



BEYOND PESTICIDES

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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: Potassium hydroxide

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

The regulations also require:²

In addition to the criteria set forth in the Act, any synthetic substance used as a processing aid or adjuvant will be evaluated against the following criteria:

- (1) The substance cannot be produced from a natural source and there are no organic substitutes;
- (2) The substance's manufacture, use, and disposal do not have adverse effects on the environment and are done in a manner compatible with organic handling;
- (3) The nutritional quality of the food is maintained when the substance is used, and the substance, itself, or its breakdown products do not have an adverse effect on human health as defined by applicable Federal regulations;

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

² §205.600(b).

- (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;
- (5) The substance is listed as generally recognized as safe (GRAS) by Food and Drug Administration (FDA) when used in accordance with FDA's good manufacturing practices (GMP) and contains no residues of heavy metals or other contaminants in excess of tolerances set by FDA; and
- (6) The substance is essential for the handling of organically produced agricultural products.

As listed on 205.605(b) Potassium hydroxide carries the annotation, “prohibited for use in lye peeling of fruits and vegetables except when used for peeling peaches.”

Potassium hydroxide is hazardous to humans and the environment. As summarized in the 2001 TAP review, health effects may be severe.³

The substance is highly corrosive and can cause severe burns of eyes, skin, and mucous membranes. Generally, studies and surveys regarding the toxicity of potassium hydroxide are included with studies of sodium hydroxide, and they are collectively known as ‘caustics’ or ‘lye.’ Lye poisoning results in numerous deaths annually, generally as accidents involving cleaners. Lyes are particularly penetrating and corrosive with tissue. This is due to the solubilizing reactions with protein, saponification of fats, and dehydration of tissue.

Regarding environmental impacts, the TAP review says, “A lye peeling processing method is of concern to the agroecosystem due to handling of waste from the plant. Large volumes of water are used, which enter the waste stream along with the soluble potassium and alkali ions.”⁴ “Disposal of KOH can be potentially dangerous. Mercury cells are used to produce most of the KOH in the United States.”⁵

Reviewer #2 adds, “As an industrial chemical whose manufacture does employ the use of other toxic materials, i.e., mercury cells, by-products of chlorine production, etc., KOH does impact the environment. The mere transportation of these chemicals poses a risk. Note the restrictions placed on facilities using this technology based on waste water requirements. In the textile industry, there is growing concern about the disposal of bleaching products and more and more communities are requiring closed systems for KOH & NaOH bleaching.”⁶

³ Lines 118-122.

⁴ Lines 165-166.

⁵ Lines 185-186.

⁶ Lines 369-374.

Is potassium hydroxide essential for organic processing?

OFPA states, “The [National List] shall contain an itemization, by specific use or application, of each synthetic substance permitted under subsection (c)(1) or each natural substance prohibited under subsection (c)(2).” The annotation is unclear in that it specifies uses that are not allowed rather than those that are allowed. Nevertheless, the HS notes say, “A member added that it is used extensively and is also used for nectarines,”⁷ and this is clearly not allowed by the listing.

The 2016 Technical Review (TR) identifies a number of food processing uses of potassium hydroxide:⁸

Uses of potassium hydroxide that are Generally Recognized As Safe (GRAS) by the U.S. Food and Drug Administration (FDA) include use as a formulation aid, pH control agent, processing aid, stabilizer and thickener [21 CFR 184.1631(b)].

Potassium hydroxide’s main food processing uses include use as a pH adjuster, cleaning agent, stabilizer, thickener, fruit and vegetable peeling agent, and poultry scald agent. It is used in dairy products, baked goods, cocoa, fruits, vegetables, soft drinks and poultry. The main foods processed with potassium hydroxide are chicken, cocoa, coloring agents, ice cream and black olives.

Soft soap is manufactured with potassium hydroxide.

Is potassium hydroxide used for all these purposes in organic processing? Is it necessary?

The TR says, “Peaches peeled for canning or pickling use a 1.5% solution of lye at a temperature slightly below 145°F (<62°C) for about 60 seconds, followed by a wash and dip into a solution of 0.5-3.0% citric acid. **Because hot water cannot be used for freezing peaches**, they require a higher solution –about 10%– and a treatment time of about 4 minutes to be peeled. Lye is removed by thorough washing, and again citric acid is used to neutralize the pH of the fruit (Woodroof 1986).”⁹ (Emphasis added.) Most home freezing uses hot water treatment,¹⁰ and although heat in a certain range is avoided in commercial preparation using potassium hydroxide, steam treatment is a possibility for peeling peaches commercially.¹¹

TAP Reviewer #3 said, “Suitable equipment exists to remove the peels and pits by mechanical means.”¹²

⁷ HS notes for January 19, 2016.

⁸ Lines 52-61.

⁹ TR lines 88-92.

¹⁰ <https://extension.purdue.edu/extmedia/HHS/HHS-808-W.pdf>.

¹¹ https://archive.org/stream/commercialfreezi0703josl/commercialfreezi0703josl_djvu.txt.

¹² Lines 557-558.

Is potassium hydroxide compatible with organic processing?

The 2001 TAP review summarizes the issues with regard to peeling peaches, “The use of a synthetic substance to perform a mechanical function such as peeling can be seen as not consistent with objectives of minimizing synthetic substances in handling of organic food. However, use of this material will allow the availability of an organic product otherwise not available, as hand peeling of peaches will not be viable on a commercial scale. Pureed peach products can be produced without chemical peeling techniques, but canned and frozen peaches cannot.”¹³

Conclusion

Potassium hydroxide is a hazardous material, possibly (with sodium hydroxide) one of the most hazardous and toxic on the National List.¹⁴ The 2016 TR does not seem to have resolved the issue of the essentiality for potassium hydroxide in processing peaches, but the essentiality of other allowed uses also needs to be examined. The NOSB must address the following questions:

1. For what purposes is potassium hydroxide used in organic processing?
2. What are the alternatives for those uses?
3. Is further annotation necessary?

Thank you for your consideration of these comments.

Sincerely,



Terry Shistar, Ph.D.
Board of Directors

¹³ Lines 239-243.

¹⁴ TAP lines 376-378.