



# BEYOND PESTICIDES

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**Docket ID # AMS-NOP-25-0914**

## **Re. LS: Sunsets**

These comments to the National Organic Standards Board (NOSB) on its Spring 2026 agenda are submitted on behalf of Beyond Pesticides. Founded in 1981 as a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to bridge the interests of consumers, farmers and farmworkers, Beyond Pesticides advances improved protections from pesticides and alternative pest management strategies that reduce or eliminate a reliance on pesticides. Our membership and network span the 50 states and the world.

## **Activated charcoal**

**§205.603(a) (6) Activated charcoal (CAS # 7440-44-0)—must be from vegetative sources.**

This is one of several materials recommended by the NOSB for addition to the National List in 2002 and added by the National Organic Program (NOP) in 2018.

Activated charcoal is used as the preferred therapeutic treatment as needed for treatment of suspected poisoning by plants or moldy silage. Activated charcoal removes toxic chemicals by adsorption. It is then excreted.

Issues expressed in the TAP review include:

- Its use should be non-routine in specific cases of ingestion of toxic materials; it should not be used to allow grazing of poisonous plants.
- Animal and mineral sources should not be allowed. (They are not.)
- “The purpose of activated carbon is to absorb toxins accidentally ingested by livestock, allowing these toxins to safely pass through the GI track of the animal without being absorbed by the body. These toxins would be then be deposited in the animal’s manure. Animal manure cannot contaminate crops, soil or water with pathogenic organisms, heavy metals or residues of prohibited substances (7 CFR 205.203(c)). If the toxins can

be broken down by composting without harming the composting organisms, the contaminated manure can be composted (and documented in the organic management plan). If the toxins are heavy metals, the manure must be disposed of without contaminating organic crop lands or water.”

- USP pharmaceutical grade has low amounts of contaminants and is suitable for organic operations.

The 2021 TR does not add to these points. In view of the possible contamination of crops through manure, activated charcoal should be annotated to include proper handling of manure after treatment.

## Calcium borogluconate

### §205.603 (a)(7) Calcium borogluconate (CAS # 5743-34-0) - for treatment of milk fever only.

The listing allows calcium borogluconate for treatment of milk fever. Because organic dairies often have older cows in their herd than their conventional counterparts, having materials that treat milk fever, to which these older cows are more susceptible, is important and can be lifesaving.

The 2015 Technical Report for electrolytes identified calcium borogluconate as an electrolyte. Unlike most electrolytes, calcium borogluconate is *injected* for treatment of milk fever.

In the TAP review prepared in 2000, several issues were raised:

- No LD<sub>50</sub> was found for calcium borogluconate.
- No information about the metabolism and fate of the boron portion was available.
- The calcium gluconate portion may be produced by fermentation of a genetically engineered form of *Aspergillus niger*.

The 2015 technical review of electrolytes has this to say about calcium borogluconate:

- All of these materials except magnesium citrate, calcium borogluconate, magnesium hypophosphite and magnesium borogluconate are FDA permitted feed additives. All of these materials except glycine, calcium borogluconate, magnesium borogluconate, and calcium sulfate are Generally Recognized as Safe (GRAS). Those not GRAS or approved food additives are considered slightly toxic.”<sup>1</sup>
- “The average dose of boric acid that produces toxic effects in humans is 3.2g. In sensitive individuals, the dose that produces toxic effects is 0.1 g (Harper et al. 2012). The maximum dose of calcium borogluconate for milk fever is 125 grams, and this contains 32 g of boric acid (Bayer 2013b). From mouse data, at least 90% would be excreted in urine over 96 hrs (Harper, et al. 2012). Assuming the remaining (3.2 g), went into the milk, it would be diluted when the dairy pooled the milk with that from other cows.... If the milk from a treated cow was not pooled about 3.2 g would be excreted

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<sup>1</sup> Lines 888-894.

over a 96 hr period into about 22 gallons of milk. The average concentration in the milk would be about 145 mg/gallon. The amount in one gallon would be about 22 times lower than the average toxic threshold. In the rare case of individuals sensitive to boric acid acid, the amount would be about 1.5 times lower than the toxic threshold.”<sup>2</sup>

