Sunset 2019
Meeting 1 - Request for Public Comment
Crops Substances
April 2017

Introduction

As part of the Sunset Process, the National Organic Program (NOP) announces substances on the National List of Allowed and Prohibited Substances (National List) that are coming up for sunset review by the National Organic Standard Board (NOSB). The following list announces substances that are on the National List for use in organic crop production that must be reviewed by the NOSB and renewed by the USDA before their sunset dates in 2017. This list provides the substance's current status on the National List, use description, references to past technical reports, past NOSB actions, and regulatory history, as applicable. If a new technical report has been requested for a substance, this is noted in this list. To see if any new technical report is available, please check for updates under the substance name in the Petitioned Substances Database.

Request for Comments

While the NOSB will not complete its review and any recommendations on these substances until the Fall 2017 public meeting, the NOP is requesting that the public provide comments about these substances to the NOSB as part of the Spring 2017 public meeting. Comments should be provided through Regulations.gov at www.regulations.gov by March 30, 2017 as explained in the meeting notice published in the Federal Register.

These comments are necessary to guide the NOSB's review of each substance against the criteria in the Organic Foods Production Act (7 U.S.C. 6518(m)) and the USDA organic regulations (7 CFR 205.600). The current substances on the National List were originally recommended by the NOSB based on evidence available to the NOSB at the time of their last review, which demonstrated that the substances were found to be: (1) not harmful to human health or the environment, (2) necessary because of the unavailability of wholly nonsynthetic alternatives, and (3) consistent and compatible with organic practices.

Public comments should focus on providing new information about a substance since its last NOSB review. Such information could include research or data that may support a change in the NOSB's determination for a substance. Public comment should also address the continuing need for a substance or whether the substance is no longer needed or in demand.

Guidance on Submitting Your Comments

Comments should clearly indicate your position on the allowance or prohibition of substances on the list and explain the reasons for your position. You should include relevant information and data to support your position (e.g., scientific, environmental, manufacturing, industry impact information, etc.).

For Comments That Support Substances Under Review:

If you provide comments in support of an allowance of a substance on the National List, you should provide information demonstrating that the substance is:

(1) not harmful to human health or the environment;
(2) necessary to the production of the agricultural products because of the unavailability of wholly nonsynthetic substitute products; and
(3) consistent with organic crop production.

For Comments That Do Not Support Substances Under Review:
If you provide comments that do not support a substance on the National List, you should provide reasons why the use of the substance should no longer be allowed in organic production or handling. Specifically, comments that support the removal of a substance from the National List should provide new information since its last NOSB review to demonstrate that the substance is:

(1) harmful to human health or the environment;
(2) unnecessary because of the availability of alternatives; and
(3) inconsistent with crop production.

For Comments Addressing the Availability of Alternatives:
Comments may present information about the viability of alternatives for a substance under sunset review. Viable alternatives include, but are not limited to:

- Alternative management practices that would eliminate the need for the specific substance;
- Other currently exempted substances that are on the National List, which could eliminate the need for this specific substance; and
- Other organic or nonorganic agricultural substances.

Your comments should address whether any alternatives have a function and effect equivalent to or better than the allowed substance, and whether you want the substance to be allowed or removed from the National List. Assertions about alternative substances, except for those alternatives that already appear on the National List, should, if possible, include the name and address of the manufacturer of the alternative. Further, your comments should include a copy or the specific source of any supportive literature, which could include product or practice descriptions; performance and test data; reference standards; names and addresses of producers or handlers who have used the alternative under similar conditions and the date of use; and an itemized comparison of the function and effect of the proposed alternative(s) with substance under review.

Written public comments will be accepted through March 30, 2017 via www.regulations.gov. Comments received after that date may not be reviewed by the NOSB before the meeting.

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Note: With the exception of biodegradable biobased mulch film, the materials included in this list are undergoing early sunset review as part of November 18, 2016 NOSB recommendation on efficient workload re-organization.

Reference: 7 CFR §205.601 Synthetic substances allowed for use in organic crop production.

Chlorine materials: calcium hypochlorite,
chlorine dioxide, sodium hypochlorite
Herbicides, soap-based
Biodegradable biobased mulch film
Boric acid
Sticky traps/barriers
Coppers, fixed
Copper sulfate
Humic acids
Micronutrients: soluble boron products
Micronutrients: sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt
Vitamins B1, C, E

205.602 Nonsynthetic substances prohibited for use in organic crop production
Lead salts
Tobacco dust (nicotine sulfate)

Links to additional references and supporting materials for each substance can be found on the NOP website: http://www.ams.usda.gov/rules-regulations/organic/national-list/petitioned

Chlorine materials - Calcium Hypochlorite

Reference: 205.601(a) - As algicide, disinfectants, and sanitizer, including irrigation system cleaning systems. (2) Chlorine materials -For pre-harvest use, residual chlorine levels in the water in direct crop contact or as water from cleaning irrigation systems applied to soil must not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act, except that chlorine products may be used in edible sprout production according to EPA label directions.

