



## Presentation of the revised substances for crop production

### **Table 4.2 – Substances for crop production**

### **CAN/CGSB-32.311-2020**

Note that Column 1 contains substances that were in Table 4.2 of the 2015 PSL and Column 2 contains substances that were in Table 4.3 of the 2015 PSL.

Text in blue presents the 2015 version of the annotation.

The 2015 annotation was not inserted when for changes that are strictly editorial.

- Tables 4.2 and 4.3 are now combined into one “Table 4.2” to avoid duplication for several entries; it results in a shorter table and gives only one table to look at for crop production users.
- Because it is often hard to interpret, the word “synthetic” is eliminated as much as possible from the annotations and replaced with more precise restrictions.
- A more systematic order is introduced in the annotations, presenting allowed sources first, prohibited sources next and followed by uses. A positive wording is used whenever possible (i.e., describing what is allowed rather than what isn’t allowed).

Some substances were removed completely (see end of 4.2 table), either because they were redundant or incorporated into other annotations. These are : Arthropod, Arthropod pathogens; Arthropod predators and parasitoids; Calcium chloride; Calcium lignin sulphonate; Calcium silicate; Humus from worms and insects (vermicompost); Magnesium chloride; pH buffers; Potting soil; Sodium silicate; Sterile insects; Vegetable oils and Virus sprays.

Substance name(s)	Origin and usage	Soil amendments Column 1	Production aids Column 2	Comments from the Crop PSL Convener, Jean Duval
Acetic acid	Sources other than petrochemicals can be used. As an adjuvant, a pH regulator and for controlling pests (including weeds) and cleaning seeds.		•	Avoid the word synthetic
Adhesives for sticky traps and barriers			•	
Agar	For use in initial mushroom spawn production.	•		
Alfalfa meal and pellets	Shall be organic if commercially available.	•		
Algae	See Table 4.2 Aquatic plants and aquatic plant products.	•	•	
Amino acids	<p>Derived from plants, animals or microorganisms, and extracted, hydrolyzed or isolated by non-chemical means, such as physical separation, or by substances listed in Table 4.2 (Column 1 or Column 2) excluding Formulants used in crop production aids.</p> <p>Shall be from non-synthetic sources. Amino acids are considered non-synthetic if they are:</p> <p>a) produced by plants, animals and micro-organisms; and</p> <p>b) extracted or isolated either by hydrolysis or by other non-chemical means (example: physical extraction).</p>	•	•	Avoid the word synthetic
Ammonium carbonate	As an attractant in insect traps.		•	

Animal manure	See clauses 5 and 6 of CAN/CGSB-32.310. See also Table 4.2 Manure, composted and Manure, non-organic.	•		Editorial
Animal manure, processed	<p>Manure treated by mechanical or physical (including heat) methods are permitted. Additional ingredients shall be listed in Table 4.2 (Column 1).</p> <p>Manure sources shall conform to requirements specified in 5.5.1 of CAN/CGSB-32.310.</p> <p>The operator shall be able to demonstrate that best practices known to eliminate human pathogens during the treatment have been used or that the requirements in 5.5.2.5 of CAN/CGSB-32.310 have been met.</p> <p>See also Table 4.2 Manure, composted and Manure, non-organic.</p>	•		Editorial
Aquatic plants and aquatic plant products	<p>Aquatic plant products may be extracted by using the following substances in order of preference:</p> <p>a) substances in Table 4.2 Extractants;</p> <p>b) potassium hydroxide;</p> <p>c) sodium hydroxide provided the amount of solvent used does not exceed the amount necessary for extraction. The operator shall provide an affidavit from the manufacturer that proves the need to use sodium hydroxide.</p> <p>Sodium benzoate and potassium sorbate may be used as preservatives for water-extracted aquatic plant products. All other preservatives are prohibited unless listed in Table 4.2 (Column 1 or 2) with the exception that Formulants used in crop production aids are prohibited.</p> <p>Non-synthetic extracts are permitted. Extraction with synthetic solvents is prohibited except with, in order of preference:</p> <p>a) potassium hydroxide;</p> <p>b) sodium hydroxide;</p> <p>provided the amount of solvent used does not exceed the amount necessary for extraction. The manufacturer shall prove the need to use sodium hydroxide.</p> <p>Shall not contain synthetic preservatives, such as formaldehyde.</p>	•	•	Problem of instability with water-extracted products

Ascorbic acid (vitamin C)	<p>Non-synthetic sources may be used to promote growth.</p> <p>Synthetic and non-synthetic sources may be used as a pH regulator.</p>		•	<p>Avoid the word synthetic. More permissive</p>
Ash	<p>Ash shall be from plant and animal sources. Ash from burning manure or from burning minerals, coloured paper, plastics or other non-biological substances is prohibited. Ash containing materials that cannot be verified or containing prohibited substances shall not exceed the limits (category C1) for acceptable levels (mg/kg) of arsenic, cadmium, chromium, lead and mercury, as specified in <i>Guidelines for the Beneficial Use of Fertilising Residuals</i>.</p> <p>Shall not cause a build-up of heavy metals or micronutrients in soil.</p> <p>Ash shall be from plant and animal sources. Ash containing materials that cannot be verified or containing prohibited substances shall not exceed the limits (category C1) for acceptable levels (mg/kg) of arsenic, cadmium, chromium, copper, lead and mercury, as specified in <i>Guidelines for the Beneficial Use of Fertilising Residuals</i>.</p> <p>Ash from burning minerals, manure, coloured paper, plastics or other synthetic substances is prohibited.</p> <p>Shall not cause heavy metal buildup in soil through repeated application.</p>	•	•	<p>Editorial</p>
Baits for rodent traps	<p>May contain food or substances listed in Table 8.2.</p>		•	<p>Avoid the word synthetic</p>
Bentonite	<p>See Table 4.2 Mined minerals, unprocessed and Clay.</p>	•	•	
Biochar	<p>Produced through pyrolysis of forestry by-products which have not been treated or combined with prohibited substances.</p> <p>Recycled biochar from contaminated remediation sites is prohibited.</p>	•		
Biodegradable plant containers	<p>Biodegradable planting containers (for example, pots or cell packs) may be left to decompose in the field if all ingredients are listed in Table 4.2 (Column 1).</p>		•	

