

**National Organic Standards Board
Crops Subcommittee
Petitioned Material Proposal
Ammonium Citrate
September 6, 2016**

Summary of [Petition](#):

Alpha Chelates has petitioned for the inclusion of Ammonium citrate on the National List at §205.601 (synthetic substances allowed for use in organic crop production). Ammonium citrate is used as a chelating agent. Ammonium glycinate was petitioned at the same time for an equivalent use and will be addressed in a separate proposal.

Ammonium citrate, or citrate ammonium salt, is an amino acid. As an organic chemistry salt, it is reacted with trace metal salts of copper, iron, manganese, or zinc to form a chelate. The petitioner manufactures liquid micronutrient chelates using ammonium citrate as the chelating agent. Chelates are used to provide micronutrients that are readily available to plants in deficient soils.

Ammonium citrate is manufactured through a reaction of ammonium hydroxide and citric acid. The petition argues that approval of ammonium hydroxide is understood in the listing of ammonium carbonate in §205.601(e)(1) since it is a salt of ammonium hydroxide and carbonic acid (ammonium carbonate is listed for use “in insect traps only, no direct contact with crop or soil”). Further, the petitioner claims that since lignin sulfonate is listed as a chelating agent in §205.601(j)(4) and because OMRI approves the use of ammonium lignosulfonate, ammonium citrate should be allowed.

The petition states that chelated trace minerals are necessary in high pH soils because the simple metal micronutrient salts allowed in §205.601(j)(6)(ii) otherwise need to be applied at four to five times the rate of plant up-take because unchelated micronutrients precipitate quickly when they come into contact with soils high in pH. Additionally, the petitioner claims that although nonsynthetic chelating agents can be produced, they are incompatible with the manufacturing of chelates as a result of unpredictable variations in species and composition.

In addition to the information on ammonium citrate, the petition puts forth a case that the use of the term “chelating agent” in the regulations needs to be revisited. The petitioner contends that both the cation and anion of a salt approved for use as a chelating agent should be on National List. The petitioner requests that the NOP define which bases can be used to neutralize acids used to synthesize chelating agents. However, these claims and request are beyond the purview of this Subcommittee whose role in this case is the review of substances petitioned for inclusion on the National List.

Summary of Review:

Upon review of the petition, the Subcommittee determined that there was insufficient information in the justification statement regarding the necessity of the material for organic crop production. The Subcommittee sent a request to the petitioner, asking why the petitioned materials would be better than the nonsynthetic and/or synthetic chelating agents that are already allowed. The petitioner submitted an [addendum](#) but still did not completely address the question of alternatives. The addendum claims that there are no nonsynthetic substances, nor any substances already on the National List, that could be used in place of ammonium citrate. The petitioner subsequently volunteered a [second addendum](#).

Despite the submission of the second addendum, the petitioner did not make a convincing case that the permitted products already on the market are inadequate to meet farmers' needs. The petitioner does not provide evidence that chelates made with synthetic citrate are needed to replace lignin sulfonate and nonsynthetic chelating agents such as fulvic acids, humic acids, and nonsynthetic citrate currently in use by organic growers.

The Subcommittee did not request a technical review after determining that the petitioned material was not necessary for organic production.

The Subcommittee has concluded that the petitioned substance does not meet the OFPA criteria and therefore should not be added to the National List.

Category 1: Classification

1. For CROP use: Is the substance Non-synthetic or synthetic? This substance is synthetic. Is the substance formulated or manufactured by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources? [OFPA §6502(21)] If so, describe, using NOP 5033-1 as a guide.

No

2. Reference to appropriate OFPA category:
Is the substance used in production, and does it contain an active synthetic ingredient in the following categories: [§6517(c)(1)(B)(i)]; copper and sulfur compounds; toxins derived from bacteria; pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals; livestock parasiticides and medicines and production aids including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleansers; or (ii) is used in production and contains synthetic inert ingredients that are not classified by the Administrator of the Environmental Protection Agency as inerts of toxicological concern?

No

Category 2: Adverse Impacts

1. What is the potential for the substance to have detrimental chemical interactions with other materials used in organic farming systems? [§6518(m)(1)]

Chelates occur in nature and are used at low rates in organic farming, so there should be no detrimental chemical interactions with other materials used in organic farming systems.

2. What is the toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment? [§6518(m)(2)]

Ammonium hydroxide and citric acid are introduced in a reaction vessel to produce ammonium citrate, a salt. The amino acid citric acid is neutralized by the alkali ammonium hydroxide. Ammonium citrate is reacted in a solution with copper, iron, manganese, or zinc salt to form a

liquid chelate of the given metal. Chelates are applied in low dosages; application rates for the chelates manufactured by the petitioner are 1.2-2.5 kg/ha.

3. Describe the probability of environmental contamination during manufacture, use, misuse or disposal of such substance? [§6518(m)(3)]

The petition states that there is minimal chance of environmental or human contamination during the manufacturing process as the reaction takes place inside a sealed vessel. As stated above, the petitioned substance is an ingredient in a finished product and is converted into a metal salt chelate and is therefore not subject to questions of disposal. However, ammonium hydroxide is used in the manufacture of the substance, and ammonium hydroxide is produced by the reaction of ammonia with water. Ammonia can be harmful to human health and aquatic life if spilled or improperly handled.

4. Discuss the effect of the substance on human health. [§6517(c)(1)(A)(i); §6517(c)(2)(A)(i); §6518(m)(4)].

The petition states that “in the unlikely event of contact of reaction vessel contents with human skin, there is a very low level of hazard as the substance is at a low concentration, is not toxic, and can be easily washed off with water”.

5. Discuss any effects the substance may have on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock. [§6518(m)(5)]

The Subcommittee is not aware of negative effects of the petitioned material on biological and chemical interactions in the agroecosystem.

6. Are there any adverse impacts on biodiversity? (§205.200)

None known.

Category 3: Alternatives/Compatibility

1. Are there alternatives to using the substance? Evaluate alternative practices as well as nonsynthetic and synthetic available materials. [§6518(m)(6)]

Alternatives to the petitioned substance exist and are currently in use, including lignin sulfonate, humic acids, fulvic acids, and nonsynthetic citrate.

2. In balancing the responses to the criteria above, is the substance compatible with a system of sustainable agriculture? [§6518(m)(7)]

Chelates occur naturally in soils, so chelates, *per se*, are not incompatible with a system of sustainable agriculture. However, overreliance on synthetic materials is not compatible with a system of sustainable agriculture. The subcommittee has determined that there are insufficient grounds for adding this substance to the National List as there are natural alternatives and one allowed synthetic already available.

Classification Motion:

Motion to classify Ammonium Citrate as synthetic
Motion by: Emily Oakley
Seconded by: Francis Thicke
Yes: 7 No: 0 Abstain: 0 Absent: 0 Recuse: 0

National List Motion:

Motion to add Ammonium Citrate as petitioned at §205.601
Motion by: Emily Oakley
Seconded by: Francis Thicke
Yes: 0 No: 7 Abstain: 0 Absent: 0 Recuse: 0