

**National Organic Standards Board  
Materials/GMO Subcommittee  
Proposal - Technical Review template update  
February 13, 2024**

**Intro/Background:**

The Materials Subcommittee (MS) is proposing updates to the Technical Review (TR) templates to better align with the petition process and OFPA criteria and to directly address excluded methods.

The NOSB Policy and Procedures Manual defines a technical review as follows: “Technical Review - A report prepared by a third-party expert under contract addressing the environmental, human, and industrial impact of a petitioned material per the OFPA and regulatory evaluation criteria to aid in the thorough evaluation of that material by the NOSB.” According to the PPM, “A Subcommittee cannot proceed with a recommendation to list a material if it is determined that there is insufficient valid scientific information on that material’s impact on the environment, human health and its compatibility with organic principles.” The two revised TR templates, one for Handling and one for Crops/Livestock are included as Appendices to this proposal. Also included as appendices are the two versions with redlining.

**Discussion:**

The Materials Subcommittee submitted a [discussion document](#) on the TR updates for comment at the Spring 2023 meeting. Public commenters were supportive of the initiative to reorganize the flow of questions, reduce redundancy, and suggested additional questions for ancillary substances, nanoparticles, and excluded methods. The suggested changes were incorporated into the templates, and in January 2024, the MS voted unanimously in support of the versions of the TR templates included in the appendices.

**Questions to stakeholders:**

Do the proposed revisions to the technical report (TR) templates for Handling and Crops/Livestock raise any concerns or challenges for stakeholders that create and/or use TRs?

**Subcommittee Vote:**

Motion to accept the technical Report template updates for Handling and Crops/Livestock.

Motion by: Mindee Jeffery

Seconded by: Nate Lewis

Yes: 7 No: 1 Abstain: 0 Absent: 0 Recuse: 0

**Appendix A1** - Redlined version of TR template: Handling

**Appendix A2** - New version of TR template: Handling

**Appendix B1** - Redlined version of TR template: Livestock/Crops

**Appendix B1** - New version of TR template: Livestock/Crops

# Name of Material

## Handling/Processing

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**Identification of Petitioned Substance**

**Chemical Names:**

List all chemical names

**CAS Numbers:**

List CAS numbers

**Other Name:**

List other names

**Other Codes:**

List other codes (e.g., INS number, E number, etc.)

**Trade Names:**

List trade names

**Summary of Petitioned Use**

For petitions to add or amend a substance, describe the petitioned use of the substance. For substances currently on the National List, summarize the allowed uses under the USDA organic regulations (7 CFR Part 205).

**Characterization of Petitioned Substance**

**Composition of the Substance:**

Describe Composition of the Substance

**Source or Origin of the Substance:**

Briefly describe the source or origin of the substance (to be addressed in more detail below under Evaluation Questions 1 through 4).

**Properties of the Substance:**

Describe Physical and Chemical Properties of the Substance

**Specific Uses of the Substance:**

Describe Specific Uses of the Substance - primary focus should be given to describing the petitioned use of the substance as it relates to organic handling; secondary focus should be given to providing general information on other uses of the petitioned substance in agricultural handling/processing.

**Approved Legal Uses of the Substance:**

Describe the Status of the Petitioned Substance under applicable Federal Regulations (i.e., EPA, FDA, USDA (including APHIS or FSIS), NIEHS, etc.)

**Action of the Substance:**

Describe Action of the Substance - focus should be given to describing mode of action of the substance, when used as petitioned.

**Combinations of the Substance:**

Describe Combinations of the Substance - focus should be given to describing whether the petitioned substance is a precursor to, component of, or commonly used in combination with a substance(s) identified on the National List. Any known synergistic effects (either positive or negative) with other substances on the National List should be identified.

In addition, information should be provided on whether any additional ingredients (e.g., inert ingredients, stabilizers, preservatives, carriers, anti-caking agents, or other materials) are generally added to commercially available forms of the petitioned substance.

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## Status

### Historic Use:

Describe historic use of the substance in organic agricultural production (if no historic use in organic agricultural production, please describe historic use in conventional agricultural production).

### Organic Foods Production Act, USDA Final Rule:

Describe whether the Petitioned Substance is Listed anywhere in the Organic Foods Production Act of 1990 (OFPA) or the USDA organic regulations, 7 CFR Part 205.

### International

Describe the status of the substance among international organizations. Specifically, the report should address whether the petitioned substance is allowed or prohibited for use in other international organic standards such as:

#### ~~Canada, Canadian General Standards Board —~~

**CAN/CGSB-32.310- Organic production systems-General principles and management standards**  
**CAN/CGSB-32.311-2015, Organic Production Systems Permitted Substances List**

<http://www.inspection.gc.ca/food/organic-products/standards/eng/1300368619837/1300368673172>

**CODEX Alimentarius Commission – Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods (GL 32-1999)**

<http://www.fao.org/docrep/005/Y2772E/Y2772E00.HTM>

Note: For Codex, the reference should be cited as “guidelines,” rather than as “standards”.

**European Economic Community (EEC) Council Regulation – EC No. 834/2007 and 889/2008**

<http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008R0889>

**Japan Agricultural Standard (JAS) for Organic Production**

[http://www.maff.go.jp/e/jas/specific/criteria\\_o.html](http://www.maff.go.jp/e/jas/specific/criteria_o.html)

**International Federation of Organic Agriculture Movements (IFOAM)**

<http://www.ifoam.bio/en/ifoam-norms>

## Evaluation Questions for Substances to be used in Organic Handling

**[combination of old #1, 2 & 3 – word smithed and added D, E and F]**

**Evaluation Question #1: Describe the most prevalent processes used to manufacture or formulate the petitioned substance. Further, describe any chemical change that may occur during manufacture or formulation of the petitioned substance when this substance is extracted from naturally occurring plant, animal, or mineral sources (7 U.S.C. § 6502 (21)). (A) Describe if the substance is extracted from naturally occurring plant, animal, or mineral sources. (B) Describe the most prevalent processes used to manufacture or formulate the petitioned substance. Include any chemical changes that may occur during manufacture or formulation of the substance. (C) Discuss whether the petitioned substance is agricultural or Non-agricultural. If the substance is Non-agricultural, is it synthetic or non-synthetic? [7 U.S.C. §6502(21); NOP 5032-1; NOP 5033-2]. (D) Does the substance in its raw or formulated forms contain nanoparticles? (E) Does the substance in its raw or formulated forms contain ancillary substances (F) Is the substance created using Excluded Methods?**

**Data Required:** The response must describe the processes used to manufacture or formulate the substance, including a discussion of all precursors and/or feedstocks. A description of alternate manufacturing methods which are not included in the petition, if any, should be presented. The response must also describe, in detail, any chemical changes effected on any naturally occurring precursor or feedstock by all manufacturing or formulation processes. For the purposes of this response, a chemical change could be the addition or deletion of one atom to the substance's molecular structure or other description of chemical modification.

- (A) If the substance is extracted from a natural material, information should be provided on any materials and methods used to extract, separate, isolate, or withdraw the substance, including any solvents used, acid-base extraction methods, or mechanical or physical separation methods. If the substance is created by a naturally occurring biological process, those process(es) must be described in detail.

For the purposes of this response, naturally occurring biological processes are processes that include but are not limited to, aerobic and anaerobic digestion, decomposition, fermentation, various metabolic processes, and photosynthesis.

- (B) The response must describe the processes used to manufacture or formulate the substance, including a discussion of all precursors and/or feedstocks. A description of alternate manufacturing methods and the extent of their commercial use which are not included in the petition, if any, should be presented. The response must also describe, in detail, any chemical changes effected on any naturally occurring precursor or feedstock by all manufacturing or formulation processes. If any synthetic materials used in the production or extraction of a substance remain in the final product, describe them.

For the purposes of this response, a chemical change involves a process (i.e., chemical reaction) whereby a substance is transformed into one or more other distinct substances. This may include the addition or deletion of one atom to the substance's molecular structure or other description of chemical modification.

Chemical processes include, but are not limited to: acid base reactions, calcification, thermal or catalytic cracking, esterification, hydrogenation, mixing of substances or elements, oxidation-reduction, polymerization, etc., obtained through process units such as compressors, cracking towers, heat exchangers, mixers, reactors, pumps, etc.

- (C) Based on the information provided on (A) and (B), the definition of synthetic at 7 U.S.C. § 6502 (22) NOP Guidance 5033-1 and NOP Guidance 5033-2, describe if the substance can be classified as agricultural or non-agricultural.

- (D) Nano Particles: Does the substance in its raw or formulated forms contain nanoparticles? If so, are they engineered nanomaterials or incidental nanomaterials as defined by the NOSB and NOP? (Policy Memo 15-2)

- (E) Ancillary Substances: Does the substance in its raw or formulated forms contain ancillary substances as defined by the NOSB in the 2016 recommendation?  
(<https://www.ams.usda.gov/sites/default/files/media/HS%20Ancillary%20Substance%20Proposal%20NOP.pdf>)

- (F) Excluded Methods:

- i. Is the substance created using excluded methods? This includes but is not limited to the following list of techniques found to be "excluded methods" by the NOSB: Targeted genetic modification (TagMo), Synthetic gene technologies, Genome engineering, Gene editing, Gene targeting, Gene Silencing, Accelerated plant breeding techniques, Synthetic Biology, cloned animals and offspring, plastid transformation, cisgenesis, intragenesis, agro-infiltration, transposons developed

- 160 using invitro nucleic acid techniques, induced mutagenesis developed through in  
161 vitro nucleic acid techniques, cell and protoplast fusion (NOP policy Memo 13-1).  
162 ii. If the substance is manufactured from agricultural raw materials, are those  
163 materials derived from genetically engineered crop, or crops resulting from  
164 excluded methods?  
165 iii. If the substance is manufactured from other biological raw materials – such as  
166 those produced by fermentation or enzymatic action – are those biological  
167 materials, derived from genetically engineered organisms, or crops organisms  
168 resulting from excluded methods?