Biodynamic preparations for compost, soil and plants	As described in Appendix 10 of the <i>Demeter Production Standards</i> .	•	•	“Biodynamic” needed to be defined. Compost added to name of substances.
Biological organisms	<p>Biological organisms (living, dead or as extracts), such as viruses, bacteria, protozoa, phages, fungi, insects and nematodes. Pharmaceuticals derived from or by biological sources, such as natamycin, penicillin and streptomycin, are prohibited even if registered as pesticides.</p> <p>See Table 4.2 Invertebrates; Microorganisms and microbial products.</p> <p>4.2 Biological organism naturally occurring - Includes worms and their products.</p> <p>See Table 4.2 <i>Worm castings</i>.</p> <p>4.3 Biological organisms (living, dead or as extracts), such as viruses, bacteria, protozoa, fungi, insects and nematodes. Some examples are <i>Bacillus thuringiensis</i>, Spinosad and granulosis. Antibiotics are prohibited.</p> <p>Used to benefit plant production by reducing pest populations.</p>	•	•	Same annotation used for both columns.
Blood meal	Shall be sterilized.	•		
Bone meal	<p>Shall be guaranteed free of Specified Risk Material (SRM).</p> <p>Shall be guaranteed free of specified risk materials including: the skull, brain, trigeminal ganglia (nerves attached to the brain), eyes, tonsils, spinal cord and dorsal root ganglia (nerves attached to the spinal cord) of cattle aged 30 months or older; and the distal ileum (portion of the small intestine) of cattle of all ages.</p>	•		Editorial. SRM definition says it all.
Borate (boric acid)	<p>Mined sources of sodium tetraborate and octaborate are permitted as wood preservatives.</p> <p>Permitted for structural pest control (example: for ants).</p> <p>Direct contact with organic food or crops is prohibited in the case of products formulated as pesticides.</p> <p>4.3 Boric acid - Permitted for structural pest control (example: for ants).</p>		•	Combination of the two entries (same substance)

	<p>Direct contact with organic food or crops is prohibited.</p> <p>4.3 Borate - Mined sources of sodium tetraborate and octaborate are permitted as wood preservatives.</p>			
Boron	<p>The following soluble boron products are permitted:</p> <p>a) borate (boric acid);</p> <p>b) sodium tetraborate (borax and anhydrous); and</p> <p>c) sodium octaborate.</p> <p>May only be used when soil and plant deficiencies are documented by visual symptoms or by testing of soil or plant tissue, or when the need for a preventative application can be documented</p> <p>See Table 4.2 Micronutrients.</p>	•		Editorial : may instead of shall
Botanical pesticides	<p>Botanical pesticides shall be used in conjunction with a biorational pest management program. They shall not be the primary method of pest control. The least toxic botanicals shall be used in the least ecologically disruptive way possible. All label restrictions and directions shall be followed, including restrictions concerning crops, livestock, target pests, safety precautions, pre-harvest intervals and worker re-entry.</p>		•	
Calcium	<p>Calcium carbonate (calcitic limestone), calcium magnesium carbonate (dolomitic limestone), calcium silicate, and calcium sulphate (gypsum), all from mined sources.</p> <p>Other biological or mineral sources, such as shells from aquatic animals (for example, oyster shell flour), aragonite, eggshell meal and lime from sugar processing. Calcium chloride derived from naturally occurring brines and not chemically treated.</p> <p>Prohibited forms include slaked limestone (calcium hydroxide); quicklime (calcium oxide); calcium sulphate produced using sulphuric acid and calcium products that have been used in controlled atmosphere storage.</p> <p>See Table 4.2 Calcium sulphate (gypsum) for additional restrictions on this substance.</p> <p>The following calcium products are permitted:</p> <p>mined calcium carbonate, limestone, dolomite (not slaked) and other non-synthetic sources, including shells from aquatic animals (such as oyster shell flour), aragonite,</p>	•		Editorial + calcium chloride precision

	eggshell meal and lime from sugar processing. Non-synthetic calcium chloride is permitted for treatment of nutrient deficiencies and physiological disorders. Calcium products used in controlled atmosphere storage are prohibited. Shall not cause salt buildup in soil through repeated application. See Table 4.2 <i>Calcium sulphate (gypsum)</i> .			
Calcium lignin sulphonate	See Table 4.2 Lignin and lignin sulphonates (lignosulphonates)	•	•	
Calcium polysulphide	See Table 4.2 Lime sulphur.		•	
Calcium sulphate (gypsum)	Mined sources are allowed; calcium sulphate produced using sulphuric acid is prohibited. To correct calcium and sulphur deficiencies and soil salinity problems.	•		More permissive. No need for justification to use it.
Cannery wastes	Shall be from organic sources. Non-organic cannery wastes shall be composted. See Table 4.2 Compost feedstocks.	•		
Carbon dioxide (CO <sub>2</sub> )	For soil and greenhouse use, for controlled atmosphere storage, and for storage pest control.		•	Added another use (pest control)
Cardboard	Cardboard shall not be waxed or impregnated with fungicide or prohibited substances. For use as mulch, as composting feedstock or as pest trapping material. See Table 4.2 Compost feedstocks.	•	•	Added another use (pest control)
Chelates	Chelating agents that are listed in Table 4.2 (Column 2) are permitted. Examples include Acetic acid; Ascorbic acid; Citric acid; Humates; Lignin and lignin sulphonates (lignosulphonates) and Vinegar.  4.3 Non-synthetic and listed synthetic chelates are permitted. See Table 4.3 <i>Lignin sulphonates</i> .	•	•	More complete list of examples

