropriate transitional period (see 5.2.1) and verification shall be conducted before the first harvest of product from this new production unit.

Note: Certification to this standard requires operators to document that they have not used prohibited substances. It also requires that, in the case of an initial application for an organic certification of crops with a production cycle of more than 12 months, the application for certification shall be filed 15 months before the day on which the product is expected to be marketed. During that period of time, compliance with this standard will be assessed by the certification body and this assessment shall include at least one inspection of the production unit, during production, in the year before crops may be eligible for certification; and one inspection, during production, in the year crops are eligible for certification.

The initial application for an organic certification of crops with a production cycle of 12 months or less shall be filed within 12 months of the day on which the product is expected to be marketed. During that period of time, compliance with this standard will be assessed by the certifying body, and this assessment shall include one inspection of the production unit in the year crops are eligible for certification.

5.3 Parallel production and buffer zones

5.3.1 Parallel production is permitted within an operation, but not within a production unit.

5.3.2 In open-water systems, organic facilities shall provide buffer zones from potential contamination sources, including pesticide drift and other possible contaminants from external sources. The minimum separation distance between organic and non-organic production shall be based on the natural situation, separate water distribution systems, distances, tidal flow, and the upstream and downstream location of the organic production unit.

5.3.3 For land-based facilities, there shall be physical barriers such that water cannot circulate between organic and non-organic production units.

5.3.4 Equipment dedicated to organic production should be used. If equipment is used on non-organic and organic production units, it shall be cleaned according to a defined protocol established to prevent contact with organic production and handling operations and products with substances not permitted by this standard.

5.3.5 Areas for storing all inputs for organic and non-organic production methods shall be kept well separated.

5.3.6 Feed and inputs for organic production shall be clearly marked.

5.3.7 Adequate records shall be available for organic and non-organic production systems.

5.4 Crop cultivation

5.4.1 Seeds and planting stock

Organic seed, bulbs, tubers, cuttings, annual seedlings, transplants and other propagules shall be used. The following exceptions or conditions apply:

- a) non-organic, untreated seed and planting stock or seed treated with substances listed in Table 4.3 of CAN/CGSB-32.311 are permitted provided that the organic seed or planting stock variety is:
 - 1) not produced on or available from within the operation; or
 - 2) not commercially available, and a reasonable search involving potential known organic suppliers has been conducted;
- b) non-organic perennial planting stock treated with substances prohibited by 1.4 d), 1.4 e), 1.4 f) or 1.4 g) shall be managed in accordance with this standard for at least 12 months before the first harvest of organic product.

5.4.2 Crop nutrient management

5.4.2.1 Crop cultivation shall only utilize nutrients naturally occurring in the environment, or from organic livestock production, preferably located nearby as part of an Integrated Multi-Trophic Aquaculture system.

5.4.2.2 In enclosed and recirculation systems, the dissolved amounts of nutrients shall not exceed those necessary for healthy growth of the crops, and culture media shall be disposed of in a manner that does not adversely impact the environment. Nutrients from organic livestock production or nutrients of plant or mineral origin as listed in Table 3 of this standard or in Table 4.2 of CAN/CGSB-32.311, may be used provided that the origin and usage are consistent with the annotation for that substance.

5.4.2.3 In enclosed and recirculation systems, crop production aids and materials as listed in Table 4 of this standard or in Table 4.3 of CAN/CGSB-32.311, may be used provided that the origin and usage are consistent with the annotation for that substance.

5.5 Pest, disease and weed management

5.5.1 Pest, disease and weed control practices shall focus on organic management practices that enhance crop health and reduce losses due to weeds, disease and pests. Management practices include cultural practices (for example, rotations, establishment of a balanced ecosystem, and use of resistant varieties); mechanical techniques (for example, sanitation measures, cultivation and traps); and physical techniques (for example, flaming against weeds, heat against diseases).

5.5.2 When organic management practices alone cannot prevent or control crop pests, disease or weeds, a biological or botanical substance, or other substances listed in Table 4 of this standard or in Table 4.3 of CAN/CGSB-32.311, may be used. Conditions for and of the use of substances shall be documented in the organic plan (see clause 4).

5.5.3 If application equipment, such as sprayers, is used to apply prohibited substances, it shall be thoroughly cleaned prior to use in an organic crop.

5.6 Crop product preparation

Wherever organic product preparation takes place, clause 8 applies.

5.7 Facility pest management

Clause 8 applies to pest management practices in and around facilities.

6 Livestock production

6.1 Water quality and environment

6.1.1 Operations shall be sited in locations where the water is not subject to contamination by products or substances not authorized for organic production, or pollutants that would compromise the organic nature of the products.

6.1.2 The operator shall detail the environmental effects of the operation and the environmental monitoring to be undertaken, and list measures to be taken to minimize negative impacts on the surrounding aquatic and terrestrial environments, including limiting waste accumulation and minimizing impact to the migratory and reproductive patterns of local wild fish populations, other local species like predators, birds and any other fauna and flora.

6.1.3 Open-water units shall be sited and managed in such a way that sediment build-up underneath the unit does not exceed the assimilation capacity of the local environment. The operator shall develop a dissolved and particulate nutrient management plan clearly illustrating how assimilation capacity will be evaluated and maintained.

6.1.4 Nutrient cycling through practices such as Integrated Multi-Trophic Aquaculture is encouraged.

6.1.5 For production in ponds, tanks or raceways, farms shall be equipped with natural filter beds, settlement ponds, biological filters, or clarifiers to collect waste nutrients. Plants and/or animals that contribute to improving the quality of the effluent can also be used. Mechanical filters are permitted.