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171 **[old #4] Evaluation Question #2: Discuss whether the petitioned substance is formulated or**  
172 **manufactured by a chemical process, or created by naturally occurring biological processes (7 U.S.C. §**  
173 **6502 (21)). Discuss whether the petitioned substance is derived from an agricultural source. Specify**  
174 **whether the petitioned substance is categorized as generally recognized as safe (GRAS) when used**  
175 **according to FDA’s good manufacturing practices (7 CFR 205.600(b)(5)). If not categorized as GRAS,**  
176 **describe the regulatory status.**  
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178 **Data Required:** For the purposes of this response, chemical processes are processes include, but are not  
179 limited to, acid-base reactions, calcification, thermal or catalytic cracking, esterification, hydrogenation,  
180 mixing of substances or elements, oxidation-reduction, polymerization, etc., obtained through process units  
181 such as compressors, cracking towers, heat exchangers, mixers, reactors, pumps, etc.  
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183 If the substance is extracted from a natural material, information should be provided on any materials and  
184 methods used to extract, separate, isolate, or withdraw the substance, including any solvents used, acid-  
185 base extraction methods, or mechanical or physical separation methods.  
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187 If the substance is created by a naturally occurring biological process, those process(es) must be described  
188 in detail. For the purposes of this response, naturally occurring biological processes are processes that  
189 include but are not limited to, aerobic and anaerobic digestion, decomposition, fermentation, various  
190 metabolic processes, and photosynthesis.  
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192 Information should be provided on whether the substance has been chemically modified from the source  
193 or origin of the substance, including whether the substance has been isolated from a natural source in a  
194 form that does not occur in nature, and whether any synthetic materials used in the production or  
195 extraction of a substance may remain in the final product.  
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197 For the purposes of this response, an agricultural source is any agricultural commodity or product,  
198 whether raw or processed, including any commodity or product derived from livestock that is marketed in  
199 the United States for human or livestock consumption.  
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### 201 Purpose and necessity of the substance

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203 **[old #5] Evaluation Question #3: If the substance is a synthetic substance, provide a list of nonsynthetic**  
204 **or natural source(s) of the petitioned substance (7 CFR 205.600(b)(1)). Describe whether the primary**  
205 **technical function or purpose of the petitioned substance is a preservative (7 CFR 205.600(b)(4)).**  
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207 **Data Required:** The response must discuss whether non-synthetic or natural sources of the petitioned  
208 substance exist and are available. The report contractor should examine the effect, form, function, quality,  
209 and quantity of the naturally sourced version of the petitioned substance, in comparison to manufactured  
210 versions. The following information on any naturally sourced versions should be provided in the report:  
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- 212 • literature, including product or practice description, on performance and test data;
- 213 • name and address of the manufacturer(s), if applicable; and,

214 • ~~types of products the substance is currently used in.~~

215 The response must explain why the primary function of the substance is or is not as a preservative.

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217 **[old #6] Evaluation Question #4: Specify whether the petitioned substance is categorized as generally**  
218 **recognized as safe (GRAS) when used according to FDA's good manufacturing practices (7 CFR**  
219 **205.600(b)(5)). If not categorized as GRAS, describe the regulatory status. Describe whether the**  
220 **petitioned substance will be used primarily to recreate or improve flavors, colors, textures, or nutritive**  
221 **values lost in processing (except when required by law). If so, how? (7 CFR 205.600(b)(4)).**

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223 **Date Required:** The response must indicate whether or not the substance has been determined to be GRAS  
224 by FDA. This information may be found in 21 CFR Parts 182, 184, and 186. If not determined to be GRAS  
225 by FDA, indicate whether it appears on FDA's "GRAS Notice Inventory" available at  
226 <http://www.accessdata.fda.gov/scripts/cen/fcnNavigation.cfm?rpt=grasListing>.

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228 The response should cite the FDA regulatory citation confirming GRAS status or whether FDA has  
229 provided a response letter of no objection to a manufacturer's notification of GRAS status. **When**  
230 **replacement or improvement of nutrients is required or allowed by regulation, the report evaluators**  
231 **should cite the appropriate regulations.**

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233 **[old #7] Evaluation Question #5: Describe whether the primary technical function or purpose of the**  
234 **petitioned substance is a preservative. If so, provide a detailed description of its mechanism as a**  
235 **preservative (7 CFR 205.600(b)(4)). Describe any effect or potential effect on the nutritional quality of**  
236 **the food or feed when the petitioned substance is used (7 CFR 205.600(b)(3)).**

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238 **Data Required:** The response must explain why the primary function of the substance is or is not as a  
239 preservative. The response must indicate whether the use of the petitioned substance affects the levels of  
240 nutrients (e.g., proteins, carbohydrates, fats, vitamins, and minerals) commonly found in the food product.  
241 Effects may include increasing or decreasing the amount and/or bioavailability of the nutrients.

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#### 243 **Environment and human health effects**

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245 **[old #8] Evaluation Question #6: Describe whether the petitioned substance will be used primarily to**  
246 **recreate or improve flavors, colors, textures, or nutritive values lost in processing (except when required**  
247 **by law) and how the substance recreates or improves any of these food/feed characteristics (7 CFR**  
248 **205.600(b)(4)). List any reported residues of heavy metals or other contaminants in excess of FDA**  
249 **tolerances that are present or have been reported in the petitioned substance (7 CFR 205.600(b)(5)).**

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251 **Data Required:** When replacement or improvement of nutrients is required or allowed by regulation, the  
252 report evaluators should cite the appropriate regulations. The response must indicate whether the  
253 petitioned substance may contain residues of substances that exceed FDA's Action Levels for Poisonous or  
254 Deleterious Substances in Human Food. For the most part, these action levels will relate to residues found  
255 in agricultural products. Heavy metals or contaminants are addressed through FDA's action levels.  
256 [https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-action-levels-](https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-action-levels-poisonous-or-deleterious-substances-human-food-and-animal-feed)  
257 [poisonous-or-deleterious-substances-human-food-and-animal-feed](https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-action-levels-poisonous-or-deleterious-substances-human-food-and-animal-feed) See the latest edition of Food Chemicals  
258 Codex (National Research Council) for accepted reference standards for metals and other contaminants in  
259 food ingredients in the U.S.

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261 **[old #9] Evaluation Question #7: Describe any effect or potential effect on the nutritional quality of the**  
262 **food or feed when the petitioned substance is used (7 CFR 205.600(b)(3)). Discuss and summarize**  
263 **findings on whether the manufacture and use of the petitioned substance may be harmful to the**  
264 **environment or biodiversity (7 U.S.C. § 6517 (c) (1) (A) (i) and 7 U.S.C. § 6517 (c) (2) (A) (i)).**

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266 **Data Required:** The response must indicate whether the use of the petitioned substance affects the levels of  
267 nutrients (e.g., proteins, carbohydrates, fats, vitamins, and minerals) commonly found in the food product.  
268 Effects may include increasing or decreasing the amount and/or bioavailability of the nutrients. In  
269 consideration of the petitioned substance, its manufacturing process, and its breakdown products, describe

270 the mode of action of the substance with respect to its effects on biological, chemical and physical effects on  
271 the environment or biodiversity. The analysis must include consideration of potential effects on both  
272 terrestrial and aquatic systems and effects on arthropod natural enemies (e.g., predators and parasitic  
273 hymenoptera), pollinators, bats and birds.

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275 **[old #10] Evaluation Question #8: List any reported residues of heavy metals or other contaminants in**  
276 **excess of FDA tolerances that are present or have been reported in the petitioned substance (7 CFR**  
277 **205.600(b)(5)). Describe and summarize any reported effects upon human health from use of the**  
278 **petitioned substance (7 U.S.C. § 6517(c)(1)(A)(i), 7 U.S.C. § 6517(c)(2)(A)(i) and 7 U.S.C. § 6518(m)(4)).**

279  
280 **Data Required:** The response must indicate whether the petitioned substance may contain residues of  
281 substances that exceed FDA's Action Levels for Poisonous or Deleterious Substances in Human Food. For  
282 the most part, these action levels will relate to residues found in agricultural products. Heavy metals or  
283 contaminants are addressed through FDA's action levels. These action levels can be found at  
284 <https://www.fda.gov/food/guidanceregulation/ucm077969>. See the latest edition of Food Chemicals  
285 Codex (National Research Council) for accepted reference standards for metals and other contaminants in  
286 food ingredients in the U.S. Describe reported health effects and causation that may be attributed to the use  
287 of the petitioned substance and/or its breakdown products.

### 288 **Alternatives**

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291 **[old #3] Evaluation Question #9: Discuss and summarize findings on whether the manufacture and use**  
292 **of the petitioned substance may be harmful to the environment or biodiversity (7 U.S.C. § 6517 (c) (1)**  
293 **(A) (i) and 7 U.S.C. § 6517 (c) (2) (A) (i)). Are there alternative natural (nonsynthetic) source(s) of the**  
294 **substance? (7 CFR 205.600(b)(1)).**

295  
296 **Data Required:** In consideration of the petitioned substance, its manufacturing process, and its breakdown  
297 products, describe the mode of action of the substance with respect to its effects on biological, chemical and  
298 physical effects on the environment or biodiversity. The analysis must include consideration of potential  
299 effects on both terrestrial and aquatic systems and effects on arthropod natural enemies (e.g., predators and  
300 parasitic hymenoptera), pollinators, bats and birds.

301 The response must discuss whether natural (nonsynthetic) sources of the petitioned substance exist and are  
302 available. The report contractor should examine the effect, form, function, quality, and quantity of the  
303 naturally sourced version of the petitioned substance, in comparison to manufactured versions. Briefly  
304 describe any naturally sourced alternatives by summarizing:

- 305
- 306 • literature, including product or practice description, on performance and test data;
- 307 • name and address of the manufacturer(s), if applicable; and,
- 308 • types of products the substance is currently used in.
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310 **[old #12] Evaluation Question #10: Describe and summarize any reported effects upon human health**  
311 **from use of the petitioned substance (7 U.S.C. § 6517(c)(1)(A)(i), 7 U.S.C. § 6517(c)(2)(A)(i) and 7 U.S.C. §**  
312 **6518(m)(4)). Describe all nonagricultural non-synthetic substances or products which may be used in**  
313 **place of the petitioned substance (7 U.S.C. § 6517(c)(1)(A)(ii)). Additionally, identify which of those are**  
314 **currently allowed under the NOP regulations.**

315  
316 **Data Required:** Describe reported health effects and causation that may be attributed to the use of the  
317 petitioned substance and/or its breakdown products.