These very helpful calculations in the TR suggest that a withdrawal period should be established. In addition, boron, boric acid, and borates have recently been classified as reproductive and developmental toxicants.<sup>3</sup>

The TR’s calculations of boron excreted suggest that the resulting environmental boron would not exceed normal levels after cows are treated—assuming that cows are not treated on a routine basis.<sup>4</sup>

Veterinarians believe that calcium borogluconate is an essential emergency treatment for milk fever.<sup>5</sup> In view of the concerns expressed above, we urge the LS to examine the need for an annotation establishing a withdrawal period.

## Calcium propionate

### **§205.603(a) (8) Calcium propionate (CAS # 4075-81-4)—for treatment of milk fever only.**

The listing allows calcium propionate for treatment of milk fever. Because organic dairies often have older cows in their herd than their conventional counterparts, having materials that treat milk fever, to which these older cows are more susceptible, is important and can be lifesaving.

Calcium propionate was used in organic cows for milk fever before 2018 by virtue of its inclusion as an electrolyte. The 2015 Technical Review of electrolytes says, [compared to calcium chloride], “Calcium propionate is less caustic, does not cause acidosis, and the propionate fatty acid is glucogenic.”

While we have found reports of illness when calcium propionate is used as a preservative in food,<sup>6</sup> we cannot determine the relevance of these reports to the use for treatment of milk fever, and urge the LS to request a TR on calcium propionate.

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<sup>2</sup> Lines 983-999.

<sup>3</sup> Agency for Toxic Substances and Disease Registry, 2010. Toxicological Profile for Boron. <https://www.atsdr.cdc.gov/ToxProfiles/tp26.pdf>.

<sup>4</sup> Lines 897-910.

<sup>5</sup> TAP review, personal communications between Christie Badger and Dr. Hue Karreman and Dr. Dayna Locitzer.

<sup>6</sup> For example, Dengate, S. and Ruben, A., 2002. Controlled trial of cumulative behavioural effects of a common bread preservative. *Journal of Paediatrics and Child Health*, 38(4), pp.373-376.

## **Chlorine materials (Calcium hypochlorite, Chlorine dioxide, hypochlorous acid, sodium hypochlorite)**

**§205.603(a)(7) Chlorine materials —disinfecting and sanitizing facilities and equipment.**

**Residual chlorine levels in the water shall not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act.**

**(i) Calcium hypochlorite.**

**(ii) Chlorine dioxide.**

**(iii) Hypochlorous acid.**

**(iv) Sodium hypochlorite.**

Before an adequate sunset review can be performed, the NOSB and NOP need to clarify whether chlorine is required by other statutes. Some have said that other laws require the use of chlorine in higher concentrations than those listed on the National List. If other laws specifically require the use of chlorine, then it must be allowed under the organic program. If it is required, the use should be included on the National List with specific citations for the requirements.

### **Alternatives to chlorine disinfection**

We here repeat our request that the NOSB perform a comprehensive review of sanitizers, disinfectants, and sterilants. To the extent that organic production requires a disinfectant other than the level of residual in finished drinking water, the NOSB should be looking at non-chlorine alternatives. A 2003 NOSB recommendation stated:

The TAP reviews pointed out many ways in which chlorine is unsatisfactory for organic handling. Chlorine compounds and other halogens have been shown to produce trihalomethanes. It was the NOSB's opinion that while chlorine needs to be allowed in the handling of organic food out of concern for public health and safety, its use needs to be minimized and operators need incentives and clear guidance to develop viable alternatives that protect the public as effectively as chlorine, but are less harmful to food handlers and the environment.

Toward that end, the NOSB has recommended other methods for disinfecting water in crop contact, including ozone, hydrogen peroxide, and periacetic acid. The review of chlorine should be prioritized in the re-review process in light of new information about alternatives, food safety, health effects, and application procedures. To the extent possible, the NOSB encourages the adoption of non-chemical and less toxic methods of disinfection of wash and chill water. This should be done with the full support and cooperation of the Food and Drug Administration's Center for Food Safety and Nutrition, and the Food Safety Inspection Service.