6.1.6 Feed waste, manure and mortalities that have been collected shall be recycled.

6.1.7 Retired equipment used in rearing livestock shall be re-used or recycled where possible.

6.2 Transition of livestock production units to organic production

6.2.1 The following transitional periods for livestock production units shall apply for the following types of aquaculture:

- a) for facilities that cannot be drained and cleaned, a transitional period of 36 months, including their existing livestock;
- b) for facilities that can be drained or have been fallowed, a transitional period of 12 months, including their existing livestock;
- c) for facilities that have been drained, cleaned, disinfected and rinsed, no transitional period for new stock and a transitional period of 12 months for existing livestock; and
- d) for open-water facilities, a transitional period of at least 12 months or one production cycle, whichever is less, during which time equipment and apparatus are cleaned.

6.2.2 Any documented period in which the facilities and livestock were not treated or exposed to substances prohibited or not permitted by this standard may be included in the transitional period.

6.2.3 When new production units are added to an existing organic operation, the operator shall provide records to show that prohibited substances have not been used for the appropriate transitional period (see 6.2.1) and verification shall be conducted before the first harvest of product from this new production unit.

Note: Certification to this standard requires operators to document that they have not used prohibited substances. It also requires that, in the case of an initial application for an organic certification of livestock with a production cycle of more than 12 months, the application for certification shall be filed 15 months before the day on which the product is expected to be marketed. During that period of time, compliance with this standard will be assessed by the certification body and this assessment shall include at least one inspection of the production unit, during production, in the year before livestock may be eligible for certification; and one inspection, during production, in the year livestock are eligible for certification.

The initial application for an organic certification of livestock with a production cycle of 12 months or less shall be filed within 12 months of the day on which the product is expected to be marketed. During that period of time, compliance with this standard will be assessed by the certification body, and this assessment shall include one inspection of the production unit in the year livestock are eligible for certification.

6.3 Parallel production and buffer zones

6.3.1 Parallel production is permitted within an operation, but not within a production unit.

6.3.2 In open water systems, organic facilities shall provide buffer zones from potential contamination sources, including pesticide drift and other possible contaminants from external sources. The minimum separation distance between organic and non-organic production shall be based on the natural situation, separate water distribution systems, distances, tidal flow, and the upstream and downstream location of the organic production unit.

6.3.3 For land-based facilities, there shall be physical barriers such that water cannot circulate between organic and non-organic production units.

6.3.4 Equipment dedicated to organic production should be used. If equipment is used on non-organic and organic production units, it shall be cleaned according to a defined protocol established to prevent contact with organic production and handling operations and products with substances not permitted by this standard.

6.3.5 Areas for storing all inputs for organic and non-organic production methods shall be kept well separated.

6.3.6 Feed and inputs for organic production shall be clearly marked.

6.3.7 Adequate records shall be available for organic and non-organic production systems.

6.4 Livestock species and origins

6.4.1 Livestock intended for organic production shall be taken from indigenous species or be a species that has been naturalized or adapted to the rearing conditions.

6.4.2 Livestock, including, for example, seed and juveniles, that are introduced in a production unit shall come from organic sources, except as otherwise specified.

6.4.3 For breeding purposes or for improving genetic stock, and when organic livestock are not commercially available, wild-caught or non-organic livestock may be brought into a production unit and kept under organic management. Collection of wild-caught species shall be in compliance with all local regulations, and shall be done in collaboration with government agencies, to ensure that natural populations and the collected individuals are protected, and that biodiversity in the ecosystem is supported.

6.4.4 Broodstock that has not been under continuous organic management shall never be organic for slaughter purposes. However, the offspring may be organic if they have been raised according to this standard.

6.4.5 Single-sex populations are permitted.

6.4.6 For finfish, if organic animals are not commercially available, stock from non-organic hatcheries may be used, provided that at least the final 90% of biomass gain occurs while the animals are under continuous organic management.

6.5 Reproduction

6.5.1 Cultivation methods shall allow natural methods of hatching or spawning with the following exceptions:

- a) the use of methods involving human intervention to extract gametes and fertilize eggs is permitted;
- b) for species that cannot spawn naturally in captivity, spawning may be induced using exogenous releasing hormones only if other methods are not available. Broodstock shall lose organic status when slaughtered.

6.5.2 Livestock treated with steroids or other hormones shall lose organic status for human consumption. Broodstock treated with steroids or other hormones shall lose organic status for human consumption but may continue to be used within the organic aquaculture system.

6.5.3 Techniques using genetic engineering are prohibited.

6.5.4 Induced polyploidy is acceptable by use of temperature and pressure methods only.

6.6 Feed and feeding

6.6.1 Livestock may receive their nutritional requirements from nature or from feed supplied to them:

- a) supplied feed shall be compatible with diets occurring in the natural environment;
- b) supplied feed shall be designed according to the specific nutritional needs of each species.

Note: Feeds for both terrestrial and aquatic livestock are governed by the same laws and regulations, enforced by the Animal Feed Division of the Canadian Food Inspection Agency.

6.6.2 Supplied feed shall only be offered in a way that minimizes loss of feed to the environment.

6.6.3 The following shall not be fed:

- a) urea, antibiotics and hormones used to promote growth and synthetic growth agents;
- b) silage preservation products except for products listed in Table 5.2 of CAN/CGSB-32.311;
- c) synthetic appetite-enhancers or synthetic flavour-enhancers;
- d) synthetic colouring agents and pigments.

6.6.4 Supplied feeds shall be composed of ingredients that are organic, except that feed, feed additives and feed supplements listed in Table 5 of this standard or in Table 5.2 of CAN/CGSB-32.311 may be used, as well as fish meal and fish oil sourced according to the requirements in 6.6.6 and 6.6.7, and whole insects, insect meal and insect oil according to the requirements in 6.6.9.

6.6.5 Pigments from organic sources may be added to the feed. If organic sources are not commercially available, only non-synthetic pigments may be used.

6.6.6 Preference shall be given to the following sources for fish meal and fish oil in the following order:

- a) organic feed products of aquaculture origin;
- b) trimmings from organic fish raised for human consumption;
- c) if organic products are not commercially available:
 - 1) trimmings from wild-capture fish already caught for human consumption in legal, sustainably managed fisheries, as specified in 6.6.7;
 - 2) fish meal and fish oil derived from legal, sustainably managed wild-capture fisheries, as specified in 6.6.7.