318 The response must describe the availability of a nonagricultural non-synthetic or natural substance(s)  
319 which could be substituted for petitioned substance. Briefly describe any nonagricultural nonsynthetically  
320 sourced alternatives by summarizing:

- 321 • A comparison of the effect, form, function, quality, and quantity of the substitute non-synthetic  
322 (natural) product with the petitioned substance;
- 323 • Commercial availability of substitute non-synthetic (natural) products, both domestically and  
324 globally.

- A comparison of reported risks to human health associated with the substitute non-synthetic (natural) product to the petitioned substance;
- A comparison of reported environmental effects (both aquatic and terrestrial) associated with the substitute non-synthetic (natural) product to the petitioned substance;
- Literature, including product or practice description, on performance and test data; and
- Types of products and range of uses for the alternative substance

**[old #13] Evaluation Question #11: Describe any alternative practices that would make the use of the petitioned substance unnecessary (7 U.S.C. § 6518(m)(6)). Provide a list of organic agricultural products that could be alternatives for the petitioned substance (7 CFR 205.600(b)(1)).**

**Data Required:** The response to this request for development of technical information must describe the availability of an alternative practice(s) to the use of the petitioned substance. Many research based alternative practices may be found at: <http://eorganic.info/>, <https://www.sare.org/>, and <https://attra.ncat.org/>; these resources should be consulted before exhausting search for alternative practices. When assessing alternative practices, the report should address:

- Literature, including practice description, on performance and test data;
- A comparison of the function and effectiveness of the proposed alternative practice to the petitioned substance; and,
- Types of products produced and scope of use of alternative practices.

The list should be based upon a comparison of the effect, form, function, quality, and quantity of the recommended organic agricultural product with the petitioned substance. Many organic products may be found at: <https://organic.ams.usda.gov/Integrity/default.aspx>, <http://eorganic.info/>, <https://www.sare.org/>, <https://www.omri.org/>, [www.606organic.com](http://www.606organic.com), and <https://attra.ncat.org/>; these resources should be consulted before exhausting search for alternative practices. Briefly describe the organic agriculturally derived alternatives by summarizing:

- A comparison of the effect, form, function, quality, and quantity of the substitute organic agricultural product to the petitioned substance;
- Commercial availability of substitute organic products, both domestically and globally
- A comparison of reported risks to human health associated with the substitute organic agricultural product to the petitioned substance;
- A comparison of reported environmental effects (both aquatic and terrestrial) associated with the substitute organic agricultural product to the petitioned substance;
- Any literature, including product description, on performance and test data;
- The name and address of the supplier/manufacturer, if applicable; and
- Types of products and range of uses for the alternative substance.

**[old #11] Evaluation Question #12: Describe all natural (non-synthetic) substances or products which may be used in place of a petitioned substance (7 U.S.C. § 6517(c)(1)(A)(ii)). Provide a list of allowed substances that may be used in place of the petitioned substance (7 U.S.C. § 6518(m)(6)). Describe if there are any alternative practices that would make the use of the petitioned substance unnecessary (7 U.S.C. § 6518(m)(6)).**

**Data Required:** The response must describe the availability of a non-synthetic or natural substance(s) which could be substituted for petitioned substance. Many natural substances may be found at: <https://organic.ams.usda.gov/Integrity/default.aspx>, <http://eorganic.info/>, <https://www.sare.org/>, <https://www.omri.org/>, [www.606organic.com](http://www.606organic.com), and <https://attra.ncat.org/>; these resources should be consulted before exhausting search for alternative practices. The examination should address:

- A comparison of the effect, form, function, quality, and quantity of the substitute non-synthetic (natural) product with the petitioned substance;



- 380 • ~~Commercial availability of substitute non-synthetic (natural) products, both domestically and~~  
381 ~~globally.~~
- 382 • ~~A comparison of reported risks to human health associated with the substitute non-synthetic~~  
383 ~~(natural) product to the petitioned substance;~~
- 384 • ~~A comparison of reported environmental effects (both aquatic and terrestrial) associated with the~~  
385 ~~substitute non-synthetic (natural) product to the petitioned substance;~~
- 386 • ~~Literature, including product or practice description, on performance and test data; and~~  
387 • ~~Types of products and range of uses for the alternative substance; and,~~

388 The response to this request for development of technical information must describe the availability of an  
389 alternative practice(s) to the use of the petitioned substance. Many research-based alternative practices  
390 may be found at: <http://eorganic.info/>, <https://www.sare.org/>, and <https://attra.ncat.org/>; these  
391 resources should be consulted before exhausting search for alternative practices. Briefly describe  
392 alternative practices by summarizing:

- 393 • Literature, including practice description, on performance and test data;
- 394 • A comparison of the function and effectiveness of the proposed alternative practice to the  
395 petitioned substance; and,
- 396 • Types of products produced and scope of use of alternative practices.

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398 **Evaluation Information #13: Provide a list of organic agricultural products that could be alternatives for**  
399 **the petitioned substance (7 CFR 205.600(b)(1)).**

400

401 **Data Required:** The list should be based upon a comparison of the effect, form, function, quality, and  
402 quantity of the recommended organic agricultural product with the petitioned substance. Many organic  
403 products may be found at: <https://organic.ams.usda.gov/Integrity/default.aspx>, <http://eorganic.info/>,  
404 <https://www.sare.org/>, <https://www.omri.org/>, [www.606organic.com](http://www.606organic.com), and <https://attra.ncat.org/>;  
405 these resources should be consulted before exhausting search for alternative practices. In developing the  
406 list, the following should be considered:

- 407
- 408 • ~~A comparison of the effect, form, function, quality, and quantity of the substitute organic~~  
409 ~~agricultural product to the petitioned substance;~~
- 410 • ~~Commercial availability of substitute organic products, both domestically and globally~~  
411 ~~A comparison of reported risks to human health associated with the substitute organic agricultural~~  
412 ~~product to the petitioned substance;~~
- 413 • ~~A comparison of reported environmental effects (both aquatic and terrestrial) associated with the~~  
414 ~~substitute organic agricultural product to the petitioned substance;~~
- 415 • ~~Any literature, including product description, on performance and test data;~~  
416 • ~~The name and address of the supplier/manufacturer, if applicable; and~~  
417 • ~~Types of products and range of uses for the alternative substance.~~

### Report Authorship

420

421 The following individuals were involved in research, data collection, writing, editing, and/or final  
422 approval of this report:

- 423
- 424 • Name, Title, Organization
- 425 • Name, Title, Organization
- 426 • Name, Title, Organization

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428 All individuals are in compliance with Federal Acquisition Regulations (FAR) Subpart 3.11 – Preventing  
429 Personal Conflicts of Interest for Contractor Employees Performing Acquisition Functions.

432

**References**

433

434 All citations listed in the report must be included in references section using MLA format.

435 A minimum of 20 current scientific references must be cited in the report to provide adequate scientific  
436 credibility and thorough review. Citation using MLA format must be included appropriately within the

437 text to avoid plagiarism.

# Name of Material

## Handling/Processing

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### Identification of Petitioned Substance

**Chemical Names:**

List all chemical names

**CAS Numbers:**

List CAS numbers

**Other Name:**

List other names

**Other Codes:**

List other codes (e.g., INS number, E number, etc.)

**Trade Names:**

List trade names

### Summary of Petitioned Use

For petitions to add or amend a substance, describe the petitioned use of the substance. For substances currently on the National List, summarize the allowed uses under the USDA organic regulations (7 CFR Part 205).

### Characterization of Petitioned Substance

**Composition of the Substance:**

Describe Composition of the Substance

**Source or Origin of the Substance:**

Briefly describe the source or origin of the substance (to be addressed in more detail below under Evaluation Questions 1 through 4).

**Properties of the Substance:**

Describe Physical and Chemical Properties of the Substance

**Specific Uses of the Substance:**

Describe Specific Uses of the Substance - primary focus should be given to describing the petitioned use of the substance as it relates to organic handling; secondary focus should be given to providing general information on other uses of the petitioned substance in agricultural handling/processing.

**Approved Legal Uses of the Substance:**

Describe the Status of the Petitioned Substance under applicable Federal Regulations (i.e., EPA, FDA, USDA (including APHIS or FSIS), NIEHS, etc.)

**Action of the Substance:**

Describe Action of the Substance - focus should be given to describing mode of action of the substance, when used as petitioned.

**Combinations of the Substance:**

Describe Combinations of the Substance - focus should be given to describing whether the petitioned substance is a precursor to, component of, or commonly used in combination with a substance(s) identified on the National List. Any known synergistic effects (either positive or negative) with other substances on the National List should be identified.

In addition, information should be provided on whether any additional ingredients (e.g., inert ingredients, stabilizers, preservatives, carriers, anti-caking agents, or other materials) are generally added to commercially available forms of the petitioned substance.

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## Status

### **Historic Use:**

Describe historic use of the substance in organic agricultural production (if no historic use in organic agricultural production, please describe historic use in conventional agricultural production).

### **Organic Foods Production Act, USDA Final Rule:**

Describe whether the Petitioned Substance is Listed anywhere in the Organic Foods Production Act of 1990 (OFPA) or the USDA organic regulations, 7 CFR Part 205.

### **International**

Describe the status of the substance among international organizations. Specifically, the report should address whether the petitioned substance is allowed or prohibited for use in other international organic standards such as:

#### **Canada**

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

CAN/CGSB-32.311, Organic Production Systems-Permitted Substances List

<http://www.inspection.gc.ca/food/organic-products/standards/eng/1300368619837/1300368673172>

**CODEX Alimentarius Commission – Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods (GL 32-1999)**

<http://www.fao.org/docrep/005/Y2772E/Y2772E00.HTM>

Note: For Codex, the reference should be cited as “guidelines,” rather than as “standards”.