EPA's Design for the Environment (DfE) program has been investigating alternative disinfectants.<sup>7</sup> A DfE label on a disinfectant means that the product meets the following criteria:

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<sup>7</sup> <http://www.epa.gov/pesticides/regulating/labels/design-dfe-pilot.html>.

1. It is in the least-hazardous classes (i.e. III and IV) of EPA's acute toxicity category hierarchy;
2. It is unlikely to have carcinogenic or endocrine disruptor properties;
3. It is unlikely to cause developmental, reproductive, mutagenic, or neurotoxicity issues;
4. It has no outstanding "conditional registration" data issues;
5. EPA has reviewed and accepted mixtures, including inert ingredients;
6. It does not require the use of Agency-mandated personal protective equipment;
7. It has no unresolved or unreasonable adverse effects reported;
8. It has no unresolved efficacy failures (associated with the Antimicrobial Testing Program or otherwise);
9. It has no unresolved compliance or enforcement actions associated with it; and
10. It has the identical formulation as the one identified in the DfE application reviewed by EPA.<sup>8</sup>

EPA has approved the following for use in DfE disinfectant products: citric acid, hydrogen peroxide, l-lactic acid, ethanol, isopropanol, and peracetic acid.<sup>9</sup> DfE disinfectant product formulations and "inert" ingredients must also meet the DfE standard for safer cleaning products.<sup>10</sup> All of the approved DfE disinfectant active ingredients are on the National List. Citric and lactic acids are considered nonsynthetic, are listed on §205.605(a), and do not need to be listed in order to be used in crop or livestock production. In addition, the need for equipment to be clean must be distinguished from a need for disinfection, and disinfection is difficult to accomplish if a surface is not clean.<sup>11</sup>

Technical Reviews on chlorine have identified the following alternative materials: ethanol and isopropanol; copper sulfate; hydrogen peroxide; peracetic acid—for use in disinfecting equipment, seed, and asexually propagated planting material; soap-based algaecide/demossers; phosphoric acid, ozone. The TRs also identified some alternative practices—steam sterilization and UV radiation.<sup>12</sup>

Technical reviews for the above sanitizers and EPA's Design for the Environment (DfE) program have identified alternatives, including essential oils and natural acids.

EPA's DfE has approved **l-lactic acid and citric acid** as meeting its criteria for use as disinfectants.<sup>13</sup> While the DfE criteria are not the same as OFPA criteria, they do require that the materials be low-hazard and efficacious. Lactic acid and citric acid are both considered nonsynthetic and are listed on §205.605(a) with no restrictions as to use.

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<sup>8</sup> <http://www.epa.gov/pesticides/regulating/labels/design-dfe-pilot.html>.

<sup>9</sup> <http://www.epa.gov/pesticides/regulating/labels/design-dfe-pilot.html>.

<sup>10</sup> [http://www.epa.gov/dfe/pubs/projects/formulat/dfe\\_criteria\\_for\\_cleaning\\_products\\_10\\_09.pdf](http://www.epa.gov/dfe/pubs/projects/formulat/dfe_criteria_for_cleaning_products_10_09.pdf).

<sup>11</sup> Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008.

[http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection\\_Nov\\_2008.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf).

<sup>12</sup> 2011 Crops TR and 2006 Livestock TR.

<sup>13</sup> <http://www.epa.gov/pesticides/regulating/labels/design-dfe-pilot.html>.

**Essential oils** are often cited as a class of natural disinfectants. The TR for hydrogen peroxide refers to the following essential oils and extracts: clove oil, melaleuca (tea tree) oil, and oregano oil, pine oil, basil oil, cinnamon oil, eucalyptus oil, helichrysum oil, lemon and lime oils, peppermint oil, tea tree oil, and thyme oil. Aloe vera contains six antiseptic agents active against fungi, bacteria and viruses. There is considerable research on essential oils as disinfectants that could be useful to organic producers. For example, an early review by Janssen et al. described methods for screening.<sup>14</sup> A more recent review by Kalemba and Kunicka provides an updated review of screening methods and an overview of the susceptibility of human and food-borne bacteria and fungi towards different essential oils and their constituents.<sup>15</sup> Deans and Ritchie compares the potency of 50 different essential oils and the range of their antibacterial action against 25 genera of bacteria.<sup>16</sup> A review of the literature should be evaluated by the NOSB as part of an effort to incentivize and then transition to the use of safer materials more compatible with organic principles.

