

**National Organic Standards Board  
Livestock Subcommittee  
Petitioned Material Proposal  
Hypochlorous Acid  
August 15, 2017**

**Summary of Petition for [Hypochlorous Acid](#):**

Hypochlorous acid has been petitioned as a synthetic substance for addition to the National List at §205.603, as a topical treatment for pinkeye and wounds in livestock.

Hypochlorous acid was previously petitioned for use as a sanitizer in crop production, in livestock production, and in handling. In April 2016, the NOSB recommended adding hypochlorous acid to the National List at § 205.601(a) As algicide, disinfectants, and sanitizer, including irrigation system cleaning systems; at § 205.603(a)(7) Chlorine materials—disinfecting and sanitizing facilities and equipment; and at §205.605(b) Chlorine materials—disinfecting and sanitizing food contact surfaces.

The NOSB favored adding hypochlorous acid to the National List as a sanitizer because the technical review indicated that although hypochlorous acid is chlorine-based, it is used at a lower concentration and is safer for health and the environment than the other chlorine-based sanitizers already on the National List: namely, chlorine dioxide, sodium hypochlorite, and calcium hypochlorite.

**Summary of Review:**

The petition to add hypochlorous acid to the National List as a topical treatment for pinkeye and wounds in livestock entails different considerations than when hypochlorous acid was under review as a sanitizer. Livestock producers already have a number of natural (nonsynthetic) materials available for treatment of pinkeye and wounds.

The July 12, 2017, technical report (TR) of hypochlorous acid for use as a topical treatment for pinkeye and wounds in livestock mentions many nonsynthetic materials in use for pinkeye and wounds in livestock: calendula, chamomile, garlic, aloe vera, seabuckthorn, kiwi fruit, chickory, St. John's wort, olive, white poplar, rose, elder, navalwort, mullein, veronica, physic nut, bacterial predators, black kelp alginates, honey, sugar, pineapple fruit enzymes, omentum, chitosan, platelet gel, pink trumpet tree, Brazilian pepper tree, siam weed, echinacea, cochlearia, goldenseal, eyebright, essential oils, breast milk, and cod liver oil.

Personal communications with organic dairy farmers by the LS member leading the review of this material indicate that many use a commercially available formulation of the nonsynthetic materials aloe, garlic, calendula, and chamomile, and find that it works well on wounds and as an eyewash for pinkeye.

In light of the many nonsynthetic materials available and in use by organic livestock producers for wounds and pinkeye, the Livestock Subcommittee does not think it necessary to add a chlorine-based synthetic material to the National List for the same use.

**Category 1: Classification**

1. Substance is for: **Livestock**
  
2. For HANDLING and LIVESTOCK use:

- a. Is the substance \_\_\_\_\_ **Agricultural** or \_\_\_x\_\_\_ **Non-Agricultural**?  
Describe reasoning for this decision using NOP 5033-2 as a guide:
- b. If the substance is **Non-agricultural**, is the substance \_\_\_\_\_ **Non-synthetic** or \_\_\_x\_\_\_ **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:

HOCl is produced by electrolyzing a brine solution made with purified water and sodium chloride

3. For **LIVESTOCK**: 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?

Hypochlorous acid is petitioned as a livestock medicine.

## 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)]

The 2015 TR (lines 140-153) mentions that there can be a reaction with organic material (humic acid) which can lead to some potential concerns. It does go on to state though: It is generally accepted that carcinogenic and teratogenic trihalomethanes and haloacetic acids are not formed by the action of hypochlorous acid in neutral or near-neutral solutions (Satyawli et al., 2007). However, because only small amounts of hypochlorous acid would be used, sprayed directly onto wounds or eyes of animals, there would be little chance of interaction with other materials used in organic farming.

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)]

“In Huang’s et al., 2008 review of the scientific literature, the authors suggested that hypochlorous acid penetrates cell membranes and produces hydroxyl radicals, which exert their antimicrobial activity through the oxidation of key metabolic systems” (2015 TR, lines 253-255).

“Diluted aqueous solution of hypochlorous acid decomposes very slowly in the dark but more rapidly in the presence of light, particularly rapidly in full sun light, by producing hydrogen chloride and oxygen. Some chlorine and chloric acid may also develop. Chlorine released into the environment is distributed into water and preferably air.

In water and in atmosphere chlorine/hypochlorite undergoes photolysis with an estimated half-life of 1-4 hours, depending on the time of the day. In natural water, in the presence of organic or inorganic compounds, the free available chlorine immediately reacts forming various chlorinated by-products e.g. chloramines and chloromethanes, which are mainly distributed to the hydrosphere, but are also able to

transfer to some extent to the atmosphere depending on their intrinsic properties. A potential for bioaccumulation or bioconcentration of active chlorine species can be disregarded, because of their water solubility and their high reactivity (2015 TR lines 602-612).

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

This substance is formed by the electrolysis of a sodium chloride solution. Any environmental concerns would be from a spill during manufacturing or transport of a formulated end product.

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

Chlorine disinfectants have been shown to cause occupational dermatitis or skin irritation (2015 TR, line 662). However as a wound or pinkeye spray, only a small amount of hypochlorous acid would be sprayed directly onto an animal, so threats to human health would be minimal.

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)]

Because only small amounts of hypochlorous acid would be used, sprayed directly onto wounds or eyes of animals, there would be no chemical or biological effect on the agroecosystem, including soil organisms.

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

The TR, (lines 596-612) states that hypochlorous acid in aqueous solutions at pH < 7. Was of minimal toxicity to birds, but could be very toxic to fish and freshwater invertebrates. However as a wound or pinkeye spray, only a small amount of hypochlorous acid would be sprayed directly onto an animal, so it would not contaminate water resources.

### **Category 3: Alternatives/Compatibility**

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

As noted in the 2017 TR (and above), there are many non-synthetic materials already available and currently being used by organic livestock producers as medical treatments for livestock wounds and pinkeye. There are also management practices that can be used to prevent pinkeye infections, including fly control; bolstering animals' immune system with vitamins, trace minerals, and kelp meal; and use of vaccines.

2. **For Livestock substances, and Nonsynthetic substances used in Handling:** In balancing the responses to the criteria above, is the substance compatible with a system of sustainable agriculture? [§6518(m)(7)]

Given the many alternatives currently available, the Livestock Subcommittee does not think hypochlorous acid is a necessary material for livestock producers for treating wounds and pinkeye in livestock.

**Subcommittee vote:**

Motion to add hypochlorous acid at §205.603

Motion by: Francis Thicke

Seconded by: Harriet Behar

Yes: 1 No: 5 Abstain: 0 Absent: 1 Recuse: 0

**Approved by Ashley Swaffar, Subcommittee Chair, to transmit to NOSB August 29, 2017**