**European Economic Community (EEC) Council Regulation – EC No. 834/2007 and 889/2008**

<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32021R1165&from=EN#d1e32-48-1>

**Japan Agricultural Standard (JAS) for Organic Production**

[http://www.maff.go.jp/e/jas/specific/criteria\\_o.html](http://www.maff.go.jp/e/jas/specific/criteria_o.html)

**IFOAM-Organics International**

<http://www.ifoam.bio/en/ifoam-norms>

## Evaluation Questions for Substances to be used in Organic Handling

### **Classification of the substance**

**Evaluation Question #1:** (A) Describe if the substance is extracted from naturally occurring plant, animal, or mineral sources. (B) Describe the most prevalent processes used to manufacture or formulate the petitioned substance. Include any chemical changes that may occur during manufacture or formulation of the substance. (C) Discuss whether the petitioned substance is agricultural or Non-agricultural. If the substance is Non-agricultural, is it synthetic or non-synthetic? [7 U.S.C. §6502(21); NOP 5032-1; NOP 5033-2]. (D) Does the substance in its raw or formulated forms contain nanoparticles? (E) Does the substance in its raw or formulated forms contain ancillary substances (F) Is the substance created using Excluded Methods?

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**Data Required:**

- (A) If the substance is extracted from a natural material, information should be provided on any materials and methods used to extract, separate, isolate, or withdraw the substance, including any solvents used, acid-base extraction methods, or mechanical or physical separation methods. If the substance is created by a naturally occurring biological process, those process(es) must be described in detail.

For the purposes of this response, naturally occurring biological processes are processes that include but are not limited to, aerobic and anaerobic digestion, decomposition, fermentation, various metabolic processes, and photosynthesis.

- (B) The response must describe the processes used to manufacture or formulate the substance, including a discussion of all precursors and/or feedstocks. A description of alternate manufacturing methods and the extent of their commercial use which are not included in the petition, if any, should be presented. The response must also describe, in detail, any chemical changes effected on any naturally occurring precursor or feedstock by all manufacturing or formulation processes. If any synthetic materials used in the production or extraction of a substance remain in the final product, describe them.

For the purposes of this response, a chemical change involves a process (i.e., chemical reaction) whereby a substance is transformed into one or more other distinct substances. This may include the addition or deletion of one atom to the substance's molecular structure or other description of chemical modification.

Chemical processes include, but are not limited to: acid base reactions, calcification, thermal or catalytic cracking, esterification, hydrogenation, mixing of substances or elements, oxidation-reduction, polymerization, etc., obtained through process units such as compressors, cracking towers, heat exchangers, mixers, reactors, pumps, etc.

- (C) Based on the information provided on (A) and (B), the definition of synthetic at 7 U.S.C. § 6502 (22) NOP Guidance 5033-1 and NOP Guidance 5033-2, describe if the substance can be classified as agricultural or non-agricultural.

- (D) **Nano Particles:** Does the substance in its raw or formulated forms contain nanoparticles? If so, are they engineered nanomaterials or incidental nanomaterials as defined by the NOSB and NOP? (Policy Memo 15-2)

- (E) **Ancillary Substances:** Does the substance in its raw or formulated forms contain ancillary substances as defined by the NOSB in the 2016 recommendation?  
(<https://www.ams.usda.gov/sites/default/files/media/HS%20Ancillary%20Substance%20Proposal%20NOP.pdf>)

- (F) **Excluded Methods:**

- i. Is the substance created using excluded methods? This includes but is not limited to the following list of techniques found to be "excluded methods" by the NOSB: Targeted genetic modification (TagMo), Synthetic gene technologies, Genome engineering, Gene editing, Gene targeting, Gene Silencing, Accelerated plant breeding techniques, Synthetic Biology, cloned animals and offspring, plastid transformation, cisgenesis, intragenesis, agro-infiltration, transposons developed

- 158 using invitro nucleic acid techniques, induced mutagenesis developed through in  
159 vitro nucleic acid techniques, cell and protoplast fusion (NOP policy Memo 13-1).  
160 ii. If the substance is manufactured from agricultural raw materials, are those  
161 materials derived from genetically engineered crop, or crops resulting from  
162 excluded methods?  
163 iii. If the substance is manufactured from other biological raw materials—such as  
164 those produced by fermentation or enzymatic action—are those biological  
165 materials, derived from genetically engineered organisms, or crops organisms  
166 resulting from excluded methods?

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168 **Evaluation Question #2: Specify whether the petitioned substance is categorized as generally**  
169 **recognized as safe (GRAS) when used according to FDA’s good manufacturing practices (7 CFR**  
170 **205.600(b)(5)). If not categorized as GRAS, describe the regulatory status.**

171 **Purpose and necessity of the substance**

172

173 **Evaluation Question #3: Describe whether the primary technical function or purpose of the petitioned**  
174 **substance is a preservative (7 CFR 205.600(b)(4)).**

175

176 **Data Required:** The response must explain why the primary function of the substance is or is not as a  
177 preservative.

178

179 **Evaluation Question #4: Describe whether the petitioned substance will be used primarily to recreate**  
180 **or improve flavors, colors, textures, or nutritive values lost in processing (except when required by law).**  
181 **If so, how? (7 CFR 205.600(b)(4)).**

182

183 **Data Required:** When replacement or improvement of nutrients is required or allowed by regulation, the  
184 report evaluators should cite the appropriate regulations.

185

186 **Evaluation Question #5: Describe any effect or potential effect on the nutritional quality of the food or**  
187 **feed when the petitioned substance is used (7 CFR 205.600(b)(3)).**

188

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191 **Data Required:** The response must indicate whether the use of the petitioned substance affects the levels of  
192 nutrients (e.g., proteins, carbohydrates, fats, vitamins, and minerals) commonly found in the food product.  
193 Effects may include increasing or decreasing the amount and/or bioavailability of the nutrients.

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196 **Environment and human health effects**

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198 **Evaluation Question #6: List any reported residues of heavy metals or other contaminants in excess of**  
199 **FDA tolerances that are present or have been reported in the petitioned substance (7 CFR 205.600(b)(5)).**

200

201 **Data Required:** The response must indicate whether the petitioned substance may contain residues of  
202 substances that exceed FDA’s Action Levels for Poisonous or Deleterious Substances in Human Food. For  
203 the most part, these action levels will relate to residues found in agricultural products. Heavy metals or  
204 contaminants are addressed through FDA’s action levels. [https://www.fda.gov/regulatory-information/search-](https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-action-levels-poisonous-or-deleterious-substances-human-food-and-animal-feed)  
205 [fda-guidance-documents/guidance-industry-action-levels-poisonous-or-deleterious-substances-human-food-and-](https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-action-levels-poisonous-or-deleterious-substances-human-food-and-animal-feed)  
206 [animal-feed](https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-action-levels-poisonous-or-deleterious-substances-human-food-and-animal-feed) See the latest edition of Food Chemicals Codex (National Research Council) for accepted  
207 reference standards for metals and other contaminants in food ingredients in the U.S.

208

209 **Evaluation Question #7: Discuss and summarize findings on whether the manufacture and use of the**  
210 **petitioned substance may be harmful to the environment or biodiversity (7 U.S.C. § 6517 (c) (1) (A) (i)**  
211 **and 7 U.S.C. § 6517 (c) (2) (A) (i)).**

212  
213 **Data Required:** In consideration of the petitioned substance, its manufacturing process, and its breakdown  
214 products, describe the mode of action of the substance with respect to its effects on biological, chemical and  
215 physical effects on the environment or biodiversity. The analysis must include consideration of potential  
216 effects on both terrestrial and aquatic systems and effects on arthropod natural enemies (e.g., predators and  
217 parasitic hymenoptera), pollinators, bats and birds

218  
219 **Evaluation Question #8: Describe and summarize any reported effects upon human health from use of**  
220 **the petitioned substance (7 U.S.C. § 6517(c)(1)(A)(i), 7 U.S.C. § 6517(c)(2)(A)(i) and 7 U.S.C. § 6518(m)(4)).**

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222 **Data Required:** Describe reported health effects and causation that may be attributed to the use of the  
223 petitioned substance and/or its breakdown products.

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226 **Alternatives**

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228 **Evaluation Question #9: Are there alternative natural (nonsynthetic) source(s) of the substance? (7 CFR**  
229 **205.600(b)(1)).**

230  
231 **Data Required:** The response must discuss whether natural (nonsynthetic) sources of the petitioned  
232 substance exist and are available. The report contractor should examine the effect, form, function, quality,  
233 and quantity of the naturally sourced version of the petitioned substance, in comparison to manufactured  
234 versions. Briefly describe any naturally sourced alternatives by summarizing:

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  - literature, including product or practice description, on performance and test data;
  - name and address of the manufacturer(s), if applicable; and,
  - types of products the substance is currently used in.