Cholecalciferol (vitamin D <sub>3</sub> )	Permitted if used outdoors and inside greenhouses for rodent control when methods described in 5.6.1 of CAN/CGSB-32.310 have failed.  Prohibited inside on-farm food processing and food storage facilities.		•	
Citric acid	4.3 Non-synthetic and synthetic sources are permitted to be used as a chelating agent and to adjust pH.		•	Avoid the word synthetic. No restriction on usage.
Clay	Bentonite, perlite and kaolin as soil amendments, as seed pellet additives or for pest control.  See Table 4.2 Mined minerals, unprocessed; Bentonite; Kaolin clay.	•	•	
Compost	Compost produced on the farm is restricted to compost produced on a certified organic farm. Compost from off-farm sources includes every other source, for example: municipal, residential or industrial sources, or from any organic or non-organic farm.  See Table 4.2 Compost from off-farm sources; Compost produced on the farm; Compost tea; and Compost feedstocks. For information on compost starters, see Table 4.2 Microorganisms and microbial products. For information on vermicompost, see Table 4.2 Worm castings.	•		
Compost feedstocks	Acceptable feedstocks include: a) animal manures conforming to criteria specified in 5.5.1 of CAN/CGSB-32.310; b) animals, animal products and by-products (including fishery); c) plants and plant by-products (including forestry and source-separated yard debris, such as grass clippings and leaves), pomaces and cannery wastes; d) soils and minerals that conform to the requirements of this standard and of CAN/CGSB-32.310; and e) paper yard waste bags which contain coloured ink.  When evidence indicates that compost feedstocks could contain a substance or substances prohibited by 1.4 or 1.5 of CAN/CGSB-32.310 that is known to be potentially persistent in compost, testing of the compost <u>before use is required or reference to</u>	•		Reworded, stricter (added sentence underlined)

	<p><u>scientific literature which establishes that the specific potential contaminant(s) will degrade during the composting process.</u></p> <p>The following composting feedstocks are prohibited: sewage sludge; compost starter and feedstocks fortified with substances not included in this standard; leather by-products; glossy paper; waxed cardboard; paper containing coloured ink other than paper yard waste bags; and animals, animal products and animal by-products not guaranteed free of Specified Risk Material (SRM).</p>				
Compost from off-farm sources	<p>Compost obtained from off-farm sources shall conform to the criteria specified in Table 4.2 Compost feedstocks. If compost is obtained from another farm, feedstock sources shall be documented. Compost obtained from all other sources shall comply to the following:</p> <p>a) shall not exceed the maximum acceptable levels of arsenic, cadmium, chromium, lead and mercury (mg/kg) and foreign matter outlined for unrestricted use compost (Category A), as specified in <i>Guidelines for Compost Quality</i>;</p> <p>b) shall meet criteria for acceptable levels (MPN/g total solids) of human pathogens as specified in <i>Guidelines for Compost Quality</i>; and</p> <p>c) shall not cause heavy metal buildup in soil.</p>	•		Editorial changes to provide more precision	
Compost produced on the farm	<p>Compost produced on the farm shall conform to the criteria specified in Table 4.2 Compost feedstocks. In addition, if made from animal manures or other likely sources of human pathogens, compost produced on the farm shall:</p> <p>a) reach a temperature of 55 °C (130 °F) for a period of four consecutive days or more. The compost piles shall be mixed or managed to ensure that all of the feedstock heats up to the required temperature for the minimum time; or</p> <p>b) meet limits for acceptable levels (Most Probable Number of total solids per gram [MPN/g total solids]) of human pathogens specified in <i>Guidelines for Compost Quality</i>; or</p> <p>c) be considered as aged or raw manure rather than compost, that is, meeting requirements specified in 5.5.2.5 of CAN/CGSB-32.310.</p>	•			
Compost tea	<p>Compost tea shall be made from composts that conform to criteria specified in Table 4.2 Compost produced on the farm; Compost from off-farm sources; or Worm castings.</p> <p>Additional ingredients shall be listed in Table 4.2 (Column 1).</p>	•	•	Added another use (pest control);	

	<p>If compost tea is applied directly to the edible parts of plants, the operator shall be able to demonstrate that best practices known to eliminate pathogens during the processing have been used OR that the requirements for raw manure, as specified in 5.5.2.5 of CAN/CGSB-32.310, have been met.</p> <p>See the <i>Compost tea</i> definition in clause 3 of CAN/CGSB-32.310.</p>			Added Compost tea to column 2 (it was not listed in Table 4.3 of the 2015 PSL).
Copper (plant nutrition)	<p>The following copper products may be used to correct documented copper deficiencies: copper sulphate, basic copper sulphate, copper oxide and copper oxysulphate.</p> <p>Copper ammonia base, copper ammonium carbonate, copper nitrate and cuprous chloride are prohibited.</p> <p>Shall be used with caution to prevent excessive copper accumulation in the soil. Copper build-up in soil shall prohibit future use. Visible residue of copper products on harvested crops is prohibited.</p> <p>See Table 4.2 Micronutrients.</p>	•		Editorial
Copper (production aid)	<p>Copper sulphate, copper hydroxide, copper octanoate, Bordeaux mix, copper oxychloride and copper oxide.</p> <p>Permitted for use as a wood preservative, or for controlling pests, including diseases.</p> <p>Shall be used with caution to prevent excessive copper accumulation in the soil. Copper build-up in soil shall prohibit future use.</p> <p>Visible residue of copper products on harvested crops is prohibited.</p>		•	
Diatomaceous earth	<p>Non-calcined forms.</p> <p>May contain substances listed in Table 4.2 (Column 2).</p> <p>Non-heated forms are permitted.</p> <p>Synthetic pesticides and synergists shall not be added.</p>		•	Avoid the word synthetic. Correction on form allowed.
Digestate, anaerobic	<p>Permitted to be used for soil amendment, provided that the following conditions are met:</p> <p>a) the materials added to the digester shall be listed in Table 4.2 (Column 1). If feedstocks are obtained from off-farm sources, the digestate shall comply with the heavy metal restrictions in Table 4.2 Compost from off-farm sources;</p>	•		