6.6.7 If non-organic fish meal and fish oil are used, they shall be sourced from legal, sustainable fisheries managed in accordance with requirements of the *FAO Code of Conduct for Responsible Fisheries*.

Note: As a signatory to the FAO Code of Conduct, States undertake to “adopt measures for the long-term conservation and sustainable use of fisheries resources. Conservation and management measures, whether at local, national, sub-regional or regional levels, should be based on the best scientific evidence available and be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of the optimum utilization and maintain their availability for present and future generations; short term considerations should not compromise these objectives.” (see FAO Code of Conduct, 7.1.1).

6.6.8 If non-organic fish meal and fish oil sources are used, feed shall not exceed 80% of the action levels for contaminants allowed by the *Feeds Act*.

Note 1: In Canada, action levels of the contaminants in feed are available in *RG-8 Regulatory Guidance: Contaminants in Feed* (available from <http://www.inspection.gc.ca/animals/feeds/regulatory-guidance/rg-8/eng/1347383943203/1347384015909?chap=1>).

Note 2: At the time of the publication of this standard, insufficient supplies of organic fish meal exist to satisfy the sector. It is the intention to develop these supplies and to revise the standard with the goal of eliminating non-organic feed supplies.

6.6.9 If non-organic whole insects, insect meal and/or insect oil are used:

- a) can be no more than 10% feed replacement for piscivorous livestock;
- b) can be no more than 5% feed replacement for omnivorous livestock;
- c) feed for insects shall be from pre-consumer vegetable matter and not include animal by-products, unless the animal by-products are organic.

6.6.10 If sources listed in 6.6.4 are unobtainable as a result of a catastrophic event with direct impact on the production unit (for example, fire, flood, or extraordinary weather or trade conditions) or because of circumstances outside the control of the operator, the following feed is permitted by derogation for a maximum of ten consecutive days or up to 10% of the total feed over the life of the animal, whichever is longer:

- a) feed manufactured using trimmings from conventional aquaculture;
- b) non-organic feed from land in transition to organic production and free from prohibited substances;
- c) non-organic feed if transition feed is not available; and
- d) non-organic livestock sources.

Livestock shall be switched back to feed in accordance with 6.6 as soon as it is available.

6.6.11 In the event of regional shortages, broodstock may be given feed containing fish meal and fish oil manufactured using trimmings from conventional aquaculture and non-organic feed from land in transition to organic production and free of prohibited substances, or non-organic feed if transition feed is not available, and non-organic livestock sources, provided that the animals are segregated in a separate production unit and 6.3 applies. In all other respects, broodstock whose offspring is intended for organic products shall be under organic management at all times. The broodstock shall be re-transitioned when feed as outlined in 6.6.4 becomes available. The organic status of other livestock on the operation is not affected.

6.7 Health and Welfare

6.7.1 Facilities shall be designed, operated and managed in a manner that seeks to maximize the welfare and minimize the stress on livestock, and minimizes the spread of disease within the facility, and to all adjoining ecosystems and native fish species.

6.7.1.1 When net pen systems are used, producers shall implement measures to minimize transmission of diseases and parasites between cultured and wild aquatic animals. Net pens shall be sited in such a manner as to minimize contamination and disease from conventional fish pens or native fish populations, taking into account factors like currents and seasonal changes.

6.7.2 Management shall be based on the five following domains of welfare:

- a) livestock shall have ready access to an appropriate diet in sufficient quantities and with a composition that maintains full health and vigour;
- b) livestock are in close contact with their environment. Water quality is of central importance to their welfare. Water quality parameters shall be appropriate to meet physiological and ethological needs;
- c) disease shall be prevented or rapidly diagnosed and treated;
- d) livestock shall have sufficient space, proper facilities and, where appropriate, the company of the animal's own kind;
- e) conditions that produce unacceptable levels of stress caused by anxiety, fear, distress, boredom, sickness, pain, hunger, and so on, shall be minimized.

6.7.3 Holding systems, equipment and utensils shall be properly cleaned according to a defined protocol. Only products listed in Table 7 of this standard or in Tables 7.3 or 7.4 of CAN/CGSB-32.311 may be used.

6.7.4 If necessary to prevent disease, an appropriate fallowing period shall be applied after each production cycle. During fallowing, the cage or other structure used for livestock production is emptied, cleaned, and left empty before being used again.

6.7.5 Uneaten feed, faeces and dead animals shall be managed to support the health and welfare of the livestock as described in 6.7.2.

6.7.6 Hygienic routines shall be carried out as well as routine examinations to detect nascent diseases and production disturbances. Where possible, the cause of outbreaks of disease or infection shall be identified and management practices implemented to prevent the causative events and future outbreaks.

6.7.7 Vaccinations are permitted. Prophylactic treatment with other synthetic veterinary drugs is prohibited.

6.7.8 Physical alterations are prohibited except when absolutely necessary to improve the health, welfare or hygiene of livestock, or for identification or safety reasons. Physical alterations shall be undertaken in a manner that minimizes pain, stress and suffering, with consideration to the use of anaesthetics and sedatives.

6.7.9 Where preventive practices and vaccines are inadequate to prevent sickness or injury and where disease and health problems require treatment, the use of biological, cultural, and physical treatments and practices is permitted, in accordance with 11.4.1.1 b) and Table 6 of this standard or Table 5.3 of CAN/CGSB-32.311.

6.7.10 Medical treatment for sick or injured livestock shall not be withheld to preserve their organic status. All appropriate medications shall be used to restore livestock to health when methods acceptable to organic production fail. Sick and medicated livestock shall be quarantined from healthy livestock.

6.7.11 Products from sick livestock or those undergoing treatment with restricted substances shall not be organic or fed to organic livestock.

