National Organic Standards Board
Crops Subcommittee
Petitioned Material Proposal
Ferric Phosphate (to Remove)

August 15, 2012

Introduction:
Ferric Phosphate has been petitioned to be removed from the National List 205.601(h). The reason given in the petition is that it cannot be used without EDTA, which according to the EPA can either be considered an active ingredient or an inert ingredient.

Background:
In 2007 the NOSB considered a petition for "Sodium Ferric Hydroxyl EDTA" aka "Ferric Sodium EDTA" and voted not to allow it, partly because of concern about the EDTA component. In 2008 and 2009 Steptoe & Johnson Law Firm submitted a petition to delist Ferric Phosphate. The main argument was that it does not work by itself and is always used with EDTA. The Technical Report (TR) requested in 2009 was received in June 2010. From 2009 to 2011 the Walter Talarek Law Firm submitted voluminous amounts of written comment in defense of keeping Ferric Phosphate listed. Much of the data submitted with this comment was not considered in the TR and needed to be reviewed objectively.

These two law firms represent competing product manufacturers and each is accusing the other of misrepresenting their data. Therefore the NOSB is having a big challenge in determining the truth among all the arguments. The Crops Subcommittee requested an unbiased review of a few specific and targeted questions of all available information, including the TR, the public comment from the last 2 years, and independent sources.

Relevant areas in the Rule:
The National List includes at:

§205.601(h)

As slug or snail bait. Ferric phosphate (CAS # 10045–86–0).

and

§205.601(m)(1)

(1) EPA List 4—Inerts of Minimal Concern.

Discussion:
The Supplemental TR (STR) received in July 2012 addressed the following questions and provided the following answers. At the request of the NOP, the USDA Agricultural Research Service (ARS) reviewed the STR; ARS citations follow below.

1. Is ferric phosphate alone an effective molluscicide? Can it be combined with other ingredients besides EDTA and still work, or are EDTA and related compounds the only ones that contribute to efficacy?
    - *STR 66-69: Effective bait formulations have been made by combining a metal with "an appropriate organic ligand" to form a metal chelate, [1] for example aluminum and iron chelates (Henderson and Triebskorn, 2002). The compound EDTA is one example of a chelating agent, and it appears that all of the ferric phosphate slug and snail baits currently marketed in the U.S. contain EDTA in their formulations.*

- *STR 182-187: Based on the available studies (summarized in Table 1), there is not enough evidence to definitively conclude that ferric phosphate alone is an effective molluscicide when incorporated into ingestible baits. The limited evidence does support the conclusion that iron baits that contain a chelating agent such as EDTA are typically more effective at killing snails and slugs than iron baits that lack a chelating agent (Henderson et al., 1989; Zheng et al., 2008; Whaley, 2007). However, the Whaley (2007) study demonstrated that ferric phosphate alone can have at least some molluscicidal activity against slugs.*
- *STR 192-194: Besides EDTA, at least one other chelating agent has been used in combination with ferric phosphate in order to increase its efficacy as a molluscicide. That compound is (S,S)-ethylenediaminedisuccinic acid (EDDS), a structural isomer of EDTA that is biodegradable (Tandy et al., 2006).*
- *ARS pg. 1: The report…presents convincing evidence that ferric phosphate is toxic to slugs, but that it requires a chelating agent as a synergist in order to make it an effective product. Other types of aminopolycarboxylic acid chelating agents are available and EDDS, at least, is also an effective synergist.*

2. Are there reasons for concern about EDTA beyond what information goes into a tolerance exemption, such as effects on soil organisms or contamination in groundwater?
    - *STR 273-275: there is not enough evidence to definitively conclude whether ferric phosphate molluscicides containing EDTA are toxic to earthworms following typical rates of application.*
    - *STR 282-283: No information was found linking the specific use of EDTA in pesticide formulations to groundwater pollution.*
    - *ARS pg. 2: The Technical Review might have gone into more detail on potential environmental challenges posed by EDTA and compared it to other aminopolycarboxylic acid chelating agents. On the one hand, industrial use of EDTA has resulted in detectable residues in oceans and surface water, without apparent harm. On the other hand, such wide distribution and concentration within sediments could have unforeseen effects on particular ecosystems.*