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240 **Evaluation Question #10: Describe all nonagricultural non-synthetic substances or products which may**  
241 **be used in place of the petitioned substance (7 U.S.C. § 6517(c)(1)(A)(ii)). Additionally, identify which of**  
242 **those are currently allowed under the NOP regulations.**

243  
244 **Data Required:** The response must describe the availability of a nonagricultural non-synthetic or natural  
245 substance(s) which could be substituted for petitioned substance. . Briefly describe any nonagricultural  
246 nonsynthetically sourced alternatives by summarizing:

- 247
  - A comparison of the effect, form, function, quality, and quantity of the substitute non-synthetic  
248 (natural) product with the petitioned substance;
  - Commercial availability of substitute non-synthetic (natural) products, both domestically and  
249 globally.
  - A comparison of reported risks to human health associated with the substitute non-synthetic  
250 (natural) product to the petitioned substance;
  - A comparison of reported environmental effects (both aquatic and terrestrial) associated with the  
251 substitute non-synthetic (natural) product to the petitioned substance;
  - Literature, including product or practice description, on performance and test data; and
  - Types of products and range of uses for the alternative substance

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258 **Evaluation Information #11: Provide a list of organic agricultural products that could be alternatives for**  
259 **the petitioned substance (7 CFR 205.600(b)(1)).**

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261 **Data Required:** The list should be based upon a comparison of the effect, form, function, quality, and  
262 quantity of the recommended organic agricultural product with the petitioned substance. Many organic  
263 products may be found at: <https://organic.ams.usda.gov/Integrity/default.aspx>, <http://eorganic.info/>,

264 <https://www.sare.org/>, <https://www.omri.org/>, [www.606organic.com](http://www.606organic.com), and <https://attra.ncat.org/>;  
265 these resources should be consulted before exhausting search for alternative practices. Briefly describe the  
266 organic agriculturally derived alternatives by summarizing:

- 267
- 268 • A comparison of the effect, form, function, quality, and quantity of the substitute organic  
269 agricultural product to the petitioned substance;
- 270 • Commercial availability of substitute organic products, both domestically and globally
- 271 • A comparison of reported risks to human health associated with the substitute organic agricultural  
272 product to the petitioned substance;
- 273 • A comparison of reported environmental effects (both aquatic and terrestrial) associated with the  
274 substitute organic agricultural product to the petitioned substance;
- 275 • Any literature, including product description, on performance and test data;
- 276 • The name and address of the supplier/manufacturer, if applicable; and
- 277 • Types of products and range of uses for the alternative substance.
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280 **Evaluation Question #12:** Describe if there are any alternative practices that would make the use of the  
281 petitioned substance unnecessary (7 U.S.C. § 6518(m)(6)).  
282

283 **Data Required:** The response to this request for development of technical information must describe the  
284 availability of an alternative practice(s) to the use of the petitioned substance. Many research-based  
285 alternative practices may be found at: <http://eorganic.info/>, <https://www.sare.org/>, and  
286 <https://attra.ncat.org/>; these resources should be consulted before exhausting search for alternative  
287 practices. Briefly describe alternative practices by summarizing:

- 288 • Literature, including practice description, on performance and test data;
- 289 • A comparison of the function and effectiveness of the proposed alternative practice to the  
290 petitioned substance; and,
- 291 • Types of products produced and scope of use of alternative practices.
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- 293

### Report Authorship

294  
295  
296 The following individuals were involved in research, data collection, writing, editing, and/or final  
297 approval of this report:

- 298
- 299 • Name, Title, Organization
- 300 • Name, Title, Organization
- 301 • Name, Title, Organization
- 302

303 All individuals are in compliance with Federal Acquisition Regulations (FAR) Subpart 3.11 – Preventing  
304 Personal Conflicts of Interest for Contractor Employees Performing Acquisition Functions.  
305  
306

### References

307  
308  
309 All citations listed in the report must be included in references section using MLA format.  
310 A minimum of 20 current scientific references must be cited in the report to provide adequate scientific  
311 credibility and thorough review. Citation using MLA format must be included appropriately within the text  
312 to avoid plagiarism.



# Name of Material

## Crops or Livestock

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**Identification of Petitioned Substance**

**Chemical Names:**

List all chemical names

**CAS Numbers:**

List CAS numbers

**Other Name:**

List other names

**Other Codes:**

List other codes

**Trade Names:**

List Trade Names

**Summary of Petitioned Use**

For petitions to add or amend a substance, describe the petitioned use of the substance. For substances currently on the National List, summarize the allowed uses under the USDA organic regulations.

**Characterization of Petitioned Substance**

**Composition of the Substance:**

Describe Composition of the Substance

**Source or Origin of the Substance:**

Briefly describe the source or origin of the substance (to be addressed in more detail below under Evaluation Questions 2 and 3).

**Properties of the Substance:**

Describe Physical and Chemical Properties of the Substance

**Specific Uses of the Substance:**

Describe Specific Uses of the Substance - primary focus should be given to describing the petitioned use of the substance; secondary focus should be given to providing general information on other uses of the petitioned substance in agricultural crop or livestock production.

**Approved Legal Uses of the Substance:**

Describe the Status of the Petitioned Substance under applicable Federal Regulations (i.e., EPA, FDA, USDA (including APHIS or FSIS), NIEHS, etc.)

**Action of the Substance:**

Describe the Mode Action of the Substance - focus should be given to describing the mode of action of the substance, when used as petitioned.

**Combinations of the Substance:**

Describe Combinations of the Substance - focus should be given to describing whether the petitioned substance is a precursor to, component of, or commonly used in combination with a substance(s) identified on the National List.

In addition, information should be provided on whether any additional ingredients (e.g., inert ingredients, stabilizers, preservatives, carriers, anti-caking agents, or other materials) are generally added to commercially available forms of the petitioned substance.

52	<b>Status</b>
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54	<b>Historic Use:</b>
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55	Describe historic use of the substance in organic agricultural production (if no historic use in organic agricultural production, please describe historic use in conventional agricultural production).
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58	<b>Organic Foods Production Act, USDA Final Rule:</b>

59	Describe whether the Petitioned Substance is Listed anywhere in the Organic Foods Production Act of 1990 (OFPA) or the USDA organic regulations, 7 CFR Part 205.
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62	<b>International</b>

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64	Describe the status of the substance among international organizations. Specifically, the report should address whether the petitioned substance is allowed or prohibited for use in other international organic standards such as:
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68	<b>Canada</b> –Canadian General Standards Board Permitted Substances List. This list was updated in November 2015.

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70	<b>CAN/CGSB-32.310- Organic production systems-General principles and management standards</b>

71	CAN/CGSB-32.311-2015 – Organic production systems - Permitted substances lists
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72	<a href="http://www.tpsgc-pwgsc.gc.ca/oncge-cgsb/programme_program/normes_standards/internet/bio-org/lsp-psl-eng.html">http://www.tpsgc-pwgsc.gc.ca/oncge-cgsb/programme_program/normes_standards/internet/bio-org/lsp-psl-eng.html</a>
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75	<b>CODEX Alimentarius Commission, Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods (GL 32-1999) -</b>

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77	Note: For Codex, the reference should be cited as “guidelines,” rather than as “standards”.
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79	<a href="http://www.codexalimentarius.org/standards/list_standards/en/?no_cache=1">http://www.codexalimentarius.org/standards/list_standards/en/?no_cache=1</a>
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80	<a href="http://www.codexalimentarius.org/download/standards/360/cxg_032e.pdf">http://www.codexalimentarius.org/download/standards/360/cxg_032e.pdf</a>
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83	<b>European Economic Community (EEC) Council Regulation, EC No. 834/2007 and 889/2008</b>

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85	<a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:250:0001:0084:EN:PDF">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:250:0001:0084:EN:PDF</a>
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87	<b>Japan Agricultural Standard (JAS) for Organic Production –</b>
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88	<a href="http://www.maff.go.jp/e/jas/specific/criteria_o.html">http://www.maff.go.jp/e/jas/specific/criteria_o.html</a>
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90	<b>International Federation of Organic Agriculture Movements (IFOAM) –</b>
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91	<a href="http://www.ifoam.bio/en/ifoam-norms">http://www.ifoam.bio/en/ifoam-norms</a>
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94	<b>Evaluation Questions for Substances to be used in Organic Crop or Livestock Production</b>
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96	<b>Classification of the substance</b>
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98	<b>[combination of old #2 &amp; 3 - word smithed and added D and E]</b>
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99	<b>Evaluation Question #1: Indicate which category in OFPA that the substance falls under: (A) Does the</b>
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100	<b>substance contain an active ingredient in any of the following categories: copper and sulfur</b>
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101	<b>compounds, toxins derived from bacteria; pheromones, soaps, horticultural oils, fish emulsions, treated</b>
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102	<b>seed, vitamins and minerals; livestock parasiticides and medicines and production aids including</b>
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103	<b>netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleansers? (A)</b>
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104	<b>Describe if the substance is extracted from naturally occurring plant, animal, or mineral sources. (B) Is</b>
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105	<b>the substance a synthetic inert ingredient that is not classified by the EPA as inerts of toxicological</b>
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concern (i.e., EPA List 4 inerts) (7 U.S.C. § 6517(e)(1)(B)(ii))? Is the synthetic substance an inert ingredient which is not on EPA List 4, but is exempt from a requirement of a tolerance, per 40 CFR part 180? (B) Describe the most prevalent processes used to manufacture or formulate the petitioned substance. Include any chemical changes that may occur during manufacture or formulation of the substance. (C) Based on the manufacturing process description, discuss if the substance is classified as synthetic or a nonsynthetic. [7 U.S.C. §6502(21)]; NOP 5033-1]. (D) Does the substance in its raw or formulated forms contain nanoparticles? (E) Is the substance created using Excluded Methods?

**Data Required:**

- (A) If the substance is extracted from a natural material, information should be provided on any materials and methods used to extract, separate, isolate, or withdraw the substance, including any solvents used, acid-base extraction methods, or mechanical or physical separation methods. If the substance is created by a naturally occurring biological process, those process(es) must be described in detail.

For the purposes of this response, naturally occurring biological processes are processes that include but are not limited to, aerobic and anaerobic digestion, decomposition, fermentation, various metabolic processes, and photosynthesis.

- (B) The response must describe the processes used to manufacture or formulate the substance, including a discussion of all precursors and/or feedstocks. A description of alternate manufacturing methods and the extent of their commercial use which are not included in the petition, if any, should be presented. The response must also describe, in detail, any chemical changes effected on any naturally occurring precursor or feedstock by all manufacturing or formulation processes. If any synthetic materials used in the production or extraction of a substance remain in the final product, describe them.

For the purposes of this response, a chemical change involves a process (i.e., chemical reaction) whereby a substance is transformed into one or more other distinct substances. This may include the addition or deletion of one atom to the substance's molecular structure or other description of chemical modification.

Chemical processes include, but are not limited to: acid base reactions, calcification, thermal or catalytic cracking, esterification, hydrogenation, mixing of substances or elements, oxidation-reduction, polymerization, etc., obtained through process units such as compressors, cracking towers, heat exchangers, mixers, reactors, pumps, etc.

- (C) Based on the information provided on (A) and (B), the definition of synthetic at 7 U.S.C. § 6502 (22) and NOP Guidance 5033-1, describe if the substance can be classified as synthetic or as a nonsynthetic. Synthetic substances have been chemically modified from the source or origin or have been isolated from a natural source in a form that does not occur in nature.