(i) Calcium hypochlorite

Technical Report(s): 1995 TAP; 2006 TR; 2011 TR

Petition(s): N/A

Past NOSB Actions: 10/1995 NOSB minutes and vote; 04/2006 NOSB sunset recommendation; 04/2011 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/27/12 (77 FR 33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background from Subcommittee:

Calcium hypochlorite is an EPA registered pesticide (OPP No. 014701) that is used in controlling bacteria, fungi, and slime-forming algae (2011 TR lines 86-87). In water and soil, calcium hypochlorite separates into calcium, hypochlorite ions (OCl-), and hypochlorous acid (HOCl) molecules. The hypochlorous acid molecules diffuse through cell walls of microorganisms, changing the oxidation-reduction potential of the cell and inactivating triosephosphate dehydrogenase, an enzyme essential of the digestion of glucose, destroying the microorganism's ability to function (2011 TR lines 122-133).

Calcium hypochlorite is produced by passing chlorine gas over slaked lime. It is then separated from the coproduct, calcium chloride, and air dried or vacuumed (TR lines 194-195).

Calcium hypochlorite is highly caustic and is a concern for occupational exposure. Acute exposure to high concentrations can cause eye and skin injury. Ingestion can cause gastrointestinal irritation and corrosive injuries to the mouth, throat, esophagus and stomach (2011 TR lines 411-418).

During the 2017 sunset review, comments were received insisting that chlorine materials are necessary in organic production and handling, and that chlorine sanitizers have a wide range of uses, including sanitation of equipment and work surfaces, maintaining functioning irrigation systems, and preventing the spread of disease. There was also concern expressed that chlorine sanitizers can be harmful to human health and the environment, and alternatives should be used when possible.

Additional information requested by NOSB

1. Are there less toxic disinfecting and sanitizing materials that could be practically substituted for chlorine materials in organic crop production?
2. Are all three of these chlorine materials needed for use in organic crop production?

Chlorine materials - Chlorine Dioxide

Reference: 205.601(a) - As algicide, disinfectants, and sanitizer, including irrigation system cleaning systems. (2) Chlorine materials - For pre-harvest use, residual chlorine levels in the water in direct crop contact or as water from cleaning irrigation systems applied to soil must not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act, except that chlorine products may be used in edible sprout production according to EPA label directions.

(ii) Chlorine dioxide

Technical Report(s): 1995 TAP; 2006 TR; 2011 TR

Petition(s): N/A

Past NOSB Actions: 10/1995 NOSB minutes and vote; 04/2006 NOSB sunset recommendation; 04/2011 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/27/12 (77 FR 33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background from Subcommittee:

EPA has registered the liquid form of chlorine dioxide for use as a disinfectant and sanitizer. The Agency also has registered chlorine dioxide gas as a sterilant. Chlorine dioxide is added to drinking water as a disinfectant in some municipal water-treatment systems in the United States. EPA has set a maximum contaminant level (MCL) of 0.8 mg/L for chlorine dioxide in drinking water and 1 mg/L for chlorite (chlorine dioxide's oxidation product) (2011 TR lines 104-110).

Chlorine dioxide kills microorganisms directly by disrupting transport of nutrients across the cell wall. Chlorine dioxide is an effective disinfectant at a pH of between 5 and (2011 TR lines 149-157).

To form chlorine dioxide, sodium chlorate ($NaClO_3$) and sulfuric acid (H_2SO_4) are reacted with sulfur dioxide (SO_2), or chloric acid is reacted with methanol (CH_3OH). Alternatively, chlorine dioxide can be formed with chlorine (Cl_2) and sodium chlorite; sodium hypochlorite with hydrochloric acid; potassium chlorate with sulfuric acid; or by passing nitrogen dioxide through a column of sodium chlorate (2011 TR lines 206-210).

Chlorine dioxide is a severe respiratory and eye irritant. The reaction products of chlorine dioxide (chlorite and chlorate) can cause oxidative damage to red blood cells and mild neurobehavioral effects (2011 TR lines 433-436).