6.7.12 The use of veterinary medicinal substances in organic production systems shall conform to the following:

- a) if no alternative treatment or management practice exists, the use of veterinary biologics, including vaccines, the use of parasiticides or the therapeutic use of synthetic medications may be administered provided that such medications are permitted, in accordance with this standard, or are required by law;
- b) phytotherapeutic (i.e. algal, herbal or botanical substances excluding antibiotics), homeopathic or similar products shall be used in preference to chemical allopathic veterinary drugs or antibiotics, provided that their therapeutic effect is effective for the species and the condition for which the treatment is intended;
- c) if the use of the products in 6.7.12 a) and b) is unlikely to be effective in combatting illness or injury, chemical allopathic drugs (not listed on the permitted substances lists) may be administered under veterinary supervision. Some restrictions apply when livestock are treated (see 6.7.13, 6.7.14 d) and 6.7.15). In addition to the treatments allowed for combatting illness or injury, anaesthetics may be administered no more than twice a year when handling individual fish (for example, vaccination, weight counts, parasite counting, fin clipping, tagging, or surgery);
- d) when veterinary drugs are used, the withdrawal period indicated on the permitted substances lists shall be observed before the products from treated livestock can be considered organic;
- e) when veterinary drugs are used and the withdrawal period is not indicated on the permitted substances lists or the substance is not listed on the permitted substances lists, a withdrawal period equivalent to double the label or veterinary prescription requirement, or 14 days, whichever is longer, shall be observed before the products from treated livestock can be considered organic;
- f) broodstock treated with antibiotics or treated more than twice a year with anaesthetics may continue to be used within the organic system, but shall never be organic for slaughter purposes.

6.7.13 Hormonal treatment shall only be used on broodstock under veterinary supervision. Broodstock treated with steroids or other hormones shall lose organic status for human consumption, but may continue to be used within the organic system.

6.7.14 The operator of an organic livestock operation shall not administer:

- a) synthetic compounds to stimulate or retard growth or production, including hormones for growth promotion;
- b) synthetic parasiticides to slaughter livestock, except as provided in 6.7.15;
- c) antibiotics to slaughter livestock;
- d) chemical allopathic veterinary drugs (for example pharmaceuticals, antibiotics, hormones and steroids) for preventive treatments.

6.7.15 Organic operations shall have a comprehensive plan to minimize parasite problems in livestock.

- a) The plan shall include preventive measures such as fallowing, lowering density and monitoring, as well as emergency measures in the event of a parasite outbreak.
- b) By way of derogation, when preventive measures fail (because of climatic conditions or other uncontrollable factors), and in the case where the operator uses direct treatment measures such as feeding, topical application or external application in a confined static bath, the use of synthetic parasiticides is permitted, provided that:
 - 1) monitoring of the animal, as appropriate for the species, indicates that livestock is infested with parasites;
 - 2) the operator has received written instructions from a veterinarian indicating the product and method for parasite control to be used;
 - 3) withdrawal times shall be twice the legal requirement or 14 days, whichever is longer;
 - 4) there shall be only one treatment for slaughter livestock under a year old and a maximum of two treatments for older slaughter livestock. Slaughter livestock that require further treatment will lose organic status;
 - 5) the operator shall provide a written action plan (including timing), describing how they will amend their parasite control plan, to avoid similar emergencies.

6.7.16 Treated stock shall be clearly identifiable.

6.8 Livestock living conditions

6.8.1 The operator shall establish and maintain livestock living conditions that accommodate the health and natural behavior of livestock, including appropriate water quality, temperature, and oxygen.

6.8.2 Cultivation shall occur within a secure and well-managed production system where controls are in place to prevent breaches of containment. A contingency plan for all units shall describe how escapes can be avoided and how escapees may be recaptured. Recaptured animals will lose their organic status. The operator shall demonstrate that the organic system meets and exceeds the requirements imposed by local authorities.

Note: Any escape event shall immediately be reported to the certification body and to the appropriate government authorities.

6.8.3 Recirculation systems are permitted if the system supports the health, growth, and well-being of the species.

6.8.4 Prolonged light periods are permitted up to the day length naturally encountered by the species being reared.

6.8.5 Construction materials and housing containing leachable toxic chemical agents are prohibited.

6.8.6 Stocking density shall consider the welfare of livestock, including parameters such as fin damage or other injuries, growth rate, behavior expressed, and overall health. Density requirements are quite variable depending on many factors such as production system (for example, recirculation systems), type of water, species, production stage of the animal, and water quality. Water quality and condition of the fish shall be monitored and maintained, so that natural behaviors are promoted and aggressive and dominant behaviors from other livestock are limited.

6.8.6.1 Maximum stocking density for salmonids (excluding Arctic char) in saltwater pens for grow-out production is limited to 10 kg/m³.

6.8.6.2 Maximum stocking densities for penaeid shrimps and freshwater prawns raised in ponds, are 22 post larvae/m² for seeding and maximum instantaneous biomass of 240 g/m² for production.

6.8.7 The culture system shall be managed to minimize the risk of losses of cultured stock, stress to cultured livestock caused by predators, and harm to predators.

6.8.7.1 An Integrated Predator Deterrence Plan shall be developed. The plan shall identify potential predators, appropriate deterrence methods, how predator behavior will be modified by application of deterrence methods, documentation of control methods and effects, contingencies for failure to achieve objectives, and how plan implementation conserves biodiversity in the ecosystem adjacent to and including the aquaculture facility. Examples of such control measures include, but are not limited to, site selection, physical barriers, repellents, and legal predator deterrence methods.

6.8.7.2 Non-lethal deterrents shall be used as a first course of action.

6.8.7.3 Lethal measures may be taken only when predators threaten human safety or are necessary for predator welfare. Lethal measures shall be in compliance with local regulations and be appropriately documented.

6.8.8 The purposeful release of cultured livestock from any rearing unit into the environment is prohibited, unless approved by the local authority.

6.9 Harvesting, transporting live livestock, and slaughtering

6.9.1 Techniques used to capture, handle and harvest livestock shall be selected such that they cause minimal physiological stress or injury, and that natural habitats are preserved. In order to keep stress levels to a minimum, only essential handling shall take place.