### **Practices that eliminate the need for disinfectants**

Technical Reviews have mentioned practices that eliminate the need for disinfectant materials. They include: hot water, steam, UV radiation, slow filtration for cleaning water. As pointed out at the beginning of these comments, “cleaning” is not synonymous with disinfection, and it is possible that in some cases, disinfection is not necessary at all.

### **Conclusion**

The NOSB should perform a comprehensive review of sanitizers, disinfectants, and sterilants. While the uses of disinfectants vary so that no one method or material is likely to be effective in all cases, there are numerous alternative methods and materials that should allow organic producers and handlers to avoid the use of the most toxic materials—in particular, those containing chlorine. Regarding alternative materials for teat dips, the iodine TR says, “The available information suggests that commercial antimicrobial products containing oxidizing chemicals (e.g., sodium chlorite, hypochlorite, iodophor), natural products composed of organic acids (e.g., lactic acid), and homemade products using vinegar (i.e., acetic acid) as the active ingredient may all be equally effective teat dip treatments.” The active ingredients identified by the DfE are safer and effective alternatives.

We have discussed many alternatives that are available for use by organic producers and handlers. Rather than simply proposing another renewal of the use of chlorine-based materials, the NOSB subcommittees should commission a TR that (1) determines what disinfectant/sanitizer uses are required by law, and (2) comprehensively examines more organically-compatible methods and materials to determine whether chlorine-based materials

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<sup>14</sup> Janssen, A. M., Scheffer, J. J. C., & Svendsen, A. B. (1987). Antimicrobial activities of essential oils. *Pharmaceutisch Weekblad*, 9(4), 193-197.

<sup>15</sup> Kalemba, D., & Kunicka, A. (2003). Antibacterial and antifungal properties of essential oils. *Current medicinal chemistry*, 10(10), 813-829.

<sup>16</sup> Deans, S. G., & Ritchie, G. (1987). Antibacterial properties of plant essential oils. *International journal of food microbiology*, 5(2), 165-180.

are actually needed for any uses. If there are uses for which chlorine is necessary, then the NOSB should include them in the National List and limit the use to those particular uses.

Please also refer to our comments on the chlorine materials petition. The 2026 limited scope TR for chlorine materials provides a foundation for developing a comprehensive review of sanitizers and disinfectants, including requirements for the use of chlorine.

## **Kaolin pectin**

### **§205.603(a) Kaolin pectin—for use as an adsorbent, antidiarrheal, and gut protectant.**

Kaolin pectin is used as an adsorbent, antidiarrheal, and gut protectant in organic livestock production. In contrast to activated charcoal, it coats the stomach and gut lining to some extent and helps “dry up” excessive fluid in the gut (which is the definition of diarrhea).

There has been recent discussion of pectin by the NOSB as it is used in organic food processing, particularly relating to its classification. If pectin is non-amidated, then kaolin pectin is nonsynthetic and should not be listed on §205.603. In fact, the 2002 NOSB recommendation stated, “It is probably not necessary to list kaolin pectin since in one form it is a natural.” In view of these issues, kaolin pectin should not be added to the National List without re-review and recommendation by the NOSB. We recommend that the NOSB specifically address the issue of whether kaolin pectin containing amidated forms of pectin should be allowed (since non-amidated forms are already allowed.)

In reviewing the impact of the manufacture of kaolin pectin, the LS must consider the impacts of raising the non-organic crops used to produce pectin.

## **Oranges**

**California Farmworker Poisonings, 1992–2010:** 508 reported (CA acreage: 180,000). These poisoning incidents only represent the tip of the iceberg because it only reflects reported incidents in one state. It is widely recognized that pesticide incidents are underreported and often misdiagnosed.