During the 2017 sunset review, comments were received insisting that chlorine materials are necessary in organic production and handling, and that chlorine sanitizers have a wide range of uses, including sanitation of equipment and work surfaces, maintaining functioning irrigation systems, and preventing the spread of disease. There was also concern expressed that chlorine sanitizers can be harmful to human health and the environment, and alternatives should be used when possible.

Additional information requested by NOSB

1. Are there less toxic disinfecting and sanitizing materials that could be practically substituted for chlorine materials in organic crop production?
2. Are all three of these chlorine materials needed for use in organic crop production?

Chlorine materials - Sodium Hypochlorite

Reference: 205.601(a) - As algicide, disinfectants, and sanitizer, including irrigation system cleaning systems. (2) Chlorine materials -For pre-harvest use, residual chlorine levels in the water in direct crop contact or as water from cleaning irrigation systems applied to soil must not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act, except that chlorine products may be used in edible sprout production according to EPA label directions.

(iii) Sodium hypochlorite

Technical Report(s): 1995 TAP; 2006 TR; 2011 TR

Petition(s): N/A

Past NOSB Actions: 10/1995 NOSB minutes and vote; 04/2006 NOSB sunset recommendation; 04/2011 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/27/12 (77 FR 33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background from Subcommittee:

Sodium hypochlorite is an EPA registered pesticide (OPP No. 014703) that is used in controlling bacteria, fungi, and slime-forming algae (2011 TR lines 86-87). In water and soil, sodium hypochlorite separates into sodium, hypochlorite ions (OCl-), and hypochlorous acid (HOCl) molecules. The hypochlorous acid molecules diffuse through cell walls of microorganisms, changing the oxidation-reduction potential of the cell and inactivating triosephosphate dehydrogenase, an enzyme essential of the digestion of glucose, destroying the microorganism's ability to function. (2011 TR lines 122-133).

Sodium hypochlorite is highly caustic and is a concern for occupational exposure. Acute exposure to high concentrations can cause eye and skin injury. Ingestion can cause gastrointestinal irritation and corrosive injuries to the mouth, throat, esophagus and stomach (2011 TR lines 411-418).

Generally, sodium hypochlorite is produced by reacting chlorine with a solution of sodium hydroxide (NaOH, also called lye or caustic soda). This method is used for most commercial productions of sodium hypochlorite. A more active, but less stable formulation of sodium hypochlorite can be produced by chlorinating a solution of soda ash (Na2CO3) (TR lines 199-202).

During the 2017 sunset review, comments were received insisting that chlorine materials are necessary in organic production and handling, and that chlorine sanitizers have a wide range of uses, including sanitation of equipment and work surfaces, maintaining functioning irrigation systems, and preventing the spread of disease. There was also concern expressed that chlorine sanitizers can be harmful to human health and the environment, and alternatives should be used when possible.

Additional information requested by NOSB

1. Are there less toxic disinfecting and sanitizing materials that could be practically substituted for chlorine materials in organic crop production?
2. Are all three of these chlorine materials needed for use in organic crop production?

Herbicides, soap-based/ (Soaps, herbicidal)

Reference: 205.601(b) As herbicides, weed barriers, as applicable (1) herbicides soap-based—for use in farmstead maintenance (roadways, ditches, right of ways, building perimeters) and ornamental crops.

Technical Report: 1996 TAP; 2015 TR

Petition(s): N/A

Past NOSB Actions: Actions: 1996 recommendation; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background:

Soap based herbicides generally are comprised of a fatty acid component with carbon, hydrogen and oxygen atoms with potassium or ammonium counterions. Potassium salts of fatty acids include individual soap salts such as potassium laurate, potassium myristate, potassium oleate and potassium ricinoleate). Potassium salts of fatty acids are produced through a process known as saponification, whereby aqueous potassium hydroxide (KOH) is added to fatty acids commonly found in animal fats and plant oils (NPIC, 2001; Nora, 2010). Alternatively, ammonium salts of fatty acids, such as ammonium nonanoate, are produced through the room temperature reaction of aqueous ammonia (NH3) or ammonium hydroxide (NH4OH) with fatty acids (Reiling, 1962; Dunn, 2010).Commercially available soap salt products are used as acaricides, algicides, herbicides, insecticides and animal repellents, controlling a variety of insects, mosses, algae, lichens, liverworts and other weeds.

Technical Review Evaluation Report, Soap-Based Herbicides, February 27, 2015:
Potential Human Health Impact Concerns: The US Food and Drug Administration (FDA) classifies "salts of fatty acids" as Generally Recognized As Safe (GRAS) when used in food and in the manufacture of food components (7 CFR 172.863). Ammonium salts of fatty acids are not included in the FDA's description of GRAS fatty acid salts. Despite the lack of systemic toxicity associated with soap salts, both potassium and ammonium salts of fatty acids can lead to various forms of irritation.