3. Does the EDTA as used with ferric phosphate pose the same concerns as the EDTA that was reviewed as part of the Sodium Ferric Hydroxyl EDTA?
    - *STR 295-296: The EDTA used with ferric phosphate poses the same concerns that were raised for EDTA as part of the review of sodium ferric hydroxyl EDTA*
    - *ARS pg. 2: The Technical Review makes the case that EDTA poses the same concerns whether used with ferric phosphate or as sodium ferric hydroxyl EDTA. Given the dynamic nature of the status of a chelated molecule of EDTA, the Technical Review's conclusion seems reasonable.*

4. Are there any unbiased studies that back up the findings of Edwards et al. (2009) as cited in the TR or with contrasting results? Does the Edwards et al. (2009) study seem biased?
    - *STR 318-319: There are three available studies that evaluate the potential toxicity of ferric phosphate molluscicides containing EDTA to earthworms: Edwards et al., 2009 (sponsored by Lonza Ltd.); Langan and Shaw, 2006 (not sponsored by Lonza Ltd., however the authors were assisted by two Lonza employees); Luhrs, 2009 (sponsored by Neudorff).*
    - *STR 411-413: Based on the available studies (summarized in Table 2), there is not enough evidence to definitively conclude whether ferric phosphate molluscicides*

containing EDTA are toxic to earthworms following typical rates of application. All of the studies have strengths and limitations.

- *ARS pg. 2: Although the Technical Review concludes that there is not enough information to conclude with certainty that ferric phosphate slug-control products are harmful to earthworms, the study by Langan and Shaw (2006) certainly seems to be independently gathered data showing that under some conditions and for some earthworm species, Sluggo-type products can be harmful. Accepting this conclusion would indicate that the Edwards study is not likely to be biased.*

STR and ARS responses have been incorporated into the Checklist. Despite the information presented in the STR, the Crops Subcommittee recommends to vote down the petition to remove Ferric Phosphate from the National List. The generic active ingredient, Ferric Phosphate, needs to be considered separately from any other ingredients, either active or inert.

The inerts in the formulated Ferric Phosphate product are allowed under section 205.601(m)(1). Because of this, the generic ferric phosphate substance should remain on the National List. The NOSB-NOP-EPA Working Group on Inerts (IWG) will address the topic of inerts in pesticide products.

Minority View

The supplemental information received by the Crops Subcommittee concludes that it is actually the combination of at least two ingredients, ferric phosphate and EDTA, that establishes the efficacy of the registered product currently allowed under the ferric phosphate listing: § 205.601 Synthetic substances allowed for use in organic crop production, (h) As slug or snail bait. Ferric phosphate (CAS # 10045–86–0).

ARS pg. 1, as cited above, states, “[The TR] presents convincing evidence that ferric phosphate is toxic to slugs, but that it requires a chelating agent as a synergist in order to make it an effective product.” The STR, line 82, states,

> “[I]n a letter to the NOSB, the technical director for OMRI comments, “Based on the evidence compliled by OMRI, ferric phosphate as currently listed at 205.601(h) is not effective as an active ingredient without an additional chelating agent, such as EDTA,” and, “chelating agents such as EDTA facilitate the absorption of the metal into the body.” (OMRI, 2010)”

STR, line 90, states, “Puritch et al. (1995) claimed that an effective mollusc bait would be composed of both a simple iron compound and a second component, such as edetic acid (EDTA), hydroxyehyl derivative of edetic acid, or a salt of these acids. It also stated that individually neither component is toxic to terrestrial molluscs, but the composition becomes toxic once it is ingested. Therefore, this patent suggests that a chelating agent such as EDTA is necessary for ferric phosphate to be an effective molluscicide.”

In the lexicon of pesticide law, a material that is incorporated into a pesticide for the purpose of killing the target pest, and therefore necessary to kill, or elevate its efficacy in killing the target pesticide, is considered an active ingredient in that product. Therefore, EDTA must be evaluated an active component of the mixture of chemicals in the current slug or snail bait allowed under section 205.601(h).While ferric phosphate or similar iron salts may express toxic

properties, as identified in several studies, STR, line 117, indicates that, “It [Henderson et al., 1989] was reported that the baits containing the chelated compound killed a greater proportion of the slugs than the baits with the simple, iron salt, but quantitative results and tests of statistical significance were not provided.” Other studies do show less efficacy associated with pure iron phosphate baits when compared to the chelated baits.