	<p>b) the criteria for the application of raw manure on land specified in 5.5.2 of CAN/CGSB-32.310 shall be met if the digestate feedstocks include manure;</p> <p>c) it is permitted to use anaerobic digestate as a compost feedstock if it is added to other substances which are then composted. See Table 4.2 Compost feedstocks.</p>			
Dormant oils	For use as a dormant spray on woody plants. Shall not be used as a dust suppressant.		•	
Dust suppressants	<p>Vegetable oils, organic molasses or substances listed in Table 4.2 (Column 1 or 2) (for example: Lignin and lignin sulphonates (lignosulphonates)) are permitted, excluding Formulants used in crop production aids.</p> <p>Petroleum products are prohibited.</p> <p>4.3 Non-synthetic substances, or substances listed in Tables 4.2 and 4.3 (for example: <i>Lignin sulphonate, Molasses, Vegetable oils</i>) are permitted.</p> <p>Petroleum products are prohibited.</p>	•	•	More examples given. Avoid the word synthetic.
Enzymes	<p>Derived from plants, animals or microorganisms through the action of microorganisms.</p> <p>Shall be derived from non-synthetic substances by the action of micro-organisms. Shall not be fortified with prohibited substances.</p>	•	•	Avoid the word synthetic. Editorial.
Extractants	<p>The following may be used as extractants:</p> <p>a) water;</p> <p>b) culinary steam, as described in 8.1.2 b) of CAN/CGSB-32.310;</p> <p>c) fats and oils, such as cocoa butter, vegetable oils, lanolin and animal fats, and alcohols other than isopropyl alcohol;</p> <p>d) supercritical CO<sub>2</sub>; and</p> <p>e) substances listed in Table 4.2 (Column 1 or 2) except for Formulants used in crop production aids.</p> <p>Permitted extractants include non-synthetic substances, such as cocoa butter, lanolin, animal fats, alcohols and water. Extraction with synthetic solvents is prohibited, except as specified in the annotations of substances listed in Table 4.2 or 4.3</p>	•	•	Made changes to be consistent with annotations in other Tables of 32.311

Feather meal		•		
Ferric phosphate (iron ortho-phosphate, iron phosphate)	Permitted as a molluscicide (for slug and snail control). Shall be used in such a manner that runoff into water bodies is prevented. Contact with crops is prohibited.		•	Defined molluscicide.
Fibre row covers	Shall not be incorporated into the soil or left in the field to decompose; shall be removed at the end of the growing season.		•	
Fish products	The following fish products are permitted: fish meal; fish powder; fish farm wastes and hydrolysate, emulsions and solubles. Fish farm wastes shall be composted.  Only substances listed in Column 1 or 2 of Table 4.2 can be added to fish products with the exception that the addition of Formulants used in crop production aids is prohibited. Chemical treatment is prohibited, with the exception of the following substances which are in preferential order:  a) vinegar;  b) citric acid;  c) phosphoric acid; or  d) sulphuric acid.  The amount of acid used shall not exceed the minimum needed to stabilize the product.  Previous name in 2015 was Fish meal, fish powder, fish wastes, hydrolysate, emulsions and solubles.	•		Provided precision on formulants, and editorial change.
Formulants used in soil amendments	Formulants used in soil amendments shall be derived from biological or mineral sources unless a substance annotation allows the use of a specified formulant. For example, see Table 4.2 Aquatic plants and plant products; Fish products; Humates, humic acid and fulvic acid.  Non-synthetic substances shall be used, unless a substance annotation allows the use of a specified synthetic formulant. For example, see Table 4.2 <i>Aquatic plants and plant products; Fish meal, fish powder, fish wastes, hydrolysate, emulsions and solubles; Humates, humic acid and fulvic acid.</i>	•		Avoid the word synthetic

Formulants used in crop production aids	<p>Formulants used in crop production aids may only be used with substances listed in Column 2 of this table. Only formulants classified as List 4A or 4B by the Pest Management Regulatory Agency (PMRA) or derived from biological or mineral sources may be used with substances in Table 4.2 (Column 2).</p> <p>Formulants classified as List 3 by PMRA may be used with passive pheromone dispensers.</p> <p>Formulants classified as List 4A, 4B or 3 by PMRA are not subject to 1.4 or 1.5 of CAN/CGSB-32.310.</p> <p>Formulants classified as List 1 or 2 by PMRA are prohibited.</p>		•	Editorial
Guano	<p>Shall be decomposed, dried deposits from wild bats or birds.</p> <p>Domesticated fowl excrement is considered to be Manure, not Guano.</p>	•		
Growth regulators for plants	Plant hormones, such as gibberellic acid, indoleacetic acid and cytokinins, derived from terrestrial or aquatic plants or produced by microorganisms.		•	Avoid the word synthetic
Homeopathic preparations			•	
Hormones	See Table 4.2 Growth regulators for plants.		•	
Humates, humic acid and fulvic acid	<p>Permitted if mined; produced through microbial activity; extracted by physical processes; or with:</p> <p>a) Table 4.2 Extractants; or</p> <p>b) potassium hydroxide—potassium hydroxide levels used in the extraction process shall not exceed the amount required for extraction.</p> <p>Levels (mg/kg) of arsenic, cadmium, chromium, lead and mercury shall not exceed the limits (category C1) specified in <i>Guidelines for the Beneficial Use of Fertilising Residuals</i>. Shall not cause a build-up of heavy metals or micronutrients in soil.</p> <p>Permitted if extracted by:</p> <p>a) non-synthetic substances;</p>	•		Avoid the word synthetic and editorial change.