Potassium soaps are classified as corrosive to the skin, side effects include skin redness, cracking and fissuring of skin. Even though potassium soaps are only moderately irritating to the skin, they are corrosive to the eyes and may cause permanent eye damage in extreme exposure scenarios (US EPA, 2012).

Reproductive, weight loss, and failure to maintain pregnancies were observed in laboratory animals administered soap salts at high doses. However, the incidences of fetal loss, malformations, visceral or skeletal anomalies and skeletal variants were within the historical control range for young mice in the 500 mg/kg-day dose group. The International Agency for Research on Cancer (IARC) has not listed potassium or ammonium soaps as carcinogens (IARC, 2014).

Potential Aquatic Organisms Impact Concerns: The Technical Review (TR) states that the acute and chronic toxicity of soap salts is markedly different for land- and water-dwelling organisms. Terrestrial animals—including mammals, birds, and insects—are largely unaffected by exposure to even high doses of potassium and ammonium salts of fatty acids; however, aquatic animals are moderately (fish) to highly (crustaceans) sensitive to these substances (Thurston County, 2009a; Thurston County, 2009b). Studies submitted to US EPA for registration of potassium and ammonium salts of fatty acids indicate that potassium salts are generally more toxic to aquatic organisms than their ammonium counterparts.

The TR also states that they may harm many soil-dwelling organisms including insects, earthworms, and nematodes that are supportive of organic production.

International Standards, Soap-Based Herbicides: Organic standards for COR, EU, Codex Alimentarius Commission 209, JMAFF, and IFOAM Fatty allow fatty acid potassium salts for differing uses in organic production. COR specifically does not allow ammonium soaps to be in direct contact with soil or edible portion of crops production.

10/2015 NOSB Final Review Crops Substances Sunset Recommendation**:** The majority of public comments requested that soap-based herbicides be renewed on the National List, and the NOSB found soap-based herbicides compliant with OFPA criteria, and did not recommend removal from the National List.

Additional information requested by NOSB

1. Please provide more information on the potential health and environmental issues of herbicidal soaps.
2. Do herbicidal soaps have a special niche in weed management that cannot be met by alternatives such as natural materials and methods?

Biodegradable biobased mulch film

Reference: 205.601(b) As herbicides, weed barriers, as applicable (2) Mulches (iii) Biodegradable biobased mulch film as defined in §205.2. Must be produced without organisms or feedstock derived from excluded methods.

Technical Report: 2012 TR; 2015 Report; NOP Policy Memorandum 15-1; Supplemental Technical Evaluation Report 2016

Petition(s): 2012

Past NOSB Actions: Actions: 10/2012 NOSB Recommendation

Recent Regulatory Background: Final Rule published 09/30/14 (79 FR 58655)

Sunset Date: 10/30/19

Background from Subcommittee:
Biodegradable biobased mulch films were approved for placement on the National List of approved synthetics without detailing how much non-biobased content would be allowed. The vast majority of mulch films in this category contain 20% or less biobased materials, with the remainder consisting of polymers, colorings, and other synthetic materials. There are some products that might meet the biobased aspect of this material's definition on 205.2, but are either not biodegradable or are not used widely in production due to brittleness or other production issues. In January 2015, the National Organic Program issued Policy Memorandum 15-1, requiring that biodegradable biobased mulch film must not contain any synthetic polymer feedstocks. The NOSB requested a limited scope technical review (TR) in 2016. This TR focused upon biobased biodegradable mulches that contain polymers, and the soil and crop health effects they may have as they biodegrade. The supplemental TR was inconclusive, since research on these materials is currently limited.

Additional information requested by NOSB

1. Can you provide additional information to answer the questions in the 2016 Supplemental Technical Evaluation Report (TR) on biodegradable biobased mulch films?
2. Can you provide information on the existence or development of biobased biodegradable mulch films that would meet the requirements of NOP policy memorandum 15-1?

Boric acid

Reference: 205.601(e) As insecticides (including acaricides or mite control). (3) Boric acid—structural pest control, no direct contact with organic food or crops.
Technical Report: 1995 TAP
Petition(s): N/A
Past NOSB Actions: 04/1995 NOSB minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)

Background:
Boric acid, derived from the mineral borax, is a weak acid that has long been considered a "least-toxic" pesticide because it is non-volatile when placed in bait or gel formulations and therefore eliminates risk of direct exposure. However, when used as a dust for structural pest control, exposure can occur, causing hazards for exposed populations.