The minority view holds that the use of EDTA is integral to killing the slug and snail as the target organism with the level of efficacy to be of value in the field. Therefore, the petitioner is correct that EDTA is an active ingredient in the materials allowed under section 205.601(h) since under this provision “ferric phosphate” is not sold for slug or snail bait without EDTA for its active properties and therefore must be evaluated in reaching a determination on its acceptability for listing on the National List.

The ARS review, pg 2, and the STR, line 295, find that, “The EDTA used with ferric phosphate poses the same concerns that were raised for EDTA as part of the review of sodium ferric hydroxyl EDTA.”

> STR, line 298 states, “The NOSB Crops Committee voted to reject sodium ferric hydroxyl EDTA (SFH EDTA) for use as a slug and snail bait in 2007 (NOSB Crops Committee, 2007). The reasons cited for rejection were that ferric phosphate is already listed for that use, concerns about potential harm to humans and the environment, and inconsistency with organic farming and handling. The Crops Committee concluded that EDTA clearly has the potential to be harmful to the environment and can result in the detrimental movement of metals in soils and river sediments. Furthermore, the Crops Committee was concerned about EDTA’s slow rate of biodegradation and its persistence in the environment. The EU Commission risk assessment on EDTA (EC, 2004) was cited as the reference for this conclusion. The potential harmful effects of EDTA on human health were also a concern to the Crops Committee. In particular, the Committee concluded that “EDTA is a very strong metal chelating agent, especially for calcium. It is poorly absorbed in mammalian GI tract and concerns have been raised that excessive usage in food could deplete the body of Ca and other minerals” (NOSB Crops Committee, 2007).”

The minority view associated with these facts supports the claims of the petitioner.

Evaluation Criteria

(Applicability noted for each category; Documentation attached)	**Criteria Satisfied? (see “B” below)**		
1. Impact on Humans and Environment	☒ Yes	☐ No	☐ N/A
2. Essential & Availability Criteria	☒ Yes	☐ No	☐ N/A
3. Compatibility & Consistency	☒ Yes	☐ No	☐ N/A
4. Commercial Supply is Fragile or Potentially Unavailable as Organic (only for § 205.606)	☐ Yes	☐ No	☒ N/A

Substance Fails Criteria Category: [ ] **Comments:**

Proposed Annotation (if any): N/A

Basis for annotation: ☐ To meet criteria above ☐ Other regulatory criteria ☐ Citation
Notes:

Recommended Subcommittee Action & Vote, including classification recommendation (state actual motion): Motion to remove Ferric Phosphate from section 205.601(h)

Classification Motion: N/A

Listing Motion: Motion to remove Ferric Phosphate from section 205.601(h)

Motion by: Carmela Beck Seconded by: Jay Feldman
Yes__**3**___ No__**5**__ Abstain__**0**__ Recuse__**0**__ Absent__**0**_

Crops	☒	**Agricultural**	☐	**Allowed**[1]	☐
Livestock	☐	**Non-synthetic**	☐	**Prohibited**[2]	☐
Handling	☐	**Synthetic**	☒	**Rejected**[3]	☒
No restriction	☐	**Commercial unavailable as organic**	☐	**Deferred**[4]	☐

[1]Substance voted to be added as "allowed" on National List to § 205. 601(h) with Annotation (if any):

[2]Substance to be added as "prohibited" on National List to § 205 with Annotation (if any):

Describe why a prohibited substance:

[3]Substance was rejected by vote for amending National List to § 205. Describe why material was rejected:

[4]Substance was recommended to be deferred because:

If follow-up needed, who will follow up:

Approved by Subcommittee Chair to Transmit to NOSB

Jay Feldman, Subcommittee Chair August 15, 2012

NOSB Evaluation Criteria for Substances Added To the National List

Category 1. Adverse impacts on humans or the environment? Substance: Ferric Phosphate

Question	Yes	No	N/A[1]	Documentation (TAP; petition; regulatory agency; other) [1],[2]
1. Are there adverse effects on environment from manufacture, use, or disposal?			X	

[1] Unidentified line numbers refer to the Ferric Phosphate TR, June 15, 2010.
[2] STR labeled line numbers refer to the Supplemental Ferric Phosphate TR, July 26, 2012.