**Pesticide Tolerances —Health and Environmental Effects:** The database shows that while oranges grown with toxic chemicals show low pesticide residues on the finished commodity, there are 73 pesticides with established tolerance for oranges, 31 are acutely toxic creating a hazardous environment for [farmworkers](#), 65 are linked to chronic health problems (such as cancer), 21 contaminate streams or groundwater, and 61 are poisonous to wildlife.

**Pollinator Impacts:** In addition to habitat loss due to the expansion of agricultural and urban areas, the database shows that there are 25 pesticides used on oranges that are considered toxic to honey bees and other insect pollinators. For more information on how to protect pollinators from pesticides, see Beyond Pesticides' [BEE Protective webpage](#).

- This crop is dependent on pollinators.
- This crop is foraged by pollinators.

## Apples

**California Farmworker Poisonings, 1992–2010:** 104 reported (CA acreage: 17,500). These poisoning incidents only represent the tip of the iceberg because it only reflects reported incidents in one state. It is widely recognized that pesticide incidents are underreported and often misdiagnosed.

**Pesticide Tolerances —Health and Environmental Effects:** The database shows that while apples grown with toxic chemicals show low pesticide residues on the finished commodity, there are 109 pesticides with established tolerance for apples, 39 are acutely toxic creating a hazardous environment for [farmworkers](#), 92 are linked to chronic health problems (such as cancer), 21 contaminate streams or groundwater, and 92 are poisonous to wildlife.

**Pollinator Impacts:** In addition to habitat loss due to the expansion of agricultural and urban areas, the database shows that there are 41 pesticides used on apples that are considered toxic to honey bees and other insect pollinators. For more information on how to protect pollinators from pesticides, see Beyond Pesticides' [BEE Protective webpage](#).

- This crop is dependent on pollinators.
- This crop is foraged by pollinators.

## Mineral Oil

**§205.603(a)(20) Mineral oil—for treatment of intestinal compaction, prohibited for use as a dust suppressant.**

The 2015 TR says, “[B]ased on consultations with the US Food and Drug Administration (FDA), the NOP was informed that mineral oil has not received approval through the FDA drug approval process to be authorized as a medical treatment in cattle, and the substance would not qualify for extra-label use by a licensed veterinarian. . . . Accordingly, the NOP was unable to accept the NOSB recommendation to allow the use of mineral oil as a livestock medication under 7 CFR205.603. Mineral oil remains prohibited for use in organic livestock production as an orally administered treatment of constipation in cattle and other ruminants.” The contradictions between the FDA statements and listing on §205.603 need to be clarified. It appears that the 2021 TR does not address this issue.

The 2021 TR does clarify the issue of contaminants:

While mineral oil formulations vary based on the petroleum crude oil and refining methods used, the mineral oil pertaining to veterinary applications is highly refined and known in the literature as “white mineral oil” (although “mineral oil” is also used interchangeably) (EPA 2009, EFSA 2012, IARC 2012). White mineral oil is used in food and medical applications and undergoes greater refinement to remove aromatic compounds, including polycyclic aromatic hydrocarbons (PAHs) (EPA 2009, EFSA 2012). Since only highly refined mineral oil is used in veterinary applications, the use of mineral oil throughout the remainder of this report refers to highly refined (i.e., white) mineral

oil unless otherwise specified. As with less refined products, the exact composition of mineral oil varies, although paraffins are generally a major component and the remaining components are naphthenes (IARC 2012).<sup>17</sup>

## Nutritive supplements

**(21) Nutritive supplements—injectable supplements of trace minerals per paragraph (d)(2) of this section, vitamins per paragraph (d)(3), and electrolytes per paragraph (a)(11), with excipients per paragraph (f), in accordance with FDA and restricted to use by or on the order of a licensed veterinarian.**