Boric acid is a reproductive toxicant, a suspected endocrine disruptor, and toxic to plants and animals if misused. Boric acid has a low toxicity to mammals and humans (1995 TAP). Borax mining causes environmental damage. Boric acid raises challenging issues of health and environmental/mining impacts, and there are alternative materials and practices that may be less harmful. Of the alternative choices of pest control products, boric acid is considered to be among the least toxic, as noted in the sources used for this review.

A number of members of the public did comment regarding the listing of boric acid, and the majority supported re-listing.

History: The following question was put forth by the NOSB to the public in 2015: "Are there situations in which boric acid is the only, or safest, means of controlling the pest?", and some response was received. It was stated that boric acid is good to have as a means for control, and as a back-up for insect problems. Other comment indicated that natural alternatives do exist, and that management changes, rather than a material application, is best if problems do occur.

While boric acid is not fully compliant with many sub-components of the OFPA criteria the alternatives often have equally challenging issues with OFPA compatibility.

Additional information requested by NOSB

None

Sticky traps/barriers

Reference: §205.601(e) As insecticides (including acaricides or mite control). (9) Sticky traps/barriers.

Technical Report: 1995 TAP

Petition(s): N/A

Past NOSB Actions: 10/1995 NOSB minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background:

This listing covers a wide range of traps and coatings made with a number of different materials, including coated paper, coated plastic, and brushed on sticky chemicals applied directly to plants. They are typically used for pest control and monitoring in limited quantities and in confined areas, such as tree trunks. As noted in the 1995 TAP Review, these products are of low toxicity, and while persistent, they are unlikely to contaminate the surrounding environment. Coated plastic sticky traps produce a small amount of plastic waste. The sticky coating may contain petroleum distillates, and the traps may contain volatile attractants; however, as they do not come in direct contact with crops, there is minimal concern for human health effects. Some are non-specific and can trap non-targeted beneficial insects, spiders, mites, reptiles, and amphibians, although they do not attract non-targeted insects or animals.

One 1995 TAP reviewer suggested the traps are compatible with organic production only in processing plants. Another suggested they should be used only for monitoring, mass trapping, or barriers. Over twenty years later, more traps are now available, including targeted lures to attract only pest insects, and there is significant experience with their use in organic farming without negative consequences or problems.

During the 2017 sunset review, public feedback was solicited on the following questions: 1) should the wide range of products covered by this listing be categorized by use and materials, and 2) are some uses of sticky traps incompatible with organic production? There was support for the continued listing of sticky traps/barriers at §205.601 as a permitted synthetic given both product availability and effective insect control.

Additional information requested by NOSB

No additional information is being requested at this time.

Coppers, fixed

Reference: 205.601(i) As plant disease control. (2) Coppers, fixed —copper hydroxide, copper oxide, copper oxychloride, includes products exempted from EPA tolerance, *Provided,* That, copper-based materials must be used in a manner that minimizes accumulation in the soil and shall not be used as herbicides.

Technical Report: 1995 TAP; 2011 TR

Petition(s): N/A

Past NOSB Actions: 10/1995 NOSB meeting minutes and vote; 11/2005 NOSB sunset recommendation;

04/2011 NOSB sunset recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)

Background:
Coppers, fixed, and copper sulfate were reviewed and approved for continued use during the October 2015 NOSB meeting. Coppers continue to be an important tool for organic producers as part of a comprehensive approach to disease management in many crops. For example, copper products became an integrated part of fire blight control in pome fruits after antibiotics were removed from the national list. While some copper minerals and compounds occur in nature, products for agriculture are made from by-products of processing copper ores and are considered synthetic. Copper is on the list of exemptions for synthetic materials in OFPA at § 6517(c)(1)(B)(i). This review applies to both the listing for Coppers, fixed and the listing for Copper Sulfate on the National List 205.601.

The last Technical Report (TR) was completed in 2011 at which time the EPA had recently completed a re-assessment of copper products. The potential adverse impacts are well known and were discussed in the TR. The main concern with copper materials is their potential to accumulate to toxic levels in the environment. The TR notes the many factors that can affect copper accumulation (2011 TR lines 465 to 549). To address this concern, the copper listings on the National List have the annotation "That, copper-based materials must be used in a manner that minimizes accumulation in the soil..."