[§205.600 b.2]				
2. Is there environmental contamination during manufacture, use, misuse, or disposal? [§6518 m.3]		X		The only by-products of this process are sodium sulfate and water. Sodium sulfate is precipitated with lime and used as a secondary raw material. The water is released into a wastewater clarification plant (260-261). No information was found linking the specific use of EDTA in pesticide formulations to groundwater pollution (STR 282-283). While reported as occurring naturally in soil, ferric phosphate, if combined with chelating agents such as EDTA or EDDS may cause the accumulation of larger concentrations of iron than would be expected under normal conditions (303-305). On the one hand, industrial use of EDTA has resulted in detectable residues in oceans and surface water, without apparent harm. On the other hand, such wide distribution and concentration within sediments could have unforeseen effects on particular ecosystems (ARS, pg. 2).[3] [Minority view addition: Sodium cyanide and formaldehyde are used in making EDTA.[4]]
3. Is the substance harmful to the environment and biodiversity? [§6517c(1)(A)(i);6517(c)(2)(A)i]		X		Another important issue is the level of mammalian toxicity of iron phosphate-based molluscicides containing EDTA or other chelating agents, especially since if chelating agents increased the uptake of iron from soils into crops they may be fed upon by humans (342-345). The EPA (1998) states: A number of ecological effects toxicology data requirements were waived based on the known lack of toxicity of iron phosphate to birds, fish and non-target insects, its low solubility in water, conversion to less soluble form in the environment (soil), and its use pattern (soil application). (424-426). Submitted studies involving ground beetles, rove beetles and earthworms demonstrated that the product will not affect these organisms at up to two times the maximum application rate (430-432). If NOP's consultant who wrote Report had had access to Neudorff's Opinion, he would have seen that Edwards et al (2009) serves to demonstrate the harmlessness of NEU1165M Slug & Snail Bait to earthworms when it is applied at the recommended application rate (Talarek, 7)[5]. This section also states that assuming the reports of mammalian toxicity are accurate, that would demonstrate the potential for some level of persistence on the food chain. This is a non-sequitur. If one

[3] USDA Agricultural Research Service (ARS) review of the STR, June, 26, 2012.
[4] http://en.wikipedia.org/wiki/Ethylenediaminetetraacetic_acid
[5] Law Offices of Walter G. Talarek, P.C. letter to the NOP, October 7, 2011.[6] Unidentified line numbers refer to Ferric Phosphate TR, June 15, 2010.

				reads the reports of adverse incidents reported to EPA, one sees that most incidents involve minor acute effects that immediately follow oral exposure of dogs to the product; the incidents do not occur one month, two months, or a year after exposures. The environmental impact of ferric phosphate slug & snail baits is clear – there is none (Talarek, 7). [Minority view discussion: Combination toxic to earthworms, perhaps more. (409-417)[6]TR discusses Edwards et al (2009) conclusions, "Clearly, molluscicides containing iron phosphate and EDTA or EDDS chelating agents may present significant environmental hazards to earthworms, domestic animals and humans and these issues need further investigation. The registration statuses of these chemicals in USA and Europe should be reviewed in light of these new data and conclusions "(Edwards, et al. 2009). The TR says "This also illustrates a mode by which ferric phosphate could be introduced into the food chain." (347-351) Although the Technical Review concludes that there is not enough information to conclude with certainty that ferric phosphate slug-control products are harmful to earthworms, the study by Langan and Shaw (2006) certainly seems to be independently gathered data showing that under some conditions and for some earthworm species, Sluggo-type products can be harmful. Accepting this conclusion would indicate that the Edwards study is not likely to be biased. (ARS)]
4. Does the substance contain List 1, 2 or 3 inerts? [§6517 c (1)(B)(ii); 205.601(m)2]		X		
5. Is there potential for detrimental chemical interaction with other materials used? [§6518 m.1]		X		During the formulation process, there are no chemical reactions which form ferric EDTA or ferric phosphate EDTA as an active ingredient (Talarek, 5). [Minority view discussion: EDTA can result in the detrimental movement of metals in soils and river sediments (EU Commission Risk Assessment on EDTA)]
6. Are there adverse biological and chemical interactions in agro-ecosystem? [§6518 m.5]		X		[Minority view discussion: Grčman et al. (2003) found that addition of 10 mmol EDTA/kg soil (2920 mg/kg) decreased the structure of the fungal community in heavy metal polluted soil compared to a control treatment on days 1 and 56 after application. Results of a different trial showed that EDTA caused stress to soil microorganisms, as indicated by a significant increase in the *trans* to *cis* phospholipid fatty acid ratio (Grčman et al., 2003). Epelde et al. (2008) studied the effects of