	<p>b) microbial fermentation; or</p> <p>c) potassium hydroxide—potassium hydroxide levels used in the extraction process shall not exceed the amount required for extraction.</p> <p>Shall not exceed the limits (category C1) for acceptable levels (mg/kg) of arsenic, cadmium, chromium, copper, lead and mercury specified in <i>Guidelines for the Beneficial Use of Fertilising Residuals</i>.</p>			
Hydrated lime (calcium hydroxide)	For plant disease control.		•	
Hydrogen peroxide	Permitted for use as a fungicide.		•	More permissive
Inoculants	See Table 4.2 Microorganisms and microbial products.	•		
Invertebrates	<p>Worms, insects (including sterile insects), nematodes, arthropods and other invertebrates.</p> <p>See Table 4.2 Worm castings; Shells from aquatic animals.</p>	•	•	
Iron	<p>The following sources of iron are permitted to correct documented iron deficiencies: ferric oxide, iron citrate, iron sulphate (ferric or ferrous) or iron tartrate.</p> <p>See Table 4.2 Micronutrients.</p>	•		Editorial
Kaolin clay	<p>May be calcined. Shall not be processed or fortified with substances unless listed in Table 4.2 (Column 2).</p> <p>Kaolin clay and calcined kaolin clay. Addition of synthetic chemicals to kaolin clay during calcination is prohibited.</p>		•	Avoid the word synthetic. Editorial.
Kelp and kelp products	See Table 4.2 Aquatic plants and aquatic plant products.	•	•	
Leaf mould		•		

Lignin and lignin sulphonates (ligno-sulphonates)	<p>Permitted as chelating agent(s), as formulant ingredient(s) and as dust suppressant(s). Ammonium lignosulphonate is prohibited.</p> <p>Other lignin forms such as lignosulphonic acid, calcium lignosulphonate, magnesium lignosulphonate, sodium lignin and sodium lignosulphonate are permitted.</p> <p>Permitted as a chelating agent, as a formulant ingredient and as a dust suppressant.</p> <p>Ammonium lignosulphonate is prohibited.</p>	•	•	
Lime sulphur (calcium polysulphide)	<p>Permitted on plants as:</p> <p>a) a fungicide;</p> <p>b) an insecticide; and</p> <p>c) an acaricide (mite control).</p>		•	
Limestone	<p>Mined magnesium and calcium carbonates. See Table 4.2 Calcium.</p> <p>Magnesium carbonate and calcium carbonate. Shall be from a non-synthetic source. Oyster shell flour, limestone, dolomite (not slaked), aragonite, eggshell meal, lime from sugar processing and mined calcium carbonate are acceptable sources.</p> <p>Calcium products that have been used in controlled atmosphere storage are prohibited.</p> <p>Magnesium carbonate shall be used with caution to prevent magnesium buildup in soil.</p>	•		Editorial. Refer to Calcium.
Magnesium	<p>The following sources are permitted:</p> <p>a) mined magnesium rock;</p> <p>b) magnesium chloride derived from natural brines and not chemically treated;</p> <p>c) mined calcium magnesium carbonate (dolomitic limestone) that has not been slaked;</p> <p>d) potassium magnesium sulphate (langbeinite);</p>	•		Editorial change. Precision on magnesium chloride

	<p>e) magnesium sulphate (kieserite or Epsom salts) may be used when soil and plant deficiencies are documented by visual symptoms or by testing of soil or plant tissue, or when the need for a preventative application is documented.</p> <p>4.2 From non-synthetic substances, without the addition of chemically synthesized substances or chemical treatment. The following sources of magnesium are permitted:</p> <p>a) magnesium rock—magnesium carbonate, magnesium chloride;</p> <p>b) dolomitic limestone (not slaked);</p> <p>c) magnesium sulphate (MgSO<sub>4</sub>), kieserite or synthetic Epsom salts are permitted if used to correct a documented magnesium deficiency.</p> <p>4.3 Non-synthetic sources.</p>				
Manganese	<p>Manganous oxide and manganese sulphate are permitted to correct a documented manganese deficiency.</p> <p>See Table 4.2 Micronutrients.</p>	•			
Manure, composted	See Table 4.2 Compost. See also Table 4.2 Animal manure and Animal manure, processed.	•			Editorial
Manure, non-organic manure source	See 5.5 of CAN/CGSB-32.310. See also Table 4.2 Animal manure and Animal manure, processed.	•			Editorial
Meat meal	Shall be processed by drying or heat sterilization or composted.	•			
Microorganisms and microbial products	<p>Microorganisms, such as viruses, bacteria, protozoa, phages, and fungi, are permitted living, dead or as extracts. Microbial products may contain substances in Table 4.2 (Column 1 or 2). Examples include the following: rhizobium bacteria; mycorrhizal fungi; azolla; yeast; <i>Bacillus thuringiensis</i>; virus and virus sprays (e.g., granulosis); and spinosad.</p> <p>Microbial fertilizers or microbial soil amendments derived from substances that cannot be verified or derived from materials not listed in Table 4.2 (Column 1 or 2), may be used with the exception of municipal sewage sludge, which is prohibited.</p> <p>When used, microbial fertilizers shall not exceed the limits (category C1) for acceptable levels (mg/kg) of arsenic, cadmium, chromium, lead and mercury, as specified in</p>	•	•		Needed to consider microbial fertilizers and indicate prohibition of antibiotics