6.9.2 Vehicles and boats used shall be adapted to the types of live livestock being transported. Water quality requirements shall be met (including temperature, oxygen, etc.), and population densities shall meet the livestock welfare requirements in 6.7.2 with special consideration being given to livestock that are transported live to market and for slaughter.

6.9.3 The use of tranquillizing chemicals, paralyzing toxins and carbon dioxide is prohibited.

6.9.4 Slaughtering shall minimize pre-slaughter and slaughter stress.

6.9.5 Slaughter techniques shall render vertebrate animals immediately unconscious and insensible to pain. Differences in harvesting sizes, species, and production sites shall be taken into account when considering optimal slaughtering methods.

6.9.6 Vertebrate animals shall not be slaughtered in ponds, cages or tanks where other livestock are living.

6.9.7 Vertebrate animals shall not be slaughtered by suffocation.

6.9.8 Harvesting, transporting, slaughtering and subsequent handling of organic and non-organic livestock shall be clearly separated in time or space in order to completely avoid commingling.

6.10 Specific requirements for invertebrate production

This clause applies to the production of crustaceans (such as shrimps, lobsters and crabs), molluscs (such as mussels, clams, scallops, oysters and snails), and echinoderms (such as sea cucumbers and sea urchins). It applies *mutatis mutandis* to zooplankton, rotifers, worms and other aquatic animals.

6.10.1 Water quality and environment

6.10.1.1 In addition to the requirements in 6.1, growing areas shall be classified as “approved.” Growing areas classified as “conditionally approved,” “restricted” and “conditionally restricted” are not permitted for organic filter-feeding invertebrate livestock production.

Note: In Canada, classification criteria are as specified in the *Canadian Shellfish Sanitation Program — Manual of Operations* (<http://www.inspection.gc.ca/food/fish-and-seafood/manuals/canadian-shellfish-sanitation-program/eng/1351609988326/1351610579883>).

6.10.1.2 Depuration of bivalve molluscs for the purpose of eliminating or reducing amounts of substances prohibited by this standard is prohibited.

6.10.1.3 In the event of a closure ordered by a local authority for environmental reasons and biotoxin events, the waters under organic production shall remain closed for an additional five days after these waters are reopened by that authority and that requirements in 6.10.1.1 are satisfied.

6.10.2 Sourcing of seed

6.10.2.1 Where applicable, requirements in 6.4 and 6.5 apply.

6.10.2.2 Except as provided in 6.10.2.3, larvae or spat shall come from organic sources.

6.10.2.3 The use of seed from non-organic sources is permitted if organic material is not commercially available. If seed originates from non-organic sources, then the product may be considered as organic provided that at least the final 95% of biomass gain occurs while the animals are under continuous organic management.

6.10.2.4 The collection of wild seed shall:

- a) be done according to local regulations;
- b) not compromise the ecological integrity of the aquatic ecosystem;
- c) ensure sustainable wild populations; and
- d) minimize overset of wild seed, when possible.

6.10.3 Setting larvae

The use of epinephrine to expedite setting is prohibited.

6.10.4 Collection of wild spat

6.10.4.1 All equipment temporarily placed in a capture area of invertebrates shall be adequately identified, of orderly appearance, and securely anchored.

Note: In Canada, such equipment shall be removed from the area of spat collection as required by the local authority.

6.10.4.2 Intertidal cultch shall be adequately spaced or elevated to ensure that habitat is not smothered or otherwise damaged.

6.10.5 Feed and feeding

6.10.5.1 Where applicable, requirements in 6.6 apply.

6.10.5.2 Filter-feeding invertebrates shall receive all their nutritional requirements from nature or organic Integrated Multi-Trophic Aquaculture except in the case of animals reared in hatcheries and recirculation systems.

6.10.5.3 In hatcheries and recirculation systems, feed supplied to invertebrates shall be in compliance with this standard.

6.10.6 Health and welfare

Where applicable, requirements in 6.7 apply.

6.10.7 Cultivation practices

6.10.7.1 The requirements in 6.8 apply except requirements in 6.8.2.

6.10.7.2 Cultch (setting substrate)

6.10.7.2.1 The following materials are prohibited as setting substrate:

- a) tires;
- b) PVC (12F) French tubes that have not been weathered.

6.10.7.2.2 Cultch disinfection is permitted, provided that the substances used are listed in Table 7 of this standard or in Tables 7.3 or 7.4 of CAN/CGSB-32.311, and annotation restrictions are met.

6.10.7.3 Invertebrate livestock density

6.10.7.3.1 Density levels shall reflect due considerations of the optimal health and welfare of the cultured organisms.

6.10.7.3.2 Density levels shall not exceed the sustainable yield of the ecosystem in which the operation is located, and shall take into account the production of other tenures of invertebrates in the area.

6.10.7.4 Predator and pest control

6.10.7.4.1 Requirements in 6.8.7 and 6.8.7.1 apply.

6.10.7.4.2 Any modification of the tenure substrate (for example, removal of rock or gravelling) shall follow a management plan that demonstrably minimizes habitat impacts.

6.10.7.4.3 Predator exclusion devices (for example, predator netting on clam beaches and vertical fencing) shall be secured at all times to ensure they not do present undue risk of entanglement or injury to wildlife.

6.10.7.4.4 All predator and pest control practices shall target specific animals, with minimal impact on animal and wildlife habitat.

6.10.7.4.5 The following materials and methods are permitted in pest control:

- a) physical barriers (for example, clam netting, vertical predator fences, traps, natural bait as attractant to traps);
- b) manual removal;

- c) high-pressure water washing;
- d) dehydration through exposure to air and sun;
- e) hot water treatment;
- f) substances permitted in Table 8.2 of CAN/CGSB-32.311;
- g) dips with substances permitted in Table 8.2 of CAN/CGSB-32-311;
- h) release of natural predators (for example, sea urchins to eat bisset thread of mussels and control seaweed growth); and
- i) creation of environments fostering natural predators.