[6] Unidentified line numbers refer to Ferric Phosphate TR, June 15, 2010.

				EDTA (1000 mg/kg soil) on soil enzyme activities, potentially mineralizable nitrogen, soil basal microbial respiration, and substrate induced respiration (a measure of potentially active microbial biomass). In control non-polluted soils, EDTA caused a significantly negative effect on the soil microbial community activity (evidenced by a decrease in dehydrogenase activity and basal respiration). Examples of phytotoxicity observed in studies following the addition of EDTA to soil (1000-2920 mg EDTA/kg soil) include necrotic lesions on cabbage leaves/lowered yield of cabbage biomass, decrease of corn growth to 60% of control, signs of chlorosis and necrosis in white bean, and decreased biomass of cardoon plants (Grčman et al., 2003; Evangelou et al., 2007; Epelde et al., 2008). The studies demonstrating toxic effects of EDTA on soil microorganisms and plants involved EDTA soil concentrations that are much greater than the EDTA soil concentration expected from the use ferric phosphate baits, but it is not known if toxic effects on soil microorganisms and plants would occur from the use of slug and snail baits containing EDTA because no studies were found that tested relevant concentrations of EDTA in soil. (STR 237-269) Also, EDTA is not degraded rapidly in the environment and is the most abundant anthropogenic chemical in some European surface waters (SFHEDTA checklist[7])]
7. Are there detrimental physiological effects on soil organisms, crops, or livestock? [§6518 m.5]		X		The EPA (2008) reported 5 domestic animal deaths, 8 major domestic animal incidents and 106 moderate and minor domestic animal incidents from the sue of iron phosphate slug and snail baits marketed in the USA up to May 7, 2008 (322-324). While this may be true, it is important to note that when the incident reports are reviewed carefully, in most cases, and in particular with regard to the reports of domestic animal deaths and major animal incidents, there are speculative exposures to the products, animals had preexisting conditions which were more likely to have caused the effects or there were exposures but the effects could not have been caused by the products; however, Neudorff felt that it was obligated under the law to report all incidents no matter how remote the exposure an effect relationship (Talarek, 5). EPA's August 13, 1997, Decision Memorandum on "Consideration of Registration of an end-use

[7] SFHEDTA Checklist is the checklist produced by the Crops Committee for Sodium Ferric Hydroxyl EDTA November 2007.