	<p><i>Guidelines for the Beneficial Use of Fertilising Residuals.</i> Shall not cause a build-up of heavy metals or micronutrients in the soil.</p> <p>Ionizing radiation is permitted for use on a peat moss carrier before the addition of microbial inoculants. Radiation is otherwise prohibited.</p> <p>Pharmaceuticals derived from biological sources, such as natamycin, penicillin and streptomycin, are prohibited even if registered as pesticides.</p> <p>The following microbial products are permitted:</p> <ul style="list-style-type: none"> <li>a) rhizobium bacteria;</li> <li>b) mycorrhizal fungi;</li> <li>c) azolla; and</li> <li>d) yeast and other micro-organisms.</li> </ul> <p>Ionizing radiation is permitted for use on peat moss carrier, before the addition of microbial inoculants. Radiation is otherwise prohibited.</p>				
Micronutrients	<p>Plant micronutrients (trace elements) are Iron, Manganese, Zinc, Copper, Molybdenum, Boron, Chlorine and Silicon.</p> <p>Micronutrient fertilizers may only be used when soil and plant deficiencies are documented by visual symptoms or by testing of soil or plant tissue, or when the need for a preventative application can be documented.</p> <p>Chelation with substances listed under Table 4.2 Chelates is permitted. EDTA, DTPA, EDDHA, nitrate and ammonium forms of micronutrients are prohibited.</p> <p>See specific annotations for Boron; Silicon; Copper; Iron; Manganese; Molybdenum and Zinc in Table 4.2.</p> <p>Includes micronutrients (trace elements) from non-synthetic or synthetic sources. Chelation is permitted. See Table 4.2 <i>Chelates</i>.</p>	•		Expanded, more precise.	

	<p>To be used when soil and plant deficiencies are documented by visual symptoms or by testing of soil and/or plant tissue, or when the need for a preventative application can be documented.</p> <p>Nitrate and ammonium forms of micronutrients are prohibited.</p> <p>See Table 4.2 <i>Boron; Copper; Iron; Manganese; Molybdenum; and Zinc.</i></p>			
Milk and milk by-products		•	•	Addition of milk byproducts
Mined minerals, unprocessed	<p>Mined minerals include basalt, pumice, sand, feldspar, mica, granite dust and other unprocessed rock dust. Minerals extracted from seawater are permitted. To be allowed as a mined mineral, the product shall not have undergone any change in its molecular structure through heating, processing, ion exchange or combining with other substances.</p> <p>Sodium nitrate and rock dust that have been mixed with petroleum products, such as those from stone engraving, are prohibited.</p> <p>See annotations for specific minerals in Table 4.2 (Column 1).</p>	•		Editorial
Molasses	Shall be organic.	•		
Molybdenum	<p>To correct documented molybdenum deficiencies.</p> <p>See Table 4.2 Micronutrients.</p>	•		
Mulches	<p>Biological materials from organic sources are permitted (e.g., straw, leaves, grass clippings, hay, wool or untreated burlap). If organic materials are not commercially available, non-organic, non-genetically engineered sources may be used provided that prohibited substances have not been used on these materials for at least 60 days before harvest.</p> <p>Prohibited mulch material includes, but is not limited to, sawdust, wood chips, bark and shavings that is treated or processed with Formulants used in crop production aids or with substances, such as herbicides, preservatives and glues, not listed in Table 4.2 (Column 1 or 2).</p> <p>Newspaper and paper mulch are permitted; glossy paper and coloured ink are prohibited.</p> <p>Plastic mulches: Non-biodegradable and semi-biodegradable materials shall not be incorporated into the soil or left in the field to decompose. Use of polyvinyl chloride as plastic mulch or row cover is prohibited.</p>	•	•	<p>Annotation common to both columns. Editorial.</p> <p>Wool added to list.</p> <p>Temporary exemption removed.</p>

	Biodegradable mulches: 100% of biodegradable mulch films shall be derived from bio-based sources. Formulants or ingredients shall be listed in Table 4.2 (Column 1 or 2). Biodegradable polymers and Carbon Black from GE or petroleum sources are not permitted.			
Mushroom compost	See Table 4.2 Compost.	•		
Nitrogen gas	For controlled atmosphere storage.		•	Editorial
Oilseed meals	Shall be organic if commercially available.	•		
Oxygen	For controlled atmosphere storage.		•	
Peat moss		•		
Peracetic (peroxyacetic) acid	Formulations of peracetic acid may include unreacted residual reagents and catalysts, such as hydrogen peroxide, acetic acid and sulphuric acid.  Permitted for:  a) pest control; and  b) disinfecting and cleaning seeds and plant stock.  See Table 7.3.		•	Remove restrictions on usage. Consider what is available on the market as regard to purity
Pheromones and other semiochemicals	All sources are permitted. For pest control.  Synthetic and non-synthetic pheromones and semiochemicals are permitted.  For pest control. Use in pheromone traps or passive dispensers		•	Avoid the word synthetic.
Phosphate rock	May be fortified or processed with substances listed in Table 4.2 (Column 1).  Cadmium shall not exceed 90 mg/kg P <sub>2</sub> O <sub>5</sub> .	•		Positive wording
Plant by-products and plants	Includes plant preparations of aquatic or terrestrial plants or parts of plants, such as cover crops, green manures, crop wastes, hay, leaves and straw. Parts of plants used as soil amendments and foliar feeds are permitted. Wastes from crops that have been treated or produced with prohibited substances are permitted as compost feedstocks.	•		Provided precision on formulants

