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October 11, 2016

Ms. Michelle Arsenault
National Organic Standards Board
USDA-AMS-NOP
1400 Independence Ave., SW,
Room 2648-S, Mail Stop 0268
Washington, DC 20250-0268

Re. CS: 1-MCP

These comments to the National Organic Standards Board (NOSB) on its Fall 2016 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.

In reviewing this substance, the NOSB must apply the criteria in the Organic Foods Production Act (OFPA), that its use—

- (i) would not be harmful to human health or the environment;
- (ii) is necessary to the production or handling of the agricultural product because of the unavailability of wholly natural substitute products; and
- (iii) is consistent with organic farming and handling.¹

General comments

1-Methylcyclopropene acts as a hormone disruptor in plants by binding to the site of ethylene receptor.

The petition says, “EPA has classified 1-MCP as a biopesticide,” but EPA’s Biopesticide Registration Action Document (BRAD) states, “The Biochemical Classification Committee determined that the 1-MCP gas has not been shown to occur naturally, and cannot be proved to fit the biochemical pesticide definition.”²

The brand name product is SmartFresh™ (1-MCP stabilized in alpha cyclodextrin). Alpha cyclodextrin also appears to be a synthetic substance and is not an “inert” in EPA’s InertFinder

¹ OFPA §6517(c)(1)(A). Further details at OFPA §6518(m).

² U.S. Environmental Protection Agency Office of Pesticide Programs, Biopesticide Registration Action Document: 1- Methylcyclopropene.

database, so must also be petitioned if SmartFresh™ is to be used. It is often manufactured using a genetically-engineered enzyme.³

It should be noted that some of EPA's tests were done with 1-MCP and some with 1-MCP stabilized in alpha cyclodextrin.

1-MCP poses hazards to the environment.

Biodegradation of 1-MCP was not observed under the test conditions for the 28 day test.⁴ The atmospheric breakdown occurs through a reaction with OH⁻, and then with NO₃ and O₃, but we do not know about the products or their properties.⁵ EPA said, "The need for environmental fate and groundwater data (Tier II, (40 CFR Section 158.690(d)(2)(vii through xv)) was not triggered because of practically non-toxic results indicated in Tier I studies." However, OFPA's criteria require the NOSB to look at the full life cycle of the material, from production to use and disposal.⁶

The production and use may result in release into environment.⁷ ToxNet reports that 1-MCP has high soil mobility, high volatility. EPA states that it has low soil mobility and binds tightly to soil.⁸ It is used in closed places. Occupational exposure to 1-MCP may occur through inhalation and dermal contact with this compound at workplaces where it is produced or used. Use data indicate that the general population may be exposed to 1-MCP via inhalation and dermal contact with consumer products containing 1-MCP.⁹

Impacts on biodiversity are unknown, but 1-MCP prevents ethylene effects in a broad range of fruits, vegetables and floriculture crops. Effective concentrations are low and range from 2.5 ml l⁻¹ to 1 ml l⁻¹.¹⁰ Depending on the species being treated, 1-MCP may have a variety of effects on respiration, ethylene production, volatile production, chlorophyll degradation and other color changes, protein and membrane changes, softening, disorders and diseases, acidity and sugars.¹¹

³ Li, Z., Chen, S., Gu, Z., Chen, J., & Wu, J. (2014). Alpha-cyclodextrin: Enzymatic production and food applications. *Trends in Food Science & Technology*, 35(2), 151-160.

⁴ EPA Office of Prevention, Pesticides, and Toxic Substances. Science Review for 1-MCP. October 3, 2007. http://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-224459_03-Oct-07.pdf.

⁵ EPA Office of Prevention, Pesticides, and Toxic Substances. Science Review for 1-MCP. October 3, 2007. http://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-224459_03-Oct-07.pdf.

⁶ US Environmental Protection Agency Office of Pesticide Programs, Biopesticide Registration Action Document: 1-Methylcyclopropene.

⁷ <http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+7517>.

⁸ EPA Office of Prevention, Pesticides, and Toxic Substances. Science Review for 1-MCP. October 3, 2007. http://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-224459_03-Oct-07.pdf This finding from EPA reviews of science studies is in conflict with those in the petition and those posted on Toxnet.

⁹ <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@DOCNO+7517>.

¹⁰ Blankenship, S. M., & Dole, J. M. (2003). 1-Methylcyclopropene: a review. *Postharvest biology and technology*, 28(1), 1-25.

¹¹ Blankenship, S. M., & Dole, J. M. (2003). 1-Methylcyclopropene: a review. *Postharvest biology and technology*, 28(1), 1-25.

1-MCP is an endocrine disruptor in plants.

It acts as a hormone disruptor in plants by binding to the site of ethylene receptor. EPA's review ignored significant effects on germination –as “no dose response,” despite the fact that as a plant hormone, dose response would not necessarily be monotonic.¹²

1-MCP has unknown impacts on crop plants and interactions in the organic crop system.

Ethylene is allowed for postharvest ripening of tropical fruit and degreening of citrus and regulation of pineapple flowering. 1-MCP counteracts the effects of ethylene. 1-MCP is being developed as a crop protection chemical to protect from stress, and this use pattern could increase adverse impacts on non-target plants.¹³ 1-MCP decreases some plant disorders, but increases others.¹⁴ It binds permanently to ethylene receptors. Therefore, apples treated with 1-MCP should be labeled “apples with 1-methylcyclopropene.”

1-MCP is not essential for organic production.

Alternatives include organic waxes and oils,¹⁵ carnauba wax, wood resin, and other natural waxes;¹⁶ other edible coatings; and controlled atmosphere storage.¹⁷

1-MCP is not compatible with organic and sustainable agriculture.

1-MCP is a synthetic chemical that would take the place of organic practices and nonsynthetic alternatives. It is a growth regulator, which is not contained in the list of categories of substances eligible to be on the National List. (OFPA§6517(c)(1)(B)(i)) Its use –extending the storage life of a crop– is not one of the criteria in OFPA [§6518(m)] for NOSB evaluation of materials. It is a hormone disruptor that acts by attaching to the ethylene receptor, with an affinity about 10 times that of ethylene.¹⁸

Conclusion

1-MCP should not be added to the National List because it is hazardous to the environment, is not essential for organic production, and is not compatible with a system of organic and sustainable agriculture. This decision would be consistent with past decisions. The NOSB recognized the incompatibility of growth regulators with OFPA when it rejected the petition for Indole-3-butyric acid (IBA) in 2011 and 2013, finding that “it is not essential and is not compatible with organic production.” Similarly, in 2015, the NOSB rejected a petition for

¹² EPA Office of Prevention, Pesticides, and Toxic Substances. Science Review for 1-MCP. October 3, 2007. http://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-224459_03-Oct-07.pdf

¹³ <http://farministrynews.com/syngenta-agrofresh-alliance>.

¹⁴ Blankenship, S. M., & Dole, J. M. (2003). 1-Methylcyclopropene: a review. *Postharvest biology and technology*, 28(1), 1-25.

¹⁵ Carnauba wax TR, lines 644-675.

¹⁶ Carnauba wax TR, lines 553-639 and elsewhere.

¹⁷ Petition, pp. 8-9.

¹⁸ Blankenship, S. M., & Dole, J. M. (2003). 1-Methylcyclopropene: a review. *Postharvest biology and technology*, 28(1), 1-25.

another growth regulator –the sprout inhibitor 3-decene-2-one—because it “does not meet the essentiality or compatibility criteria of OFPA.”

Thank you for your consideration of these comments.

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