				product (NEU1165M Slug & Snail Bait, EPA File Symbol 67702-G)…does not indicate that there is a significant hazard to humans or domestic animals (Talarek, 6). EPA has issued tolerance exemptions for ferric phosphate & all the inert ingredients in Neudorff's slug & snail baits, thus indicating that these chemicals are safe to humans if used according to good agricultural practice (Talarek, 6). Neudorff's opinion contains documentation demonstrating that ferric phosphate slug & snail baits are not harmful to earthworms & other non-target organisms (Talarek, 6). Based on the available studies, there is not enough evidence to definitively conclude whether ferric phosphate molluscicides containing EDTA are toxic to earthworms following typical rates of application (STR 411-413). [Minority view discussion: "Clearly, molluscicides containing iron phosphate and EDTA or EDDS chelating agents may present significant environmental hazards to earthworms, domestic animals and humans and these issues need further investigation. The registration statuses of these chemicals in USA and Europe should be reviewed in light of these new data and conclusions "(Edwards, et al. 2009). (348-351)] Although the Technical Review concludes that there is not enough information to conclude with certainty that ferric phosphate slug-control products are harmful to earthworms, the study by Langan and Shaw (2006) certainly seems to be independently gathered data showing that under some conditions and for some earthworm species, Sluggo-type products can be harmful. Accepting this conclusion would indicate that the Edwards study is not likely to be biased. (ARS)]
8. Is there a toxic or other adverse action of the material or its breakdown products? [§6518 m.2]		X		The EPA describes ferric phosphate as ubiquitous in nature. It is a solid. It is not volatile and does not readily dissolve in water, which minimizes its dispersal beyond where it is applied (291-292). [Minority view:See above, 6 and 7.]
9. Is there undesirable persistence or concentration of the material or breakdown products in environment? [§6518 m.2]		X		Examples of the solubilization of phosphate from ferric phosphate by soil microorganisms such as *Penicillium radicum* & others, are common in literature. It is also reported to occur naturally in the soil as fertilizer (278-280). [Minority view discussion: Assuming the reports of mammalian toxicity are accurate, that would demonstrate the potential for some level of persistence in the food chain. (414-415)). EDTA is not degraded rapidly in the environment and is the most abundant anthropogenic chemical in some European surface waters (SFHEDTA checklist.)]

10. Are there any harmful effects on human health? [§6517 c (1)(A)(i); 6517 c(2)(A)i; §6518 m.4]		X		No unreasonable adverse effects to human health are expected from the use of iron phosphate (467). One might presume that only the reports of mammalian toxicity cited in question 9 are likely to be of potential concern. (503-504); Neudorff states that there are no reports of mammalian toxicity cited in the discussion of Evaluation Question #9. There is only the statement "[a]ssuming the reports of mammalian toxicity are accurate, that would demonstrate the potential for some level of persistence in the food chain". Not only does the discussion under Question #9 not list or discuss any such reports, but the one sentence in the section mentioning reports of mammalian toxicity is a non-sequitur (Talarek, 8).
11. Is there an adverse effect on human health as defined by applicable Federal regulations? [205.600 b.3]			X	
12. Is the substance GRAS when used according to FDA's good manufacturing practices? [§205.600 b.5]			X	
13. Does the substance contain residues of heavy metals or other contaminants in excess of FDA tolerances? [§205.600 b.5]			X	

[1]If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not applicable.

NOSB Evaluation Criteria for Substances Added To the National List

Category 2. Is the Substance Essential for Organic Production? Substance: Ferric Phosphate

Question	Yes	No	N/A[1]	Documentation (TAP; petition; regulatory agency; other)
1. Is the substance formulated or manufactured by a chemical process? [6502 (21)]	X			
2. Is the substance formulated or manufactured by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral, sources? [6502 (21)]	X			
3. Is the substance created by naturally occurring biological processes? [6502 (21)]		X		
4. Is there a natural source of the substance? [§205.600 b.1]	X			Ferric phosphate occurs in nature but the natural source is not able to be commercially produced [Minority view discussion: It is not effective for mollusc control without EDTA. (ARS)]
5. Is there an organic substitute? [§205.600 b.1]		X		
6. Is the substance essential for handling of organically produced agricultural products? [§205.600 b.6]			X	
7. Is there a wholly natural substitute product? [§6517 c (1)(A)(ii)]	X			Examples have been reported in various semi-professional literature, albeit they are intended for home and garden use rather than agricultural purposes (513-519). The "All Natural Snail & Slug Spray RTU"…is not registered with EPA…this RTU product is intended for home & garden use, which means it might be impractical for agricultural use (Talarak, 8).
8. Is the substance used in handling, not synthetic, but not organically produced? [§6517 c (1)(B)(iii)]			X	
9. Are there any alternative substances? [§6518 m.6]		X		Many of the "natural" remedies or deterrents for slugs and snails are abundant in the semi-professional literature, such as home and gardening publications and blog sites on the internet (529-537). Copper tape, diatomaceous earth.[8]The discussion lists spot treating with ammonia solutions, spraying with salt solutions, direct removal of slugs & snails observed & placement into containers of soap, water alcohol or other harsh solution to kill them, & predators, such as birds, mammal & toads. However, none of these methods are practicable for commercial agriculture (Talarek, 8).
10. Is there another practice that would make the substance unnecessary? [§6518 m.6]		X		One last important point to mention is that no organic growers have supported Steptoe & Johnson's petition, and organic growers have

[8] Petition for sodium ferric hydroxyl EDTA, p. 20

				supported the continued listing of ferric phosphate (Talarek, 8). [Minority view discussion: The direct removal of any slugs or snails observed and placement into a container of soap [type not specified] and water, alcohol, or other harsh solution to kill them. Birds, small mammals, and especially toads, have been said to be predators on slugs and snails, but are obviously not readily controllable. (532-535) Cultivation.[9]]

[1]If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not applicable.