- (D) Nano Particles: Does the substance in its raw or formulated forms contain nanoparticles? If so, are they engineered nanomaterials or incidental nanomaterials as defined by the NOSB and NOP? (Policy Memo 15-2)

- (E) Excluded Methods:

- i. Is the substance created using excluded methods? This includes but is not limited to the following list of techniques found to be "excluded methods" by the NOSB: Targeted genetic modification (TagMo), Synthetic gene technologies, Genome engineering, Gene editing, Gene targeting, Gene Silencing, Accelerated plant breeding techniques, Synthetic Biology, cloned animals and offspring, plastid transformation, cisgenesis, intragenesis, agro-infiltration, transposons developed

- 159 using invitro nucleic acid techniques, induced mutagenesis developed through in  
160 vitro nucleic acid techniques, cell and protoplast fusion (NOP policy Memo 13-1).  
161 ii. If the substance is manufactured from agricultural raw materials, are those  
162 materials derived from genetically engineered crop, or crops resulting from  
163 excluded methods?  
164 iii. If the substance is manufactured from other biological raw materials – such as  
165 those produced by fermentation or enzymatic action – are those biological  
166 materials derived from genetically engineered organisms, or crops organisms  
167 resulting from excluded methods?

168  
169  
170 **[old #1] Evaluation Question #2: Describe the most prevalent processes used to manufacture or**  
171 **formulate the petitioned substance. Further, describe any chemical change that may occur during**  
172 **manufacture or formulation of the petitioned substance when this substance is extracted from naturally**  
173 **occurring plant, animal, or mineral sources (7 U.S.C. § 6502 (21)). For substances classified as synthetic:**  
174 **Is the substance used in production, and does it contain an active synthetic ingredient in the following**  
175 **categories: [§6517(c)(1)(B)(i)]; copper and sulfur compounds; toxins derived from bacteria; pheromones,**  
176 **soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals; livestock parasiticides and**  
177 **medicines and production aids including netting, tree wraps and seals, insect traps, sticky barriers, row**  
178 **covers, and equipment cleansers; or (ii) is used in production and contains synthetic inert ingredients**  
179 **that are not classified by the Administrator of the Environmental Protection Agency as inerts of**  
180 **toxicological concern?**

181  
182 **Data Required:** The response must describe the processes used to manufacture or formulate the substance,  
183 including a discussion of all precursors and/or feedstocks. A description of alternate manufacturing  
184 methods and the extent of their commercial use which are not included in the petition, if any, should be  
185 presented. The response must also describe, in detail, any chemical changes effected on any naturally  
186 occurring precursor or feedstock by all manufacturing or formulation processes. For the purposes of this  
187 response, a chemical change involves a process (i.e., chemical reaction) whereby a substance is transformed  
188 into one or more other distinct substances. This may include the addition or deletion of one atom to the  
189 substance's molecular structure or other description of chemical modification.

190  
191 **[old #7] Evaluation Question #3: Discuss whether the petitioned substance is formulated or**  
192 **manufactured by a chemical process, or created by naturally occurring biological processes (7 U.S.C. §**  
193 **6502 (21)). Describe any known chemical interactions between the petitioned substance and other**  
194 **substances used in organic crop or livestock production or handling. (7 U.S.C. § 6518(m)(1)).**

195  
196 **Data Required:** For the purposes of this response, chemical processes are processes include, but are not  
197 limited to, acid base reactions, calcification, thermal or catalytic cracking, esterification, hydrogenation,  
198 mixing of substances or elements, oxidation reduction, polymerization, etc., obtained through process units  
199 such as compressors, cracking towers, heat exchangers, mixers, reactors, pumps, etc.

200  
201 If the substance is extracted from a natural material, information should be provided on any materials and  
202 methods used to extract, separate, isolate, or withdraw the substance, including any solvents used, acid-  
203 base extraction methods, or mechanical or physical separation methods.

204  
205 If the substance is created by a naturally occurring biological process, those process(es) must be described  
206 in detail. For the purposes of this response, naturally occurring biological processes are processes that  
207 include but are not limited to, aerobic and anaerobic digestion, decomposition, fermentation, various  
208 metabolic processes, and photosynthesis.

209  
210 Information should be provided on whether the substance has been chemically modified from the source  
211 or origin of the substance, including whether the substance has been isolated from a natural source in a  
212 form that does not occur in nature, and whether any synthetic materials used in the production or

213 extraction of a substance may remain in the final product. The response to this request for development of  
214 technical information must describe any known chemical interactions between the petitioned substance  
215 and other substances allowed for use in organic production or handling as applicable. Describe any  
216 common combinations of materials used with the petitioned substance. Describe any substances resulting  
217 from these interactions.  
218

219 **[combination of old #4 & 5] Evaluation Question #4: Describe the persistence or concentration of the**  
220 **petitioned substance and/or its by-products in the environment (7 U.S.C. § 6518 (m) (2)). Discuss (A) the**  
221 **toxicity and mode of action of the substance; (B) the toxicity and mode of action of its breakdown**  
222 **products or any contaminants; and (C) their persistence and areas of concentration in the environment (7**  
223 **U.S.C. §6518(m)(2)).**

224  
225 **Data Required:** The response must describe whether and how the petitioned substance and/or the  
226 breakdown products are persistent or cumulative when used in organic crop or livestock production as  
227 petitioned.

- 228 (A) Describe whether the petitioned substance has been reported to have toxic effects and if its mode of  
229 action can cause adverse health and/or environmental effects.
- 230 (B) Describe whether the petitioned substance contaminants, or any of its breakdown products have  
231 been reported to have toxic effects and are capable of causing adverse health and/or  
232 environmental effects either present in the substance or arising from the degradation of the  
233 substance over time.
- 234 (C) Describe whether and how the petitioned substance and/or the breakdown products are persistent  
235 or cumulative when used in organic crop or livestock production as petitioned.  
236

237 **[old #6] Evaluation Question #5: Describe the toxicity and mode of action of the substance and of its**  
238 **breakdown products and any contaminants. Describe the persistence and areas of concentration in the**  
239 **environment of the substance and its breakdown products (7 U.S.C. § 6518 (m) (2)). Discuss the**  
240 **probability of environmental contamination during manufacture, use, misuse or disposal of the**  
241 **substance (7 U.S.C. §6518(m)(3)).**

242  
243 **Data Required:** The response must describe whether the petitioned substance, its contaminants, or any of  
244 its breakdown products have been reported to have toxic effects and are capable of causing adverse health  
245 and/or environmental effects either present in the substance or arising from the degradation of the  
246 substance over time. The response must describe the occurrence and severity of environmental  
247 contamination during the manufacture, use, misuse, or disposal of the petitioned substance. Data or  
248 reports from U.S. or International universities, agencies, independent groups, or other news reports should  
249 be included in this response when available. This data may also be available through review of assessments  
250 performed per EPA, FDA, and/or NIEHS review.  
251

252 **[old #8] Evaluation Question #6: Describe any environmental contamination that could result from the**  
253 **petitioned substance's manufacture, use, misuse, or disposal (7 U.S.C. § 6518 (m) (3)). Discuss the effects**  
254 **of the substance on biological and chemical interactions in the agroecosystem. Include the physiological**  
255 **effects of the substance on soil, crops, livestock or other organisms (such as aquatic) that could be**  
256 **affected by the substance when used as petitioned. (7 U.S.C. §6518(m)(5))**  
257

258 **Data Required:** The response must describe the occurrence and severity of environmental contamination  
259 during the manufacture, use, misuse, or disposal of the petitioned substance. This data may be available  
260 through review of assessments performed per EPA, FDA, and/or NIEHS review. Data or reports from  
261 other U.S. or International universities, agencies, independent groups, or other news reports should be  
262 included in this response when available. The response must describe the substances (the petitioned  
263 substance and/or its byproducts in combination with naturally occurring substances over time) that are  
264 capable of affecting the agro-ecosystem.  
265

The response should describe whether and how the petitioned substance affects the survival and/ or function of soil organisms, such as, but not limited to earthworms, mites, grubs, bacteria, nematodes, algae, and protozoa by changing soil temperature, water availability, pH levels, nutrient availability, salt concentration, solubility or other parameter. For crops, the response should also describe whether and how the substance affects plant physiology by creating changes in plant pH, nutrient or water utilization, or other parameters when used as petitioned. For livestock production, the response should also describe whether and how the substance affects animal physiology by creating changes in behavior, fertility, metabolism or other parameters.

In addition, the response should describe the potential or actual impacts of the substances upon endangered species, population, viability or reproduction of non-target organisms and the potential for measurable reductions in genetic, species or eco-system biodiversity, if possible.

**[old #9] Evaluation Question #7: Describe any known chemical interactions between the petitioned substance and other substances used in organic crop or livestock production or handling. Describe any environmental or human health effects from these chemical interactions (7 U.S.C. § 6518 (m) (1)). Discuss and summarize findings on whether the use of the petitioned substance may be harmful to the environment (7 U.S.C. § 6517 (c) (1) (A) (i) and 7 U.S.C. § 6517 (c) (2) (A) (i)).**

**Data Required:** The response to this request for development of technical information must describe any known chemical interactions between the petitioned substance and other substances allowed for use in organic production or handling as applicable. Describe any common combinations of materials used with the petitioned substance. Describe any substances resulting from these interactions and whether they may cause adverse health and/or environmental effects either present in the substance or arising from the degradation of the substance over time. Toxicity, mode of action, and persistence of the substance and its breakdown products should be explained. ~~Considering the information described in questions #1-6 and any other relevant information, discuss if the petitioned substance and/ or its breakdown products can cause harmful effects on the environment. Describe the biological, chemical and physical factors that may be affected by the use of the substance and/ or its breakdown products.~~

### Harm to Human Health

**[old #10] Evaluation Question #8: Describe any effects of the petitioned substance on biological or chemical interactions in the agro-ecosystem, including physiological effects on soil organisms (including the salt index and solubility of the soil), crops, and livestock (7 U.S.C. § 6518 (m) (5)). Describe and summarize any reported effects upon human health from use of the petitioned substance (7 U.S.C. § 6517 (c) (1) (A) (i), 7 U.S.C. § 6517 (c) (2) (A) (i) and 7 U.S.C. § 6518 (m) (4)).**

**Data Required:** The response must describe the substances (the petitioned substance and/or its byproducts in combination with naturally occurring substances over time) that are capable of affecting the agro-ecosystem. The effects of these substances, including toxicity, mode of action and environmental persistence of the substance and its breakdown products should be explained.