	<p>For processing of plant by-products, see Table 4.2 Extractants.</p> <p>Prohibited substances include sawdust, wood chips, bark and shavings that are treated or processed with Formulants used in crop production aids or with substances, such as herbicides, preservatives and glues, not listed in Table 4.2 (Column 1 or 2).</p>			
Plant extracts, oils and preparations	<p>Permitted extractants include fats and oils (such as cocoa butter, lanolin and animal fats); alcohols; water; or substances listed on Table 4.2 (Column 2) other than Formulants used in crop production aids.</p> <p>Extraction with other solvents is prohibited except with, in order of preference:</p> <p>a) potassium hydroxide; or</p> <p>b) sodium hydroxide; provided the amount of solvent used does not exceed the amount necessary for extraction. The operator shall provide an affidavit from the manufacturer that proves the need to use sodium hydroxide.</p> <p>For control of pests (e.g., diseases, weeds and insects).</p> <p>Clove oil is permitted for sprout inhibition in potatoes.</p>		•	Provided precision on formulants and editorial change
Plant protectants	<p>Mineral and biological substances including, but not limited to: calcium carbonate (from chalk, limestone, etc.); diatomaceous earth; kaolin clay; pine oil; pine resin; and yucca. White wash (solution of hydrated limestone) is permitted for use on trees to protect against sunburn and southwest disease.</p> <p>Permitted to protect plants from harsh environmental conditions (such as frost and sunburn), infection, the build-up of dirt on leaf surfaces, or injury by an invertebrate pest or disease.</p>		•	Avoid the word synthetic. Editorial (“shall” was removed)
Plastic for row covers and solarization	<p>Non-biodegradable and semi-biodegradable materials shall not be incorporated into the soil or left in the field to decompose.</p> <p>Use of polyvinyl chloride as plastic mulch or row cover is prohibited.</p>		•	
Pomaces	<p>Feedstocks shall be from organically grown fruits or vegetables. Non-organic pomaces shall be composted. See Table 4.2 Compost feedstocks.</p>	•		
Potassium	<p>The following potassium sources are permitted:</p>	•		Editorial change and more precise list of acceptable

	<p>a) mined potassium magnesium sulphate (langbeinite) and mined potassium magnesium chlorides (sylvinite and kainite);</p> <p>b) potassium rock powder—includes basalt, biotite, mica, feldspar, granite, glauconite and greensand;</p> <p>c) potassium chloride—muriate of potash or rock potash. The use of potassium chloride shall not cause salt build-up in soil through repeated application;</p> <p>d) potassium sulphate—shall be produced by evaporating brines from seabed deposits or combining mined minerals using ion exchange. Potassium sulphate made using sulphuric acid as a reactant is prohibited.</p>			sources of potassium sulphate
Potassium bicarbonate	For pest and disease control for crops grown in greenhouses and other structures, and for other crops.		•	
Pyrethrum	<p>May be combined with Formulants used in crop production aids.</p> <p>See Table 4.2 Botanical pesticides for restrictions.</p>		•	Editorial
Quicklime (calcium oxide)	Shall not be used as a fertilizer or as a soil amendment.		•	
Repellents	Shall be derived from biological sources, such as sterilized blood meal, rotten eggs, hair or predator scents. May contain substances listed in Table 4.2 Column 2.		•	Avoid the word synthetic
Salt	<p>Sodium chloride, calcium chloride or potassium chloride; shall be mined or derived from sources of natural brine.</p> <p>The effluent from ion exchange water softener regeneration may be used.</p> <p>For pest control.</p> <p>Non-synthetic sources of sodium chloride and calcium chloride.</p> <p>For disease control and prevention in mushroom production.</p>		•	Avoid the word synthetic. More permissive on sources and usage.
Seaweed and seaweed products	See Table 4.2 Aquatic plants and aquatic plant products.	•	•	

Seed treatments	<p>Includes microbial products, kelp, yucca, gypsum, clays and botanicals.</p> <p>May contain substances listed in Table 4.2 (Column 1 or 2) or Table 7.3. See Table 4.2 Peracetic Acid; Treated Seeds and refer to CAN/CGSB-32.310, 5.3.2.</p> <p>Microbial products, kelp, yucca, gypsum, clays and botanicals.</p> <p>See Table 4.3 <i>Peracetic Acid; Treated Seeds</i>.</p>		•	Editorial and more permissive on sources.
Shell from aquatic animals	Includes chitin.	•	•	
Silicon, silica and silicates	<p>Silicon products from mined sources such as diatomaceous earth, calcium silicate from wollastonite, or silicon dioxide (quartz). Sodium and potassium silicates are permitted only for Crop protection (Table 4.2 Column 2).</p> <p>See Table 4.2 Diatomaceous earth.</p>	•	•	New entry was needed as silicon is considered a micronutrient. For both columns.
Soaps	Soaps (including insecticidal soaps) shall consist of fatty acids derived from animal or vegetable oils.		•	
Soaps, ammonium	<p>As a large animal repellent.</p> <p>Direct contact with soil or edible portion of crop is prohibited.</p>		•	
Sodium bicarbonate	For pest and disease control for crops grown in greenhouses and other structures, and for other crops.		•	
Soil	<p>From organic sources. Shall comply with restrictions specified in 5.1.2 of CAN/CGSB-32.310.</p> <p>See definition of <i>Soil</i> in Clause 3 of CAN/CGSB-32.310.</p> <p>For soils used in containers, see Transplant media, potting soil and potting media.</p>	•		Expanded for more precision
Sphagnum moss	May contain wetting agents listed in Table 4.2 Surfactants.	•		Positive wording
Stillage and stillage extract	Ammonium stillage is prohibited.	•		

Struvite (magnesium ammonium phosphate)	<p>Allowed if made from biological sources, including plant and plant by-products or livestock manures. Prohibited if made from sewage sludge.</p> <p>All sources of magnesium are permitted in the manufacturing process.</p> <p>Levels (mg/kg) of arsenic, cadmium, chromium, lead and mercury shall not exceed the limits (category C1) specified in <i>Guidelines for the Beneficial Use of Fertilising Residuals</i>. Shall not cause a build-up of heavy metals or micronutrients in soil.</p>	•		New entry
Sugars	Organic sugars (e.g., sucrose, glucose, fructose) are permitted.	•	•	More precise, for both columns.
Sulphur smoke bombs	Use of sulphur smoke bombs shall be permitted in conjunction with other methods used for rodent control when a full pest control program is maintained but temporarily overwhelmed.		•	
Sulphur, elemental	<p>Both mined and reclaimed sources of elemental sulphur are permitted.</p> <p>4.2 Non-synthetic elemental sulphur or elemental sulphur derived from non-synthetic sources are permitted as soil amendment or foliar application where more buffered sources of sulphur are not appropriate. Chemically synthesized substances shall not be added. Chemical treatment is prohibited.</p> <p>4.3 For foliar use</p>	•	•	Needed to reflect what is available on the market. For both columns.
Summer oils	On foliage, as suffocating or stylet oils.		•	
Surfactants	<p>Includes plant-derived saponins, such as <i>Yucca schidigera</i> and <i>Quillaja saponaria</i>, or substances listed in Table 4.2 Formulants used in soil amendments; Formulants used in crop production aids; Soaps.</p> <p>Non-synthetic substances.</p> <p>4.2 See Table 4.2 <i>Formulants, Wetting agents</i>, and Table 4.3 <i>Soaps; Vegetable oils</i>.</p> <p>4.3 See Table 4.3 <i>Soaps; Vegetable oils; Wetting agents</i>.</p>	•	•	Avoid the word synthetic. Same annotation for both columns.