To put copper use patterns into perspective, we consulted the *Materials Fact Sheet Copper Products from the Organic Resource Guide, 2nd edition (2013):*
http://web.pppmb.cals.cornell.edu/resourceguide/pdf/resource-guide-for-organic-insect-and-disease-management.pdf

"In New York, maximum soil concentration rates for copper have been recommended based on soil type; rates range from 40 ppm in sandy soils, to 60 ppm in silt loam, to 100 ppm in clay soils. These rates have been suggested in order to protect against phytotoxicity and negative impacts on soil life (Harrison et al. 1999). Typically, each spray with a copper-based fungicide results in an application of 1 to 4 lb. of copper per acre, raising the topsoil concentration from 0.5 to 2 ppm; often several copper sprays are made per season. Under a heavy copper spray program, toxic topsoil levels could be reached in a matter of decades."

The effects on human health from agricultural copper were addressed in the TR as follows:

"In "III Summary of Coppers Risk Assessments" of RED-Cu (2009), human health risk, after aggregate or combined exposure to copper compounds, was adequately assessed. The basic considerations are that copper is naturally-occurring, ubiquitous in environment, copper itself is a nutrient, copper deficiency is more of a problem than copper over-exposure, the active assimilation of copper through routes of food, drink, air, non-occupational sources, and other exposure is efficiently modulated, excessively available copper is not assimilated but instead is actively excreted, and no systematic and carcinogenic effects are observed/confirmed. The overall conclusion is that copper, when used as pesticide following the label, would not cause toxic effects." (2011 TR lines 933 - 940)

The effects of copper on the agro-ecosystem (including on biodiversity) were also discussed in the TR:

The 2011 TR (lines 647 - 761) is quite extensive and evaluates many studies on soil microorganisms, earthworms, and crops. The conclusions in all instances is that it depends on the soil composition, soil pH, concentration of copper, species being studied, and crop species being grown.

And:
Copper can have a significant diminishing effect on biodiversity in an aquatic environment such as wetlands. However it is not prone to leaching or runoff in all but the sandiest of soils and is not likely to end up in the sensitive environments if used according to label restrictions. In contrast, copper can be used to control invasive aquatic plants that out-compete native plants in some ecosystems and this would have a positive effect on biodiversity. (2011 TR lines 870 - 874)

The TR closes with a quote from the "Reregistration Eligibility Decision (RED) for Coppers – Revised May 2009":

"U.S. EPA recognized the advantages of using copper pesticides (RED-Cu, 2009): "Through extensive outreach to the public as well as additional comments and refined information provided by the user community, the Agency has determined that there are many benefits that support the significance and continued agricultural uses of copper pesticides. A significant benefit is that copper exposure from all sources, including use as a pesticide in agricultural settings, does not pose any human health concerns. Although there is still potential for ecological effects to non-target organisms, there are many benefits to retain agricultural uses of copper pesticides" (from the 2011 TR lines 988-996, p.20)

The high variability in copper use patterns and organic farming situations led the NOSB to conclude in October, 2015, that the annotation in place for this substance is appropriate since certifiers can assess copper accumulation in the context of a specific farming operation. However, to make sure that this is true, public comment was requested from growers on the importance of this material, and the ways of monitoring accumulation. Input from certifiers was sought on whether testing was being required for monitoring and whether there have been non-compliances issued for enforcement of this annotation.

Comments from certifiers indicated that they require either a testing protocol or an overall copper monitoring plan for growers who include copper on their OSPs. None of the certifiers who wrote comments had issued a non-compliance for accumulation of copper, but several had done so for not having a monitoring plan in place.

Additional information requested by NOSB

In the October 2015 sunset review, several groups noted that while the intention of the current annotation is appropriate, it is not enforced evenly and some growers are abusing copper sprays to the point where the harvested crop turns color from high copper use. One possible annotation that could be considered is the language that some of the western certifiers had in their standards before OFPA and the USDA organic regulations were published. This annotation (which was in addition to the current one about accumulation) stated: "No visible residue is allowed on harvested crops." Should such an annotation be included?

Copper sulfate

Reference: 205.601(i) As plant disease control. (3) Copper sulfate —Substance must be used in a manner that minimizes accumulation of copper in the soil.
Technical Report: 1995 TAP; 2011 TR
Petition(s): N/A
Past NOSB Actions: 10/1995 NOSB meeting minutes and vote; 11/2005 NOSB sunset recommendation; 04/2011 NOSB sunset recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)

Background:
See above for Coppers, fixed.

