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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. HS: Tetrasodium Pyrophosphate (TSPP)

These comments to the National Organic Standards Board (NOSB) on its Spring 2015 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 groups around the world.

Beyond Pesticides supports the Handling Subcommittee (HS) proposal to delist tetrasodium pyrophosphate (TSPP) because it fails to meet the criteria in the Organic Foods Production Act (OFPA) for health and environmental effects, essentiality, and compatibility with organic handling practices. We appreciate the HS review of more recent information, including a checklist.

The principal documentation available to the committee includes a 2001 technical advisory panel (TAP) review of sodium phosphates for use in soy milk, a 2002 TAP review of TSPP for use as a pH buffer and a dough conditioner for organic meat substitutes, and a 2014 limited-scope technical review (TR) addressing alternatives for the current use “in meat analog products.” Unless otherwise specified, “TAP review” below refers to the 2002 review.

1. Health and Environmental Impacts

TSPP is made from phosphoric acid and sodium carbonate. Manufacture of food grade phosphoric acid involves the removal of heavy metals and radioactive waste. This produces a waste stream of hazardous substances. A primary environmental concern of sodium phosphates is their release into water. TSPP emits toxic fumes when heated to decomposition.

According to the Technical Advisory Panel review,

[S]odium pyrophosphate is less toxic than the orthophosphates, but has similar deleterious subacute effects. TSPP depressed weight gains, decreased hemoglobin

concentration, and reduced liver iron values the greatest among several food additive phosphates tested on rats. A number of feeding studies that involved rodent models showed kidney damage and calcium deposits in test animals. The toxicity of sodium phosphates is generally related to the sequestration of calcium and the subsequent reduction of ionized calcium. Ingestion may injure the mouth, throat, and gastrointestinal tract, resulting in nausea, vomiting, cramps, and diarrhea.

According to the 2001 TAP review, “The toxicity of sodium phosphates is generally related to the sequestration of calcium and the subsequent reduction of ionized calcium. It is an irritant, and ingestion may injure the mouth, throat, and gastrointestinal tract, resulting in nausea, vomiting, cramps, and diarrhea.”

More recent studies have shown that inorganic forms of phosphate, such as sodium phosphates and TSPP, cause hormone-mediated effects and “may harm the health of persons with normal renal function. This judgment has been made on the basis of large-scale epidemiological studies and is supported by the latest findings of basic research.”¹ This is an important line of research that has been ignored by the HS because of its decision not to seek further information.

2. Essentiality

The TAP review points out that several nonsynthetic items on the National List are substitutes for the various functions of TSPP. The 2014 technical review is focused on the listed use of TSPP in “meat analog products” and demonstrates that TSPP is not necessary.

3. Compatibility

We agree with the concern raised by the Handling Subcommittee:

The subcommittee has also raised the concern about the sole function of this input being to restore texture after complex processing and this runs counter to §205.600(4): “The substance's primary use is not as a preservative or to recreate or improve flavors, colors, textures, or nutritive value lost during processing, except where the replacement of nutrients is required by law”.

This is further supported by the TAP review, “Phosphates stabilize proteins during processing so they improve finished product texture.”

In addition, we agree with observation in the TAP review,

The petitioner also states that the sequester action of TSPP inhibits rancidity of the textured final products. This implies two things: (i) TSPP is acting as a preservative; and (ii) TSPP effects a chemical interaction with the organic agricultural ingredients, from which one might thus conclude that the final product is synthetic in itself. In these regards TSPP again fails the criterion.

¹ Ritz, E., Hahn, K., Ketteler, M., Kuhlmann, M. K., & Mann, J. (2012). Phosphate Additives in Food—a Health Risk. *Deutsches Ärzteblatt International*, 109(4), 49–55.

5. Conclusion

Beyond Pesticides opposes the relisting of tetrasodium pyrophosphate (TSPP) because it fails to meet the criteria in OFPA for health and environmental effects, essentiality, and compatibility with organic handling practices.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry Shistar". The signature is fluid and cursive, with a prominent initial "T" and a long, sweeping underline.

Terry Shistar, Ph.D.
Board of Directors