This listing makes available injectable vitamins, minerals, and electrolytes in addition to use orally as feed additives (vitamins and minerals per §205.603(d)) or medical treatments (electrolytes without antibiotics per §205.603(a)). The listing of injectable vitamins, minerals, and electrolytes makes sense if it is clear that they may be used therapeutically, but not on an ongoing basis. Just as with orally-supplied vitamins and minerals, synthetic inputs may be needed to respond to unusual conditions or fine tune the system, but in organic production, they cannot be routine. The blanket listing of all synthetic vitamins as feed additives (205.603(d)) is not justified. Nor should the listing of injectable vitamins and minerals refer to the use as feed additives. The 1995 NOSB recommendation on vitamins saw a limited use of synthetic vitamins, to be reviewed within two years. Livestock producers were to “to decrease or eliminate use of feed additives when possible.” From the table in the 2015 Technical Review, we conclude that livestock feed should rarely need supplementation with synthetic vitamins, so it should be made clear that all synthetic vitamins, minerals, and electrolytes may be provided only as medical treatments.<sup>18</sup>

## Propylene glycol

**§205.603(a) (27) Propylene glycol (CAS #57-55-6)—only for treatment of ketosis in ruminants.**

Propylene glycol is listed on §205.603 for use in organic livestock production with the annotation, “only for treatment of ketosis in ruminants.”

The 2002 TAP summarizes incompatibility, “The intended use of propylene glycol as a drench treatment would not result in significant direct interaction with other materials used in organic farming systems. Thus, there is no indication of detrimental interactions in the environment/agroecosystem from this application. However, the manufacture of this synthesized material, when derived from the petrochemical feedstock, raises concerns about environmental effects and toxicity. This method is not compatible with a system of sustainable

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<sup>17</sup> Savan Group, 2021. Technical Evaluation Report for Mineral Oil, lines 80-88.

<sup>18</sup> 2015 Technical Review of Vitamins for Livestock, lines 1142-1201.

agriculture. There are ongoing studies regarding alternative methods of producing propylene glycol, for example from glycerol or sugars.”

Alternative practices and natural materials have been shown to be effective. For example, Paul Dettloff, DVM, provided a number of suggestions for prevention (maintaining a high-energy diet before calving, including dry long-stemmed hay) and treatment (glucose IV, homeopathic lycopodium, molasses, and Wellness Tonic containing apple cider vinegar and aloe vera, with tinctures of rose hips, dandelion root ,and plantain.)<sup>19</sup>

The 2021 TR identifies natural preventive and remedial substances: molasses, glycerin, glucose, and choline and B vitamins.<sup>20</sup> It also describes practices to prevent ketosis: preventing over-conditioning (overweight), high-forage diets, lower stocking densities, separate calving pens, and longer recovery times.<sup>21</sup>

In view of these issues, the NOSB should determine whether propylene glycol is needed.

### **Sodium chlorite, acidified**

**§205.603(a) (28) Sodium chlorite, acidified—allowed for use on organic livestock as a teat dip treatment only.**

**§205.603(b) (9) Sodium chlorite, acidified—allowed for use on organic livestock as teat dip treatment only.**

Acidified Sodium Chlorite (ASC) is not compatible with organic production. The fact that use of chlorine is so universally associated with the production of persistent toxic chemicals has led some environmental groups to seek a ban on chlorine-based chemicals. We believe that organic production should, for the same reasons, avoid the use of chlorine as much as possible. The early allowance of chlorine in the rule reflects the fact that many organic growers—like most of the rest of us—depend on water sources that have been treated with chlorine. We do not believe that organic producers should have to filter chlorine out of the tap water they use for irrigating, cleaning equipment, washing vegetables, or cleaning food-contact surfaces. But they should not be adding more chlorine. Organic production and handling should be, to the extent possible, chlorine-free.

The Organic Foods Production Act, §6518(m), lists three criteria that directly pertain to chlorine: (1) the potential of such substances for detrimental chemical interactions with other materials used in organic farming systems; (2) 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; and (3) the probability of environmental contamination during manufacture, use, misuse or disposal of such substance.

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<sup>19</sup> Paul Dettloff, 2009. *Alternative Treatments for Ruminant Animals*, revised and expanded edition. Acres U.S.A. Austin, TX.

<sup>20</sup> Nexight Group, 2021. Technical Evaluation Report (TR) for Propylene Glycol, lines 653-718.

<sup>21</sup> TR, lines 723-778.