6.10.7.4.6 Unnecessary destruction of organisms or habitat is prohibited.

6.10.7.4.7 Disturbance or destruction of endangered organisms or critical habitat is prohibited.

6.10.7.4.8 Killing, capturing or injuring migratory birds and disturbing their nests is prohibited.

6.10.7.4.9 The following materials and methods are prohibited in pest control:

- a) fumigants;
- b) synthetic pesticides, petroleum distillates and solvents;
- c) traps containing prohibited materials;
- d) poison, natural or otherwise.

6.10.8 Waste management

6.10.8.1 Only products that can be recycled or that have a long life span shall be used in the production system.

6.10.8.2 All wastes produced by an operation shall be collected and disposed of properly. Shells and non-edible wastes shall be disposed of in such a manner as to not attract vermin or insects or otherwise increase risks of food contamination.

6.10.8.3 The use of expanded cellular polystyrene as a flotation device is prohibited for new installations and for replacement purposes.

6.10.9 Access, private property rights and riparian rights

6.10.9.1 Sites shall be well marked.

6.10.9.2 Producers shall provide clearly marked public access through or around tenures of invertebrate livestock.

6.11 Livestock product preparation

Wherever organic product preparation takes place, clause 8 applies.

6.12 Facility pest management

Clause 8 applies to pest management practices in and around facilities.

7 Specific production requirements

7.1 Aquaponics

7.1.1 All the relevant elements of clauses 1 to 6 shall apply.

7.1.2 An aquaponics system shall continuously and simultaneously produce crops and livestock within the same or a contiguous production system.

7.1.3 Shoots and microgreens produced in aquaponics systems

Note: For production of sprouts, refer to CAN/CGSB-32.310.

Organic seed shall be used for shoots and microgreens that are generally harvested (cut from the roots) within 30 days of imbibition.

7.2 Wild crops

7.2.1 An organic wild crop shall be harvested from a clearly defined area or production unit in accordance with this standard. Documented evidence that prohibited substances have not been used for at least 36 months before the harvest of an organic crop shall be available.

7.2.2 The operator shall prepare an organic plan (see 4.1, 4.2 and 4.3) that includes:

- a) a detailed description of production areas and harvest methods. If wild crops are harvested from a shared or common area, records shall be available to demonstrate that the total harvest complies with this standard;
- b) management practices that preserve wild species and avoid disturbance of the environment; and
- c) a record-keeping system that meets the requirements of 4.4.

7.2.3 Harvesting shall be carried out in such a way that the amounts harvested do not cause significant impact on the state of the environment. Measures shall be taken to ensure that crops can regenerate. Examples of such measures include harvest techniques and tools, minimum sizes, ages, reproductive cycles or size of remaining crops. Evidence of sustainable management and of no long-term impact on the harvesting areas shall be provided.

7.2.4 The production zone for wild crops shall be situated in locations where water is not subject to contamination by products or substances not authorized for organic production, or pollutants that would compromise the organic nature of the production.

8 Maintaining organic integrity during cleaning, preparation and transportation

Cleaning, facility pest management, preparation, handling, storage and transportation of organic products are subject to the requirements of Table 7 of this standard, clause 8 of CAN/CGSB-32.310, and of CAN/CGSB-32.311.

8.1 Antifouling measures and cleaning of production equipment and facilities

8.1.1 Bio-fouling organisms shall be removed by mechanical means and disposed of in an appropriate manner, or by using substances permitted for that use in Tables 4 or 7 of this standard or in Tables 7.3 or 7.4 of CAN/CGSB-32.311.

8.1.2 Cleaning of equipment and facilities shall be carried out by physical or mechanical means. Where this is not satisfactory, only the substances listed in Table 7 of this standard or in Tables 7.3 or 7.4 of CAN/CGSB-32.311 may be used.

9 Organic product composition

This clause applies to all operations involved in organic product preparation and resale, including retailers who prepare the product, as required in clause 9 of CAN/CGSB-32.310 and including Table 5 of this standard for livestock feed.

10 Procedures, criteria and conditions to amend the permitted substances lists

Procedures, criteria and conditions to amend the permitted substances lists for organic aquaculture products are subject to the requirements of 10.1 and 10.2 of CAN/CGSB-32.310.

10.1 Specific substance review criteria

The criteria used for guiding the review of a substance are described in Tables 1 and 2 of this standard and in Tables 10 and 11 of CAN/CGSB-32.310.

Table 1 – Substance review criteria for permitted substances in crop production

	Water amendments and crop nutrition (Table 3)	Crop production aids and materials (Table 4)
A. Necessity	Shall be necessary to improve or maintain biological diversity, to fulfil specific requirements of crops, and/or for specific water conditioning and rotational purposes that cannot be satisfied by the requirements and practices of this standard.	Shall be necessary to manage diseases, insects, weeds and other pests. Used when no other adequate biological, physical or breeding alternatives or effective management practices are available.
B. Origin and mode of production	1. Shall be of plant, animal, microbial or mineral origin. Substances may be produced through physical (for example, mechanical or thermal), enzymatic or microbial (for example, composting, fermentation or digestion) methods of transformation. 2. Shall be derived from crops and livestock produced in accordance with this standard, or from naturally occurring minerals. 3. Shall be non-synthetic. If non-synthetic forms of these substances do not exist, synthetic substances may be considered for inclusion.	
C. Impact	Substance reviews shall consider: 1. The impact of a substance's manufacture and disposal after use on the environment including impacts on ecology, surface and ground water, and soil and air quality including substance persistence, degradation and concentration effects. 2. The impact of a substance's use or potential misuse on benthic zone quality, including biological diversity and activity, ecosystems (in particular non-target organisms) including wildlife and wildlife habitat, and animal and human health.	