Transplant media, potting soil and potting media	Shall be composed entirely of permitted substances listed in Table 4.2 (Column 1 or 2). Soil from the field may be used provided that prohibited substances have not been used on the soil for at least 36 months.	•		Editorial. More precise.
Treated seed	See Table 4.2 Peracetic acid; Seed treatments and refer to CAN/CGSB-32.310, 5.3.2.  Seed treated with biological management agents is permitted.  Seed pelletized with clay, gypsum, biological organisms (such as <i>Rhizobium</i> ) or other non-synthetic coatings is permitted. Plastic polymer pelletization of seed is prohibited.  See Table 4.3 <i>Peracetic acid; Seed treatments</i> .		•	Annotation shortened because of new section in 32.310
Tree seals	Plant or milk-based paints are permitted. May only be combined with substances listed in Table 4.2 (Column 1 or 2). See Table 4.2 Plant Protectants.  For planting stock: commercial grafting materials are permitted, provided that plants are maintained in accordance with requirements of CAN/CGSB-32.310 for at least 12 months prior to harvest of organic products.		•	Avoid the word synthetic.
Vermicasts	See Table 4.2 Worm castings.	•		
Vermiculite		•		
Vinegar (acetic acid)	See Table 4.2 Acetic acid.		•	Avoid the word synthetic
Vitamins	Biological and mineral sources of all vitamins are permitted. Non-biological and non-mineral sources of vitamins B <sub>1</sub> , C (ascorbic acid) and E are permitted.  Non-synthetic sources of all vitamins and synthetic sources of vitamins B <sub>1</sub> , C (ascorbic acid) and E are permitted for use in organic crop production.	•	•	Avoid the word synthetic
Water		•	•	
Water, recycled	Recycled water shall only contain substances listed in Tables 4.2 (Column 1 or 2), 7.3 and 7.4.	•	•	

	Recycled wash water from all organic operations, including dairy operations, may be spread on crop lands. Requirements for land application, as specified in 5.5.2.5 of CAN/CGSB-32.310, shall be met. In all other uses, recycled water shall meet applicable irrigation water regulatory requirements.			
Wetting agents	See Table 4.2 Surfactants.  Non-synthetic wetting agents, including saponins and microbial wetting agents, are permitted.  See Table 4.3 <i>Soaps</i> .	•	•	Avoid the word synthetic
Wood ash	See Table 4.2 Ash.	•	•	
Worm castings	Worm castings (also called vermicompost, worm compost, vermicasts, worm humus or worm manure) are the end product of the breakdown of organic matter and compounds by some earthworm species.  Feedstocks for earthworms shall meet the criteria in Table 4.2 Compost feedstocks.  The operator shall be able to demonstrate that:  a) worm castings produced either on the farm or obtained from off-farm sources meet the limits for acceptable levels (MPN/g total solids) of human pathogens as specified in <i>Guidelines for Compost Quality</i> ; or  b) best practices known to eliminate human pathogens during vermicomposting have been used.  See Table 4.2 Microorganisms and microbial products for information on compost starters.	•		
Yeast	See Table 4.2 Microorganisms and microbial products.	•		
Zinc	See Table 4.2 Micronutrients.	•		General restrictions are presented in <i>Micronutrients</i>

	Removed from 4.2 and 4.3			
pH buffers	Shall be non-synthetic, such as citric acid or vinegar. Lye and sulphuric acid are prohibited.			Annotations are provided for substances that can be used as pH buffers
Potting soil	Shall not contain synthetic wetting agents or synthetic fertilizers.			Included in Transplant media, potting soil and potting media
Arthropod pathogens	See Table 4.3 <i>Biological organisms</i> .			Included in Invertebrates and Biological organisms
Arthropod predators and parasitoids	See Table 4.3 <i>Biological organisms</i> .			Included in Invertebrates and Biological organisms
Arthropods	See Table 4.3 <i>Biological organisms</i> .			Included in Invertebrates and Biological organisms
Calcium chloride	Non-synthetic, food-grade sources. To address plant nutrient deficiencies and physiological disorders			Combined with calcium
Calcium lignin sulphonate	See Table 4.3 <i>Lignin sulphonates</i> .			Included in Lignin and lignin sulphonates (ligno-sulphonates)
Calcium silicate	Non-synthetic sources. To address plant nutrient deficiencies and physiological disorders.			Included in Calcium annotation
Humus from worms and insects (vermicompost)	See Table 4.2 Worm castings			Under Vermicompost

Magnesium chloride	Non-synthetic sources.			Included in Magnesium
Sodium silicate	For tree fruit and fibre processing.			(removed and combined with Silicon, silica and silicates)
Sterile insects	See Table 4.3 <i>Biological organisms</i> .			Included in Invertebrates and Biological organisms
Vegetable oils	Plant oils shall not contain synthetic pesticides. For use as spreader-stickers, surfactants and carriers.			Covered in Plants extracts, oils and preparations
Virus sprays				Covered in Microorganisms and microbial products