ASC and chlorine chemistry is harmful to humans and the environment. We addressed this issue in more detail in our comments on chlorine materials (above), but here we will address ASC in particular. “Acidified sodium chlorite” refers to a solution containing several active chlorine species that is formed when acid is added to sodium chlorite. The chlorine compounds contained in ASC include chlorite, chlorate, chlorous acid, and chlorine dioxide gas. The main active ingredient is considered to be chlorous acid, which is a strong oxidizing agent.

Chlorine dioxide is very toxic. It is a severe respiratory and eye irritant. Chronic exposure to animals and workers has resulted in death. Repeated acute exposure to workers has caused eye and throat irritation, nasal discharge, cough, wheezing, bronchitis, and pulmonary edema. Repeated exposure may lead to chronic bronchitis.<sup>22</sup> “In addition, exposure to high levels of chlorine dioxide and chlorite in animals both before birth and during early development after birth may cause delays in brain development.”<sup>23</sup>

In addition to the purposeful production of toxic chlorine compounds, the manufacture and use of chlorine compounds results in the unintended production of other toxic chemicals. Disinfection with chlorine, hypochlorite, or chloramines results in the formation of carcinogenic trihalomethanes, haloacetic acids, and other toxic byproducts.<sup>24</sup> Disinfection with chlorine dioxide produces undesirable inorganic byproducts, chlorite and chlorate. Industrial production of chlorine compounds, use of chlorine bleach in paper production, and burning of chlorine compounds release dioxins and other persistent toxic chemicals into the environment.<sup>25</sup>

The fact that use of chlorine is so universally associated with the production of persistent toxic chemicals has led some environmental groups to seek a ban on chlorine-based chemicals. We believe that organic production should, for the same reasons, avoid the use of chlorine as much as possible.

ASC is not necessary. In its listing proposal, the LS said, “There are several teat dips available on the market, but some may be more irritating to the animal than others, and some bacteria may become resistant, and thus a broader array of teat dip ingredient choices for organic farmers seems essential.” Beyond Pesticides cannot accept a rationale of resistance management based on providing more toxic chemicals. This approach is responsible for the proliferation of toxic chemicals in the environment and the ineffectiveness of disease and pest management. The best way to preserve the effectiveness of materials is to save their use for limited occasions when non-toxic control measures are inadequate. Routine use creates strong

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<sup>22</sup> CDC, Occupational health guideline for chlorine dioxide. <http://www.cdc.gov/niosh/docs/81-123/pdfs/0116.pdf>.

<sup>23</sup> ATSDR, Public Health Statement for Chlorine Dioxide and Chlorite.

<http://www.atsdr.cdc.gov/phs/phs.asp?id=580&tid=108>.

<sup>24</sup> Alexander G. Schauss, 1996. Chloride –Chlorine, What’s the difference? P. 4.

<http://www.mineralresourcesint.com/docs/research/chlorine-chloride.pdf>.

<sup>25</sup> ATSDR, 1998. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins. Pp. 369 ff.

<http://www.atsdr.cdc.gov/toxprofiles/tp104.pdf>.

selection pressure for resistance. Rotating use of several toxic chemicals eventually leads to multiple chemical resistance.

Again in the listing proposal, the LS said, “Research indicates that alternative practices to teat dipping/spraying or udder washing are not advised, as the exclusion of a disinfecting step from a mastitis control program would significantly increase the likelihood of infection.” Yet, according to the Technical Review, “The available information suggests that commercial antimicrobial products containing oxidizing chemicals (e.g., sodium chlorite, hypochlorite, iodophor), natural products composed of organic acids (e.g., lactic acid), and homemade products using vinegar (i.e., acetic acid) as the active ingredient may all be equally effective teat dip treatments.”<sup>26</sup>

## **Conclusion**

We urge the NOSB to make a commitment to make organic chlorine-free to the extent possible by sunseting ASC.