Table 2 — Substance review criteria for permitted substances in aquaculture livestock production

	Livestock feed (Table 5)	Livestock health care (Table 6)
A. Necessity	1. Shall be necessary to correct documented essential nutrient deficiencies in the forage or feed ration, when other biological, cultural or physical treatments permitted by this standard are not available; and/or 2. Shall be necessary to ensure and preserve product quality, when other biological, cultural or physical treatments permitted by this standard are not available.	Shall be necessary to prevent or treat livestock health problems when other treatments permitted by this standard are not available.
B. Origin and mode of production	Shall be organic or from non-synthetic sources occurring in nature. Mineral substances are permitted only if they are of natural origin.	Shall be from organic sources or of non-synthetic origin, whenever possible.
C. Impact	Substance reviews shall consider: 1. The impact of a substance's manufacture and disposal after use on the environment including impacts on ecology, surface and ground water, and soil and air quality including substance persistence, degradation and concentration effects. 2. The impact of a substance's use or potential misuse on benthic zone quality, including biological diversity and activity, ecosystems (in particular non-target organisms) including wildlife and wildlife habitat, and animal and human health.	

11 Permitted substances lists

11.1 General

This clause provides additional information in the form of permitted substances to be used as annotated in accordance with the scope of the table in which they are listed. Use of a listed substance in a manner inconsistent with the scope of the table in which it appears is not permitted, except as specified in a listed substance annotation. Listed substances shall comply with prohibitions in 1.4.

Note: Organic operations in Canada remain subject to all applicable laws and regulations. Substances that appear in this standard are subject to the *Pest Control Products Act* (PCPA) or the *Food and Drugs Act* (FDA) when used in Canada as pesticides or disinfectants. Health Canada's Pest Management Regulatory Agency (PMRA) is the federal authority responsible for the regulation of pest control products (including sanitizers) under the PCPA Regulations. Disinfectants are regulated by Health Canada's Therapeutic Products Directorate (TPD) under the FDA Regulations.

Substances that appear in this standard are subject to the FDA when used in Canada as veterinary drugs destined to food producing animals, and to the *Feeds Act* (FA) when used in Canada as feed for terrestrial and aquatic livestock. Health Canada's Veterinary Drugs Directorate is the federal authority responsible for the regulation of veterinary drugs under the FDA Regulations. All livestock feeds are regulated by the Animal Feed Division of the Canadian Food Inspection Agency under the FA Regulations and the *Health of Animals Act*.

11.2 Requirements for adding or amending substances in the lists

Clause 10 outlines the requirements for adding or amending listed substances.

11.3 Permitted substances lists for crop production

11.3.1 Classification

11.3.1.1 Crop production substances are classified according to the following uses and applications:

- a) Water amendments and crop nutrition — Substances listed in Table 3 of this standard or in Table 4.2 of CAN/CGSB-32.311 are permitted in crop production provided that the origin and usage are consistent with the annotation for that substance.
- b) Crop production aids and materials — Substances listed in Table 4 of this standard or in Table 4.3 of CAN/CGSB-32.311 are permitted in crop production provided that the origin and usage are consistent with the annotation for that substance.

11.3.2 Use of a listed substance in a manner inconsistent with the scope of the table in which it appears is not permitted, except as specified in substance annotations.

11.3.3 Substances listed in Tables 3 or 4 shall comply with prohibitions in 1.4. The following additional requirements apply to substances produced on substrates or growth media (for example, micro-organisms and lactic acid):

- a) if the substance includes the substrates or growth media, the substrates or growth media ingredients shall be listed in Tables 3 or 4 of this standard, or in Tables 4.2 or 4.3 of CAN/CGSB-32.311;
- b) if the substance does not include the substrates or growth media, the substance shall be produced on non-genetically engineered substrates or growth media, if commercially available.

Table 3 — Water amendments and crop nutrition

Note: Refer to Table 4.2 of CAN/CGSB-32.311. Only exceptions and additions permitted for aquaculture are included in this table.

Substance name(s)	Origin and usage
Calcium carbonate	As a water conditioner.
Carbon dioxide	Non-synthetic and synthetic sources. As seaweed and plant nutrient.
Ethylenediaminetetraacetate (EDTA), salts	To maintain trace elements in solution and available as micronutrients in recirculation systems.
Hydrated lime	As a water amendment
Micro-organisms	For water treatment
Oxygen	May be added to water to maintain oxygen levels.
Ozone	
Potassium hydroxide	From natural sources. As a water conditioner.
Salt	
Sodium bicarbonate	
Sodium hydroxide	For neutralizing acids.

Substance name(s)	Origin and usage
Thiosulfate	For neutralizing chlorine in incoming water in recirculating systems.
Ultraviolet	
Vitamins	Synthetic sources of biotin (H) and cyanocobalamin (B12) are permitted.

Table 4 — Crop production aids and materials

Note: Refer to Table 4.3 of CAN/CGSB-32.311. Only exceptions and additions permitted for aquaculture are included in this table.

Substance name(s)	Origin and usage
Carbon dioxide	Non-synthetic and synthetic sources. For maintaining pond water alkalinity and controlling pH of water.
Sodium hydroxide	For neutralizing acids in recirculation systems.

11.4 Permitted substances lists for livestock production

11.4.1 Classification

11.4.1.1 Livestock production substances are classified according to the following uses and applications:

- feed, feed additives and feed supplements — Substances listed in Table 5 of this standard or in Table 5.2 of CAN/CGSB-32.311 are permitted in livestock production provided that the origin and usage are consistent with the annotation for that substance;
- health care products and production aids — Health care products include medications, remedies, parasiticides and other substances used to maintain or restore the well-being of an animal. Production aids include all other substances used on livestock and their living areas. Substances listed in Table 6 of this standard or in Table 5.3 of CAN/CGSB-32.311 are permitted in livestock production provided that the origin and usage are consistent with the annotation for that substance;
- water amendments — Substances listed in Table 3 of this standard or in Table 4.2 of CAN/CGSB-32.211 are permitted in livestock production provided that the origin and usage are consistent with the annotation for that substance.