[9] Petition for sodium ferric hydroxyl EDTA, p. 21

NOSB Evaluation Criteria for Substances Added To the National List

Category 3. Is the substance compatible with organic production practices? Substance: Ferric Phosphate

Question	Yes	No	N/A[1]	Documentation (TAP; petition; regulatory agency; other)
1. Is the substance compatible with organic handling? [§205.600 b.2]			X	
2. Is the substance consistent with organic farming and handling? [§6517 c (1)(A)(iii); 6517 c (2)(A)(ii)]	X			Ferric Phosphate is the only effective molluscicide available to organic growers. [Minority view discussion: It's a synthetic material that does not present a compelling need for it as well as the toxic substances necessary for its manufacture.]
3. Is the substance compatible with a system of sustainable agriculture? [§6518 m.7]	X			Following typical rates of application, ferric phosphate + chelator baits do not harm earthworms. No information was found linking the specific use of EDTA in pesticide formulations to groundwater pollution (273-283). [Minority view discussion: EDTA is inert under some circumstances and can build up in soil. It is the most abundant anthropomorphic chemical in some European surface waters. It can enhance the movement of metals in soil and river sediments.(EU commission risk assessment on EDTA)]
4. Is the nutritional quality of the food maintained with the substance? [§205.600 b.3]			X	
5. Is the primary use as a preservative? [§205.600 b.4]			X	
6. Is the primary use to recreate or improve flavors, colors, textures, or nutritive values lost in processing (except when required by law, e.g., vitamin D in milk)? [205.600 b.4]			X	
7. Is the substance used in production, and does it contain an active synthetic ingredient in the following categories: a. copper and sulfur compounds;		X		
b. toxins derived from bacteria;		X		
c. pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals?	X			Ferric phosphate is a mineral. [Minority view discussion: Ferric phosphate plus EDTA does not fit into any category.]
d. livestock parasiticides and medicines?		X		
e. production aids including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleaners?		X		

[1] If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not applicable.

NOSB Evaluation Criteria for Substances Added To the National List

Category 4. Is the commercial supply of an agricultural substance as organic, fragile or potentially unavailable? [§6610, 6518, 6519, 205.2, 205.105 (d), 205.600 (c) 205.2, 205.105 (d), 205.600 (c)] **Substance: Name**

Question	Yes	No	N/A[1]	Documentation (TAP; petition; regulatory agency; other)
1. Is the comparative description provided as to why the non-organic form of the material /substance is necessary for use in organic handling?			X	
2. Does the current and historical industry information, research, or evidence provided explain how or why the material /substance cannot be obtained organically in the appropriate **form** to fulfill an essential function in a system of organic handling?			X	
3. Does the current and historical industry information, research, or evidence provided explain how or why the material /substance cannot be obtained organically in the appropriate **quality** to fulfill an essential function in a system of organic handling?			X	
4. Does the current and historical industry information, research, or evidence provided explain how or why the material /substance cannot be obtained organically in the appropriate **quantity** to fulfill an essential function in a system of organic handling?			X	
5. Does the industry information provided on material / substance non-availability as organic, include (but not limited to) the following: a. Regions of production (including factors such as climate and number of regions);			X	
b. Number of suppliers and amount produced;			X	
c. Current and historical supplies related to weather events such as hurricanes, floods, and droughts that may temporarily halt production or destroy crops or supplies;			X	
d. Trade-related issues such as evidence of hoarding, war, trade barriers, or civil unrest that may temporarily restrict supplies; or			X	
e. Are there other issues which may present a challenge to a consistent supply?			X	

[1]If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not applicable.