## **Zinc sulfate**

**§205.603(b) (11) Zinc sulfate—for use in hoof and foot treatments only.**

### **Zinc sulfate poses environmental and health risks.**

According to the Technical Review, emissions from zinc and zinc sulfate production include sulfur dioxide and other gases (sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic gaseous compounds (non-methane volatile organic compounds and methane (CH<sub>4</sub>)), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and ammonia (NH<sub>3</sub>), particulate matter, and heavy metals such as cadmium and zinc. Other chemicals released include lead, cadmium, mercury, zinc, polychlorinated biphenyls (PCBs), and polychlorinated dibenzodioxins.

The disposal method for spent foot bath solutions is mixing the solution with manure, and eventually spreading it on fields. There is concern about build-up of copper and zinc from the disposal of this solution. A study cited by the TR found, “[F]arms regularly using CuSO<sub>4</sub> could be applying as much as 4 to 6 kg of Cu/ha annually from the disposal of footbath solutions, which is considered as much as 45 to 50 times the annual Cu needed for most crops.”<sup>27</sup> This article recommends steps to lower the impacts of copper sulfate from footbaths on soils: test for copper regularly; spread the copper solutions across a large area; reduce the concentration of copper in and frequency of footbath use; use a clean water footbath preceding the copper sulfate footbath in order to improve efficacy; and finally, “The best long-term solution is to find new ways of preventing or treating hoof problems besides using CuSO<sub>4</sub>.”

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<sup>26</sup> ASC TR, 2013. Lines 540-543.

<sup>27</sup> Downing, T. W., Stiglbauer, K., Gamroth, M. J., & Hart, J. (2010). Case study: Use of copper sulfate and zinc sulfate in footbaths on Oregon dairies. *The Professional Animal Scientist*, 26(3), 332-334. <http://pas.fass.org/content/26/3/332.full.pdf>.

With regard to zinc sulfate, however, the situation is less clear. Zinc can have severe impacts on soil microbial life. However, according to the TR, “Zinc sulfate interacts with the soil to which it is added. Its toxicity is dependent on its bioavailability. Bioavailability depends on soil type and aging, which further depend on pH, cation exchange capacity and leaching. Soil biochemistry influences the predicted no effect concentration (PNEC) and ecological soil screening level (Eco-SSL) for zinc sulfate, however; zinc soil concentrations protective of wildlife and the environment have not entirely been resolved.”<sup>28</sup>

Therefore, it is not easy to point to a threshold above which soil zinc concentrations should not raise. The best practice might be to ensure that zinc levels in the soil do not increase—unless the zinc is added to correct a deficiency.

### **There are alternatives to zinc sulfate.**

The TR lists ethanol, pine tar, peracetic acid, and hydrogen peroxide, in addition to copper sulfate as alternative materials. The TR also lists aspirin and a combination of tea tree oil, jojoba oil, benzathonium chloride, water, propylene glycol, and emulsifiers. Not all of the ingredients of the last are on the National List. Alternative control methods listed in the TR include isolation of affected individuals, application of topically applied agents to hooves that have been pared to expose lesions, full access to pasture, housing with dry floors when indoors, and a good diet rich in zinc.

### **Routine use of zinc sulfate is not compatible with organic production.**

The Livestock Health Care Standard requires:

§205.238 (a) The producer must establish and maintain preventive livestock health care practices, including:

(3) Establishment of appropriate housing, pasture conditions, and sanitation practices to minimize the occurrence and spread of diseases and parasites;

Thus, if zinc sulfate is used, it should not be the first recourse, but the alternative that is used when the other management practices mentioned above have been shown to be insufficient.

### **Conclusion**

If the NOSB decides to relist zinc sulfate, it should recommend an additional annotation comparable to the annotation for coppers in crops, as well as an expiration date to ensure that zinc sulfate receives rigorous review and that soil problems that arise may be addressed: §205.603(b) As topical treatment, external parasiticide or local anesthetic as applicable Zinc sulfate for use as a footbath only, *provided*, that zinc sulfate must be used and disposed of in a manner that minimizes accumulation in the soil, as shown by routine soil testing. Until [5 years from publication in the *Federal Register*].

Thank you for your consideration of these comments.

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<sup>28</sup> Zinc sulfate TR, 2015. Lines 518-522.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry Shistar". The signature is written in a cursive style with a horizontal line at the end.

Terry Shistar, Ph.D.  
Board of Directors