11.4.2 Substances listed in Tables 5 and 6 shall comply with prohibitions in 1.4. The following additional requirements apply to substances produced on substrates or growth media (for example, micro-organisms and lactic acid):

- if the substance includes the substrate or growth media, the substrate or growth media ingredients shall be listed in Tables 5 or 6 of this standard, or in Tables 5.2 or 5.3 of CAN/CGSB-32.311.
- if the substance does not include the substrates or growth media, the substance shall be produced on non-genetically engineered substrate or growth media, if commercially available.

Note: In Canada, feeds for terrestrial and aquatic livestock are governed by the same *Feeds Act* and associated Regulations, enforced by the Animal Feed Division of the Canadian Food Inspection Agency. All livestock feed shall meet the compositional and labelling standards of the *Feeds Regulations, 1983*. Ingredients used in feed shall be approved and listed in Schedule IV or V of the *Feeds Regulations, 1983*. Some ingredients (such as enzymes) require registration.

Table 5 — Feed, feed additives and feed supplements

Note: Refer to Table 5.2 of CAN/CGSB-32.311. Only exceptions and additions permitted for aquaculture are included in this table.

Substance name(s)	Origin and usage
Agar	As a feed binder.
Alginates	As a feed binder.
Antioxidants	Synthetic sources of antioxidants are permitted when legally required or when non-synthetic substances are not commercially available.
Carrageenan	As a feed binder.
Enzymes	Non-synthetic sources. May not be used to stimulate growth or production.
Feeds	Supplied feeds shall be obtained from organic sources and may include silage preservation products. See Table 5.2 of CAN/CGSB-32.311 Hay or silage preservation products. See also Fish, Fish oil, Fish meal, Insects, Insect meal, Insect oil, and Seaweed meal.
Feed stabilizers	Calcium propionate, sodium propionate.
Fish	See requirements that apply in 6.6.
Fish oil	See requirements that apply in 6.6.
Fish meal	See requirements that apply in 6.6.
Insect meal	See requirements that apply in 6.6.
Insect oil	See requirements that apply in 6.6.
Insects	See requirements that apply in 6.6.
Nucleotides	
Pigments	From organic sources. When organic sources are not commercially available, non-synthetic pigments may be used.
Plankton	See requirements that apply in 6.6.
Seaweed meal	From organic sources, if commercially available; otherwise, from sustainable sources.

Table 6 — Health care products and production aids

Note: Refer to Table 5.3 of CAN/CGSB-32.311. Only exceptions and additions permitted for aquaculture are included in this table.

Substance name(s)	Origin and usage
Acetic acid	Organic sources only when used for internal use. Non-organic sources may be used for external use.
Androgens	See requirements that apply in 6.5.2.
Anesthetics	Use requires a withdrawal period of twice the label requirement.
Antibiotics	See requirements that apply in 6.6 and 6.7.
Diatomaceous earth and mineral clay	For use in control of external parasites, as a filtering aid and as a production aid.
Electrolytes	
Formaldehyde	Bath treatment for the control of fungus on eggs. For control of external parasites on broodstock. Broodstock shall never be organic for slaughter purposes.
Formic Acid	Only for silage.
Hydrogen peroxide	
Oxygen	May be added to water to maintain oxygen levels.
Parasiticides	Shall respect the requirements set out in 6.7 with regard to the use of internal parasiticides.
Potassium chloride	May be used to treat diagnosed illnesses.
Potassium permanganate	For disease control, and removal of iron and hydrogen sulfide from water.
Releasing hormones	Gonadotropin-releasing hormone GnRH, GnRH-A, LHRH. Requirements in 6.5.1 b) apply.
Salt	
Veterinary biologics, including vaccines	

11.5 Permitted substances lists for preparation

11.5.1 Refer to 6.1 and 6.2 of CAN/CGSB-32.311 for classification and restrictions.

11.5.2 Substances listed in Tables 6.3, 6.4 and 6.5 of CAN/CGSB-32.311 are permitted for use in preparation, provided that the origin and usage are consistent with the annotation for that substance.

11.6 Permitted substances lists for cleaners, disinfectants and sanitizers

11.6.1 Refer to 7.1 of CAN/CGSB-32.311 for classification details.

11.6.2 Substances listed in Table 7 of this standard or in Tables 7.3 or 7.4 of CAN/CGSB-32.311 are permitted for use in aquaculture provided that the origin and usage are consistent with the annotation for that substance.

Table 7 — Cleaners, disinfectants and sanitizers permitted on organic product contact surfaces for which a removal event is mandatory

Note: Refer to Table 7.4 of CAN/CGSB-32.311. Only exceptions and additions permitted for aquaculture are included in this table.

Substance name(s)	Origin and usage
Chlorhexidine	
Lactic acid	
Potassium peroxymonosulfate	
Sulfamic acid	
Thiosulfate	As a neutralizing agent.

11.7 Facility management substances

11.7.1 Refer to 8.1 of CAN/CGSB-32.311 for classification details.

11.7.2 The substances listed in Tables 8.2 and 8.3 of CAN/CGSB-32.311 are permitted for use in aquaculture facilities provided that the origin and usage are consistent with the annotation for that substance.

Annex A
(informative)

Categorization of organic products

For the table of categorization of organic products based on their percentage of organic ingredients, refer to Annex A of CAN/CGSB-32.310.

Annex B

(informative)

Historical organic principles

Note: The principles listed below were the original principles published in 2012. Though they have been updated in the introduction to this standard, they have been retained in this annex to provide context for existing organic plans.

Organic aquaculture production is based on principles that support healthy practices. These principles aim to increase the quality and the durability of the environment through specific management and production methods. They also focus on ensuring the humane treatment of animals.

The general principles of organic aquaculture production include the following:

1. protect the environment, minimize benthic degradation and erosion and water quality degradation, decrease pollution, optimize biological productivity and promote a sound state of health;
2. maintain long-term biological stability by optimizing conditions for biological diversity;
3. recycle materials and resources to the greatest extent possible within the enterprise;
4. provide attentive care that promotes the health and meets the behavioural needs of aquaculture animals;
5. prepare organic products, emphasizing careful processing and handling methods in order to maintain the organic integrity and vital qualities of the products at all stages of production.

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