



# BEYOND PESTICIDES

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Ms. Michelle Arsenault  
National Organic Standards Board  
USDA-AMS-NOP  
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Room 2648-S, Mail Stop 0268  
Washington, DC 20250-0268

## **Re. HS: Sodium Dodecylbenzene Sulfonate**

These comments to the National Organic Standards Board (NOSB) on its Spring 2018 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.

Sodium dodecylbenzene sulfonate (SDBS) is used as one of the active ingredients in a formulated product used as an antimicrobial processing aid in produce wash waters. The intended function of the product itself is to reduce the number of microorganisms in fruit and vegetable process water and on the surface of the fruit or vegetable. SDBS rates a green circle (verified to be of low concern based on experimental and modeled data) on EPA's Safer Chemical Ingredient List, and as such, is a material that we believe the NOSB should consider in its quest to eliminate chlorine. However, we believe that consideration should take place in the context of a comprehensive review of sanitizers, so we oppose the listing of SDBS at this time. The technical review (TR) of SDBS is a good step in the direction of the comprehensive review of sanitizers, disinfectants, and cleaners that we propose.

## **Background**

The intended function of the product itself is to reduce the number of microorganisms in fruit and vegetable process water and on the surface of the fruit or vegetable. The proposed use is on raw and processed fruits and vegetables and involves a minimum ninety (90) second immersion in the antimicrobial wash water, followed by a draining process prior to further processing and/or serving. The activity of SDBS (CAS # 25155-30-0) is commonly hypothesized to be one of the three following mechanisms:

1. Protein denaturing,
2. Essential enzyme inactivation, or
3. Membrane disruption and alteration of cell permeability.<sup>1</sup>

Kay Antimicrobial Fruit and Vegetable Treatment (SDBS and lactic acid) is claimed to kill 99.9% of *Escherichia coli*, *Listeria monocytogenes*, and *Salmonella enterica*.

## **SDBS poses health and environmental hazards.**

### **Manufacture**

SDBS is produced from kerosene or paraffin and benzene from crude oil feedstocks. Sulfonation involved in manufacture requires the use of sulfuric acids or burning elemental sulfur, also from fossil fuel feedstocks.<sup>2</sup>

### **Human health**

Kay Antimicrobial Fruit and Vegetable Treatment contains the active ingredients SDBS (1.23%) and lactic acid (17.29%).<sup>3</sup> Its label contains the following warnings: "Causes substantial but temporary eye injury. Harmful if absorbed through the skin.... Prolonged or frequently repeated skin contact with the concentrate may cause allergic reactions in some individuals."

SDBS is not Generally Recognized as Safe (GRAS).<sup>4</sup> A number of other substances in SDBS products are listed in the TR.<sup>5</sup> In addition, impurities that may be found in SDBS include sodium sulfate, dodecylbenzene, sulfones, sodium carbonate, sodium chloride, water, and free oil.<sup>6</sup> FDA does not require produce to be rinsed after treatment, so residual SDBS may remain on the treated product.<sup>7</sup> It is readily absorbed from intestinal tract, and dietary SDBS is not rapidly cleared from the body.<sup>8</sup>

There is much missing data for both human health endpoints and exposure.<sup>9</sup> SDBS is moderately acutely toxic by inhalation and dermal exposure and moderately acutely irritating by dermal exposure. It is highly acutely irritating to eyes –it produces corneal opacity that is not reversible in 72 hours.<sup>10</sup> Chronic exposure results in impacts on liver, kidneys, reproduction, and development. Several experiments showed carcinogenicity.<sup>11</sup>

### **Environment**

SDBS is highly mobile in soil and non-volatile from water. Biodegradability results are mixed. In some experiments, SDBS inhibited degradation. Decomposition products detected after

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<sup>1</sup> Petition, citing Cords, B.R., Burnett, S.L., Hilgren, J., Finley, M., and Magnuson, J., "Sanitizers: Halogens, Surface-Active Agents, and Peroxides," in *Antimicrobials in Food*, 3rd ed. Boca Raton, FL: CRC Press, 2005, ch.16, pp. 533-6.