Additional information requested by NOSB
None

Humic acids

Reference: 205.601(j) As plant or soil amendments. 3) Humic acids - naturally occurring deposits, water and alkali extracts only.
Technical Report: 1996 TAP; 2006 TR: 2012 TR for oxidized lignite/humic acid derivatives

Petition(s): N/A
Past NOSB Actions: 09/1996 meeting minutes and vote; 04/2006 sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)

Background:
Humic acids, usually manufactured from oxidized lignite, are used as a component of traditional fertilizers, they do not provide additional nutrients to plants, but rather affect soil fertility by making micronutrients more readily available to plants. "Humates are applied as a soil conditioner to increase cation exchange capacity, enhance mineral availability, improve soil structure, stimulate soil microorganisms, and provide broad spectrum trace elements." Commercially available humic acids are derived from leonardite, lignite, or coal. Extracts from nonsynthetic humates by hydrolysis using synthetic or nonsynthetic alkaline materials are permitted including the use of potassium hydroxide and ammonium hydroxide. Humic acid derivatives are on the National List with the following annotation: naturally occurring deposits, water and alkali extracts only." [7 CFR 205.601(j)(3)].

In 2015 the Crops Subcommittee did not pose any questions to the public regarding this listing. The overwhelming majority of comments were in favor of keeping humic acids on the

National List. No new information was received from the public about humic acids in relation to the OFPA criteria. One commenter opposed the relisting because, as they stated: humic acids do not meet the criteria under OFPA due to the environmental hazards related to the extraction process, are not essential, and are not compatible with organic production. Alkali extracted humic acid derivatives are synthetic, derived mostly from coal sources, which raise some concerns about environmental and human health.

Humic acids from decaying organic matter have been empirically shown to have the same benefits as those from fossil sources, such as lignite. These include nutrient storage and release; cation exchange capacity; sorption of organic compounds; anion sorption; metal mobility; soil pH buffering and amelioration; and growth regulating substances. A long-term soil building program appears to provide the same benefits as those from oxidized lignite.

However, as reiterated through extensive public comment, humic acids are viewed as critical and necessary element of nutrient management in organic farming; removal from the National List would significantly, negatively impact many growers.

The issue of synthetically extracted humic acids not being allowed in Japan was discussed in subcommittee, as was the difference between synthetic alkali extractants and non-synthetic materials used for extraction. It is hoped that the Classification of Materials Final Guidance will clear up the latter issue.

Based on the Subcommittee review and public comment, the NOSB in 2015 found humic acids compliant with OFPA criteria, and did not recommend removal from the National List.

Additional information requested by NOSB
Should there be an annotation requiring that humic acids come from sources with the lowest environmental and human harm?

Micronutrients: Soluble boron products

Reference: 205.601 (j)(6) - As plant or soil amendments. Micronutrients—not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Soil deficiency must be documented by testing. (i) Soluble boron products.
Technical Report: 2010 TR Micronutrients
Petition(s): N/A
Past NOSB Actions: 04/1995 NOSB minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 annotation change recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)

Background from Subcommittee:
Micronutrients, including soluble boron, are essential for plant health and are typically applied in very small quantities. While producers can choose to rely on the natural presence of micronutrients in their soil, many find deficiencies of some or all of these micronutrients on the National List. The lack of these micronutrients can be a limiting factor in water and macro-nutrient uptake, and can result in limiting growth and vitality of crops.

At the October 29, 2015 NOSB meeting, the Board voted to change the Micronutrients annotation from

205.601 (j) -As a plant or soil amendment.

(6) Micronutrients -not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Soil Deficiency must be documented by testing.

to:

205.601 (j) -As a plant or soil amendment.

(6) Micronutrients -not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Deficiency must be documented.

As of January 17, 2017, this annotation change has not been printed in the Federal Register.

Additional information requested by NOSB :
Is soluble boron considered essential for certified organic production?
Is there a nonsynthetic alternative for synthetic soluble boron?

Micronutrients: sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt

Reference: 205.601 (j)(6) - As plant or soil amendments. Micronutrients—not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Soil deficiency must be documented by testing. (ii) Sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt.
Technical Report: 2010 TR Micronutrients
Petition(s): N/A
Past NOSB Actions: 04/1995 NOSB minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 annotation change recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)

Background:
Micronutrients are essential for plant health and are typically applied in very small quantities. While producers can choose to rely on the natural presence of micronutrients in their soil, many find deficiencies of some or all of these micronutrients on the National List. The lack of these micronutrients can be a limiting factor in water and macro-nutrient uptake, and can result in limiting growth and vitality of crops.

At the October 29, 2015 NOSB meeting, the Board voted to change the Micronutrients annotation from:

205.601 (j) -As a plant or soil amendment.

(6) Micronutrients -not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Soil Deficiency must be documented by testing.

to:

205.601 (j) -As a plant or soil amendment.

(6) Micronutrients -not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Deficiency must be documented.

As of January 17, 2017, this annotation change has not been printed in the Federal Register.