The response should describe whether and how the petitioned substance affects the survival and/ or function of soil organisms, such as, but not limited to earthworms, mites, grubs, bacteria, nematodes, algae, and protozoa by changing soil temperature, water availability, pH levels, nutrient availability, salt concentration, solubility or other parameter. For crops, the response should also describe whether and how the substance affects plant physiology by creating changes in plant pH, nutrient or water utilization, or other parameters when used as petitioned. For livestock production, the response should also describe whether and how the substance affects animal physiology by creating changes in behavior, fertility, metabolism or other parameters.

In addition, the response should describe the potential or actual impacts of the substances upon endangered species, population, viability or reproduction of non-target organisms and the potential for measurable reductions in genetic, species or eco-system biodiversity, if possible. **Drawing upon responses**

to above questions #1-7 and any other relevant information, describe the reported health effects that may be attributed to the petitioned substance and/or its breakdown products.

### Necessity and Alternatives

**[old #11] Evaluation Question #9: Discuss and summarize findings on whether the use of the petitioned substance may be harmful to the environment (7 U.S.C. § 6517 (c) (1) (A) (i) and 7 U.S.C. § 6517 (c) (2) (A) (i)). Describe all natural (non-synthetic) substances or products which may be used in place of a petitioned substance (7 U.S.C. § 6517 (c) (1) (A) (ii)). Provide a list of allowed substances that may be used in place of the petitioned substance (7 U.S.C. § 6518 (m) (6)).**

**Data Required:** Drawing upon responses to above questions #2-8, and any other relevant information, describe the biological, chemical and physical agents capable of causing harmful environmental effects and the causation, that may be attributed to the use of the petitioned substance and/or its breakdown products. The response must describe the availability of non-synthetic or natural substance(s), including organic agricultural products, which could be substituted for petitioned substance. The examination should address:

- a comparison of the effect, form, function, quality, and quantity of the substitute non-synthetic or natural product with the petitioned substance;
- literature, including product or practice description, on performance and test data;
- name and address of the manufacturer(s), if applicable; and
- For livestock (and pet food) feed substances, information on technical barriers to production of organic agricultural products that may serve as alternatives.

**[old #12] Evaluation Question #10: Describe and summarize any reported effects upon human health from use of the petitioned substance (7 U.S.C. § 6517 (c) (1) (A) (i), 7 U.S.C. § 6517 (c) (2) (A) (i)) and 7 U.S.C. § 6518 (m) (4)). Describe any alternative practices that would make the use of the petitioned substance unnecessary (7 U.S.C. § 6518 (m) (6)).**

**Data Required:** Drawing upon responses to above questions #2-8 and any other relevant information, describe the reported health effects and causation that may be attributed to the petitioned substance and/or its breakdown products.

The response to this request for development of technical information must describe the availability of specific alternative practices, such as cultural, biological, and mechanical controls, to the use of the petitioned substance.

When assessing alternative practices, the report should address:

- Literature, including specific practice description, on performance and test data;
- A comparison of the function and effectiveness of the proposed alternative practice with the petitioned substance; and,
- Frequency or prevalence of use of alternatives, if known.

**~~Evaluation Question #11: Describe all natural (non-synthetic) substances or products which may be used in place of a petitioned substance (7 U.S.C. § 6517 (c) (1) (A) (ii)). Provide a list of allowed substances that may be used in place of the petitioned substance (7 U.S.C. § 6518 (m) (6)).~~**

**~~Data Required:~~** The response must describe the availability of non-synthetic or natural substance(s), including organic agricultural products, which could be substituted for petitioned substance. The examination should address:

- ~~• a comparison of the effect, form, function, quality, and quantity of the substitute non-synthetic or natural product with the petitioned substance;~~
- ~~• literature, including product or practice description, on performance and test data;~~
- ~~• name and address of the manufacturer(s), if applicable; and~~
- ~~• For livestock (and pet food) feed substances, information on technical barriers to production of organic agricultural products that may serve as alternatives.~~

376  
377 **Evaluation Question #12: Describe any alternative practices that would make the use of the petitioned**  
378 **substance unnecessary (7 U.S.C. § 6518 (m) (6)).**  
379

380 **Data Required:** The response to this request for development of technical information must describe the  
381 availability of alternative practices, such as cultural, biological, and mechanical controls, to the use of the  
382 petitioned substance.  
383

384 Alternative cultural methods including methods used to enhance crop health and prevent weed, pest, or  
385 disease problems without the use of substances. Examples include the selection of appropriate varieties  
386 and planting sites; proper timing and density of plantings; irrigation; and extending a growing season by  
387 manipulating the microclimate with green houses, cold frames, or wind breaks.  
388

389 Other alternative practices may include, but are not limited to, crop rotation, mulching with fully  
390 biodegradable materials, mechanical cultivation, augmentation or introduction of predators or parasites of  
391 the pest species; development of habitat for natural enemies of pests; nonsynthetic controls such as lures,  
392 traps, and repellents; sanitation measures and management practices which suppress the spread of disease  
393 organisms.  
394

395 Alternative practices used in livestock production may include, but are not limited to, selection of species  
396 and types of livestock with regard to suitability for site specific conditions, resistance to diseases and  
397 parasites; site selection, housing, pasture and sanitation practices that minimize occurrence and spread of  
398 disease and parasites; stocking density; and seasonal production practices.  
399

400 When assessing alternative practices, the report should address:

- 401 • Literature, including practice description, on performance and test data;
- 402 • A comparison of the function and effectiveness of the proposed alternative practice with the  
403 petitioned substance; and,
- 404 • Frequency or prevalence of use of alternatives, if known.  
405

### Report Authorship

407  
408 The following individuals were involved in research, data collection, writing, editing, and/or final  
409 approval of this report:

- 410 • Name, Title, Organization
- 411 • Name, Title, Organization
- 412 • Name, Title, Organization
- 413 • Name, Title, Organization
- 414

415 All individuals are in compliance with Federal Acquisition Regulations (FAR) Subpart 3.11 – Preventing  
416 Personal Conflicts of Interest for Contractor Employees Performing Acquisition Functions.  
417

### References



# Name of Material

## Crops or Livestock

1 **Identification of Petitioned Substance**

2

3 <b>Chemical Names:</b>	<b>CAS Numbers:</b>
4 List all chemical names	List CAS numbers
5	
6 <b>Other Name:</b>	<b>Other Codes:</b>
7 List other names	List other codes
8	
9 <b>Trade Names:</b>	
10 List Trade Names	

12 **Summary of Petitioned Use**

13

14 For petitions to add or amend a substance, describe the petitioned use of the substance. For substances currently  
 15 on the National List, summarize the allowed uses under the USDA organic regulations.  
 16

17 **Characterization of Petitioned Substance**

18

19 **Composition of the Substance:**  
 20 Describe Composition of the Substance  
 21

22 **Source or Origin of the Substance:**  
 23 Briefly describe the source or origin of the substance (to be addressed in more detail below under  
 24 Evaluation Questions 2 and 3).  
 25

26 **Properties of the Substance:**  
 27 Describe Physical and Chemical Properties of the Substance  
 28

29 **Specific Uses of the Substance:**  
 30 Describe Specific Uses of the Substance - primary focus should be given to describing the petitioned use of  
 31 the substance; secondary focus should be given to providing general information on other uses of the  
 32 petitioned substance in agricultural crop or livestock production.  
 33

34 **Approved Legal Uses of the Substance:**  
 35 Describe the Status of the Petitioned Substance under applicable Federal Regulations (i.e., EPA, FDA,  
 36 USDA (including APHIS or FSIS), NIEHS, etc.)  
 37

38 **Action of the Substance:**  
 39 Describe the Mode Action of the Substance - focus should be given to describing the mode of action of the  
 40 substance, when used as petitioned.  
 41

42 **Combinations of the Substance:**  
 43 Describe Combinations of the Substance - focus should be given to describing whether the petitioned  
 44 substance is a precursor to, component of, or commonly used in combination with a substance(s) identified  
 45 on the National List.  
 46

47 In addition, information should be provided on whether any additional ingredients (e.g., inert ingredients,  
 48 stabilizers, preservatives, carriers, anti-caking agents, or other materials) are generally added to  
 49 commercially available forms of the petitioned substance.  
 50

**Status****Historic Use:**

Describe historic use of the substance in organic agricultural production (if no historic use in organic agricultural production, please describe historic use in conventional agricultural production).

**Organic Foods Production Act, USDA Final Rule:**

Describe whether the Petitioned Substance is Listed anywhere in the Organic Foods Production Act of 1990 (OFPA) or the USDA organic regulations, 7 CFR Part 205.

**International**

Describe the status of the substance among international organizations. Specifically, the report should address whether the petitioned substance is allowed or prohibited for use in other international organic standards such as:

**Canada -**

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

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

**CODEX Alimentarius Commission, Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods (GL 32-1999) -**

Note: For Codex, the reference should be cited as “guidelines,” rather than as “standards”.

**European Economic Community (EEC) Council Regulation, EC No. 834/2007 and 889/2008****Japan Agricultural Standard (JAS) for Organic Production –****IFOAM - Organics International****Evaluation Questions for Substances to be used in Organic Crop or Livestock Production****Classification of the substance**

**Evaluation Question #1: (A) Describe if the substance is extracted from naturally occurring plant, animal, or mineral sources. (B) Describe the most prevalent processes used to manufacture or formulate the petitioned substance. Include any chemical changes that may occur during manufacture or formulation of the substance. (C) Based on the manufacturing process description, discuss if the substance is classified as synthetic or a nonsynthetic. [7 U.S.C. §6502(21)]; NOP 5033-1. (D) Does the substance in its raw or formulated forms contain nanoparticles? (E) Is the substance created using Excluded Methods?**

**Data Required:**

- (A) If the substance is extracted from a natural material, information should be provided on any materials and methods used to extract, separate, isolate, or withdraw the substance, including any solvents used, acid-base extraction methods, or mechanical or physical separation methods. If the substance is created by a naturally occurring biological process, those process(es) must be described in detail.