<sup>2</sup> TR lines 227-229.

<sup>3</sup> Petition, p. 29.

<sup>4</sup> <http://www.accessdata.fda.gov/scripts/fdcc/?set=GRASNotices>.

<sup>5</sup> TR, table 2.

<sup>6</sup> <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@DOCNO+740>.

<sup>7</sup> TR lines 102-103.

<sup>8</sup> TR lines 333-336.

<sup>9</sup> Alkylbenzene Sulfonates Final Work Plan, September 2013. <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2013-0097-0005>.

<sup>10</sup> EPA Summary table quoted in petition, p. 45.

<sup>11</sup> EPA Summary table quoted in petition, pp. 46-57.

desulfonation include 1-tetralone, 1-indanone, 4-methyl-1-tetralone, and naphthalene.<sup>12</sup> Acute toxicity to aquatic organisms ranges from slightly toxic to highly toxic.<sup>13</sup> Chronic toxicity to aquatic organisms occurs at less than 1 ppm. SDBS is used up to 111 ppm in washes, so effluent could easily exceed toxic levels, and does occur in environments at concentrations exceeding no effect levels.<sup>14</sup>

### **SDBS is not essential for organic handling.**

Careful handling can eliminate some/all need for sanitizers.<sup>15</sup> Other preventive practices include choice of cultivar, biocontrols, and preparation of the natural microbiome.<sup>16</sup> There are many sanitizers in use. Natural substitutes include: ethanol, l-lactic acid, citric acid,<sup>17</sup> filtered water, cinnamon and other essential oils, grapefruit seed extract, salt.<sup>18</sup> Other allowed materials include ethanol, isopropanol, hydrogen peroxide, ozone, peracetic acid, hypochlorous acid, sodium/calcium hypochlorite, organic acids, and egg white lysozyme.<sup>19</sup>

SDBS may prove to be one of the best of the choices, but that judgment should be made in a context that examines needs, regulatory requirements, and all known alternative practices and materials. The SDBS TR is a step in the process of that comprehensive review.

### **Compatibility**

SDBS is in the InertsFinder database, listed for food and non-food uses.<sup>20</sup> It was formerly on List 3 (“inerts” of unknown toxicity).<sup>21</sup> However, it is petitioned as an active ingredient. As a chemical listed on EPA’s Safer Chemical Ingredients List and an alternative to chlorine-based materials, it could be judged to be compatible with organic production if evaluated in the context of a comprehensive review of sanitizers, disinfectants, and cleaners. However, that review has yet to be undertaken.

Thank you for your consideration of these comments.

Sincerely,



Terry Shistar, Ph.D.  
Board of Directors

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<sup>12</sup> HSDB: Sodium Dodecylbenzenesulfonate. <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@DOCNO+740>.

<sup>13</sup> Pesticide Action Network database Sodium dodecylbenzene sulfonate, [http://www.pesticideinfo.org/Detail\\_Chemical.jsp?Rec\\_Id=PC33286](http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC33286).

<sup>14</sup> TR lines 296-298, 311-322.

<sup>15</sup> TR, lines 368-421.

<sup>16</sup> TR, lines 476-519.

<sup>17</sup> <http://www.epa.gov/pesticides/regulating/labels/design-dfe-pilot.html>

<sup>18</sup> Janssen, A. M., Scheffer, J. J. C., & Svendsen, A. B. (1987). Antimicrobial activities of essential oils. *Pharmaceutisch Weekblad*, 9(4), 193-197. TR lines 425-456.

<sup>19</sup> TR lines 460-475.

<sup>20</sup> [http://iaspub.epa.gov/apex/pesticides/f?p=INERTFINDER:3:::NO::P3\\_ID:6418](http://iaspub.epa.gov/apex/pesticides/f?p=INERTFINDER:3:::NO::P3_ID:6418).

<sup>21</sup> <http://www.epa.gov/sites/production/files/2015-10/documents/cascomplete.pdf>.