Additional information requested by NOSB :

1. Are synthetic sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt essential for certified organic production?
2. Are there nonsynthetic alternatives to synthetic sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt?

Vitamins B_1, C, E

Reference: 205.601 (j)(8) - As plant or soil amendments. Vitamins B_1, C, and E

Technical Report(s): 1995 TAP, 2015 TR

Petition(s): N/A

Past NOSB Actions: 10/1995 minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background:

Vitamins, including synthetically derived vitamins B1 (Thiamine), C (Ascorbic Acid) and E (Tocopherols) are generally considered non-toxic essential nutrients for terrestrial and aquatic organisms. Nonsynthetic sources of all vitamins and synthetic sources of vitamins B1, C, and E may be used in certified organic crop production. Vitamin B1 is an ingredient in many commercial root stimulator products helping to establish nursery-grown planting stock once transplanted. As noted in the 2015 Technical Report (TR), the available literature does not support the premise that foliar and soil applications of vitamin B1 are responsible for root stimulation in transplanted crops. Vitamins C and E are used to promote both growth and yields and to protect plants from oxidative stress due to salinity. However, practical information regarding their use was unavailable, therefore the TR relied on peer-reviewed scientific literature.

An OMRI search for each of the three vitamins resulted in zero entries. However, an OMRI generic materials database search indicated that nonsynthetic plant hormones such as gibberellic acid, indole acetic acid (IAA), and cytokinins may be applied to organic crops as plant growth regulators. Additionally, there are several naturally derived, OMRI-listed substances marketed to stimulate root growth.

During the 2017 sunset review, there was some public comment in support of relisting these materials for the purpose intended. Commenters indicated that Vitamins B1, C, and E are rarely used individually but are included as ingredients in some of the products reviewed for crop fertility. To supplement the 1995 TAP report, the Crops Subcommittee requested a technical review (TR).

The TR indicated that the root growth claims associated with vitamin B1 are largely unsubstantiated. Alternative practices include encouraging the growth and productivity of beneficial soil microorganisms to help produce vitamin B1, reduce fertilizer use, refrain from applying fertilizer at the time of planting, and proper irrigation of the root ball and surrounding soil. There was no use information for vitamins C and E on agriculture extension websites.

Additional information requested by NOSB

1. Given that the 2015 TR stated that Vitamin B1 is not generally effective at reducing transplant shock or stimulating new root growth outside of a laboratory setting, should Vitamin B1 be removed from 205.601(j)(8), or are there other benefits attributed to Vitamin B1 that necessitates its continued listing as a plant or soil amendment?
2. As the tree fruit industry looks aggressively at alternative rootstock or tissue cultures to deal with fire blight concerns, is there a need for Vitamin B1 to assist in transplanting shock or replant disease issues?

Lead salts

Reference: 205.602 The following nonsynthetic substances may not be used in organic crop production: (d) Lead salts.

Technical Report: none

Petition(s): N/A

Past NOSB Actions: 04/1995 NOSB minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation

Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)

Sunset Date: 6/27/17 (NOP renewal pending)

Background:
Lead poisoning can cause a number of adverse human health effects but is particularly detrimental to the neurological development of children. Lead accumulates in soils, so it is important to avoid soil applications of materials containing lead, whether the lead is in synthetic materials or naturally occurring (nonsynthetic) lead salts.

During the previous NOSB Review in 2015, the Board determined that lead salts do not meet the OFPA criteria and saw no reason to remove it from its prohibited status on the National List.

Additional information requested by NOSB

None.

Tobacco dust (nicotine sulfate)

Reference: 205.602 The following nonsynthetic substances may not be used in organic crop production: (i) Tobacco dust (nicotine sulfate)
Technical Report: none
Petition(s): N/A
Past NOSB Actions: 04/1995 NOSB minutes and vote; 11/2005 NOSB sunset recommendation; 10/2010 NOSB sunset recommendation; 10/2015 sunset recommendation
Recent Regulatory Background: Sunset renewal notice published 06/06/12 (77 FR 33290)
Sunset Date: 6/27/17 (NOP renewal pending)
Background:
Tobacco Dust (nicotine sulfate) has been present on the National List since its first printing in 1995. This natural product has been used in the past as a pesticide and a fertility input. Due to the negative human health effects caused by this material, it has been relisted as a prohibited nonsynthetic on the National List at every sunset review with no objections from the public or from the NOSB. It is present on the Hazardous substance list and regulated by OSHA and the EPA as well as other agencies.

Additional information requested by NOSB

1. Is there any new information that would lessen the human and environmental concerns associated with the use of this material?