For the purposes of this response, naturally occurring biological processes are processes that include but are not limited to, aerobic and anaerobic digestion, decomposition, fermentation, various metabolic processes, and photosynthesis.

- (B) The response must describe the processes used to manufacture or formulate the substance, including a discussion of all precursors and/or feedstocks. A description of alternate manufacturing methods and the extent of their commercial use which are not included in the petition, if any, should be presented. The response must also describe, in detail, any chemical changes effected on any naturally occurring precursor or feedstock by all manufacturing or formulation processes. If any synthetic materials used in the production or extraction of a substance remain in the final product, describe them.

For the purposes of this response, a chemical change involves a process (i.e., chemical reaction) whereby a substance is transformed into one or more other distinct substances. This may include the addition or deletion of one atom to the substance's molecular structure or other description of chemical modification.

Chemical processes include, but are not limited to: acid base reactions, calcification, thermal or catalytic cracking, esterification, hydrogenation, mixing of substances or elements, oxidation-reduction, polymerization, etc., obtained through process units such as compressors, cracking towers, heat exchangers, mixers, reactors, pumps, etc.

- (C) Based on the information provided on (A) and (B), the definition of synthetic at 7 U.S.C. § 6502 (22) and NOP Guidance 5033-1, describe if the substance can be classified as synthetic or as a nonsynthetic. Synthetic substances have been chemically modified from the source or origin or have been isolated from a natural source in a form that does not occur in nature.

- (D) **Nano Particles:** Does the substance in its raw or formulated forms contain nanoparticles? If so, are they engineered nanomaterials or incidental nanomaterials as defined by the NOSB and NOP? (Policy Memo 15-2)

- (E) **Excluded Methods:**

- i. Is the substance created using excluded methods? This includes but is not limited to the following list of techniques found to be "excluded methods" by the NOSB: Targeted genetic modification (TagMo), Synthetic gene technologies, Genome engineering, Gene editing, Gene targeting, Gene Silencing, Accelerated plant breeding techniques, Synthetic Biology, cloned animals and offspring, plastid transformation, cisgenesis, intragenesis, agro-infiltration, transposons developed using invitro nucleic acid techniques, induced mutagenesis developed through in vitro nucleic acid techniques, cell and protoplast fusion (NOP policy Memo 13-1).
- ii. If the substance is manufactured from agricultural raw materials, are those materials derived from genetically engineered crop, or crops resulting from excluded methods?

158                   iii. If the substance is manufactured from other biological raw materials – such as  
159                   those produced by fermentation or enzymatic action – are those biological  
160                   materials derived from genetically engineered organisms, or crops organisms  
161                   resulting from excluded methods?

162  
163  
164  
165 **Evaluation Question #2:** For substances classified as synthetic: Is the substance used in production, and  
166 **does it contain an active synthetic ingredient in the following categories:** [§6517(c)(1)(B)(i)]; copper and  
167 **sulfur compounds; toxins derived from bacteria; pheromones, soaps, horticultural oils, fish emulsions,**  
168 **treated seed, vitamins and minerals; livestock parasiticides and medicines and production aids**  
169 **including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment**  
170 **cleansers; or (ii) is used in production and contains synthetic inert ingredients that are not classified by**  
171 **the Administrator of the Environmental Protection Agency as inerts of toxicological concern?**

172  
173  
174 **Evaluation Question #3:** Describe any known chemical interactions between the petitioned substance  
175 **and other substances used in organic crop or livestock production or handling. (7 U.S.C. § 6518(m)(1)).**  
176

177 **Data Required:** The response to this request for development of technical information must describe any  
178 known chemical interactions between the petitioned substance and other substances allowed for use in  
179 organic production or handling as applicable. Describe any common combinations of materials used with  
180 the petitioned substance. Describe any substances resulting from these interactions.

181  
182 **Evaluation Question #4:** Discuss (A) the toxicity and mode of action of the substance; (B) the toxicity  
183 **and mode of action of its breakdown products or any contaminants; and (C) their persistence and areas**  
184 **of concentration in the environment (7 U.S.C. §6518(m)(2)).**

185 **Data Required:**

- 186  
187  
188       (A) Describe whether the petitioned substance has been reported to have toxic effects and if its mode of  
189       action can cause adverse health and/or environmental effects.  
190       (B) Describe whether the petitioned substance contaminants, or any of its breakdown products have  
191       been reported to have toxic effects and are capable of causing adverse health and/or  
192       environmental effects either present in the substance or arising from the degradation of the  
193       substance over time.  
194       (C) Describe whether and how the petitioned substance and/or the breakdown products are persistent  
195       or cumulative when used in organic crop or livestock production as petitioned.  
196

197 **Evaluation Question #5:** Discuss the probability of environmental contamination during manufacture,  
198 **use, misuse or disposal of the substance (7 U.S.C. §6518(m)(3)).**

199  
200 **Data Required:** The response must describe the occurrence and severity of environmental contamination  
201 during the manufacture, use, misuse, or disposal of the petitioned substance. Data or reports from U.S. or  
202 International universities, agencies, independent groups, or other news reports should be included in this  
203 response when available. This data may also be available through review of assessments performed per  
204 EPA, FDA, and/or NIEHS review.

205  
206  
207 **Evaluation Question #6:** Discuss the effects of the substance on biological and chemical interactions in  
208 **the agroecosystem. Include the physiological effects of the substance on soil, crops, livestock or other**  
209 **organisms (such as aquatic) that could be affected by the substance when used as petitioned. (7 U.S.C.**  
210 **§6518(m)(5))**

211 **Data Required:** The response must describe the substances (the petitioned substance and/or its  
212 byproducts in combination with naturally occurring substances over time) that are capable of affecting the  
213 agro-ecosystem.

214  
215 The response should describe whether and how the petitioned substance affects the survival and/ or  
216 function of soil organisms, such as, but not limited to earthworms, mites, grubs, bacteria, nematodes, algae,  
217 and protozoa by changing soil temperature, water availability, pH levels, nutrient availability, salt  
218 concentration, solubility or other parameter. For crops, the response should also describe whether and  
219 how the substance affects plant physiology by creating changes in plant pH, nutrient or water utilization,  
220 or other parameters when used as petitioned. For livestock production, the response should also describe  
221 whether and how the substance affects animal physiology by creating changes in behavior, fertility,  
222 metabolism or other parameters.

223  
224 In addition, the response should describe the potential or actual impacts of the substances upon  
225 endangered species, population, viability or reproduction of non-target organisms and the potential for  
226 measurable reductions in genetic, species or eco-system biodiversity, if possible.

227  
228  
229 **Evaluation Question #7:** Discuss and summarize findings on whether the use of the petitioned  
230 substance may be harmful to the environment (7 U.S.C. § 6517 (c) (1) (A) (i) and 7 U.S.C. § 6517 (c) (2) (A)  
231 (i)).

232  
233 **Data Required:** Considering the information described in questions #1-6 and any other relevant  
234 information, discuss if the petitioned substance and/ or its breakdown products can cause harmful effects  
235 on the environment. Describe the biological, chemical and physical factors that may be affected by the use  
236 of the substance and/ or its breakdown products.

### 237 238 239 Harm to Human Health

240 **Evaluation Question #8:** Describe and summarize any reported effects upon human health from use of  
241 the petitioned substance (7 U.S.C. § 6517 (c) (1) (A) (i), 7 U.S.C. § 6517 (c) (2) (A) (i) and 7 U.S.C. § 6518  
242 (m) (4)).

243  
244 **Data Required:** Drawing upon responses to above questions #1-7 and any other relevant information,  
245 describe the reported health effects that may be attributed to the petitioned substance and/or its  
246 breakdown products.

### 247 248 249 250 Necessity and Alternatives

251  
252 **Evaluation Question #9:** Describe all natural (non-synthetic) substances or products which may be used  
253 in place of a petitioned substance (7 U.S.C. § 6517 (c) (1) (A) (ii)). Provide a list of allowed substances  
254 that may be used in place of the petitioned substance (7 U.S.C. § 6518 (m) (6)).

255 **Data Required:** The response must describe the availability of non-synthetic or natural substance(s),  
256 including organic agricultural products, which could be substituted for petitioned substance. The  
257 examination should address:

- 258 • a comparison of the effect, form, function, quality, and quantity of the substitute non-synthetic or  
259 natural product with the petitioned substance;
- 260 • literature, including product or practice description, on performance and test data;
- 261 • name and address of the manufacturer(s), if applicable; and
- 262 • For livestock (and pet food) feed substances, information on technical barriers to production of  
263 organic agricultural products that may serve as alternatives.

264  
265

266 **Evaluation Question #10: Describe any alternative practices that would make the use of the petitioned**  
267 **substance unnecessary (7 U.S.C. § 6518 (m) (6)).**  
268

269 **Data Required:** The response to this request for development of technical information must describe the  
270 availability of specific alternative practices, such as cultural, biological, and mechanical controls, to the use  
271 of the petitioned substance.  
272

273 When assessing alternative practices, the report should address:

- 274 • Literature, including specific practice description, on performance and test data;
- 275 • A comparison of the function and effectiveness of the proposed alternative practice with the  
276 petitioned substance; and,
- 277 • Frequency or prevalence of use of alternatives, if known.  
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### Report Authorship

283  
284 The following individuals were involved in research, data collection, writing, editing, and/or final  
285 approval of this report:

- 286 • Name, Title, Organization
- 287 • Name, Title, Organization
- 288 • Name, Title, Organization  
289  
290

291 All individuals are in compliance with Federal Acquisition Regulations (FAR) Subpart 3.11 – Preventing  
292 Personal Conflicts of Interest for Contractor Employees Performing Acquisition Functions.  
293

### References