MEMORANDUM

Date: October 16, 2002

From: Yvonne Frost, Brian Baker, and Emily Brown Rosen,
Organic Materials Review Institute

To: National Organic Standards Board

Subject: **Ion Exchange Resins**

In light of the recent discussion regarding the suitability of the processing technology known as ion exchange for organic foods, OMRI would like to provide some background information in order to facilitate a complete, accurate, and objective consideration of the issues. This is done as part of OMRI's mission to serve the public with the professional, independent, transparent review of materials and compatible processes allowed to produce, process, and handle organic food and fiber.

In particular, OMRI would like to make the following points:

- Ion exchange is a chemical process;
- Ion exchange resins are processing aids; and
- Ion exchange resins are functionally different from other polymers used in packaging.

Ion Exchange is a Chemical Process

One of the key food science references defines ion exchange as a 'reversible *chemical reaction* between a solid and an aqueous solution that allows the interchange of ions . . .' (Ockerman, 1991). Reactions that involve ion exchange resins chemically alter the food that is processed. Synthetic ion exchange resins are formulated precisely to enhance their chemical functionality (Dow, 2002).

Ion exchange is based on the principle that a solid mass with immobilized charges can attract the mobile ions of the opposite charge in a fluid media. In practice, this involves a column that is like a large pipe packed with an exchanger, which may be in the form of beads, crystals, gels, or granules. The fluid can pass through, but the ions in solution will be pulled out and held to the exchanger. The process chemically changes the resulting fluid.

Ion Exchange Resins Differ Functionally from Other Polymers

Cross-linked polymers used to remove ions from solution differ significantly in both form and function from various polymers used to package food or used on food contact surfaces equipment. By definition, ion exchange resins create a chemical change. That is their primary purpose. However, these other applications perform different functions than ion exchange.

While some reactions may take place with such polymers, this is not their intended purpose and is regarded as a product defect. Incidental contamination by prohibited materials intentionally added to packaging is, of course, subject to the NOPS at 7 CFR 205.272(b). By contrast, ion exchange resins are used specifically for the chemical modifications that they create in the food. Such resins are considered defective—'poisoned' if you will—if they fail to react with the food they contact.

Ion exchange resins are known to leak from columns and thus become incidental additives in the food. The FDA uses ion exchange resins as an example of consumer exposure to secondary food additives (FDA, 1995).

Conclusion

Given that organic food production and processing are process-based, rather than performance-based standards, the evidence of residual contamination is secondary to the chemical reactions that take place in the processing of the food. Just as the use of a synthetic fertilizer or pesticide disqualifies crops, and the use of conventional feed and animal drugs disqualifies organic livestock from making organic claims, this principle applies as well to the use of a non-organic processing aid that does not appear on the National List. This is true regardless of whether or not the prohibited substance leaves detectable residual contamination.

The well-established procedure to petition for the use of materials for use in organic food also provides an opportunity for detailed review of the issues at hand. This will provide the organic community with a chance to comment and aid the NOSB to come to a consensus on the use of processing aids. While we understand that this particular process is important for some segments of the food industry, we believe that an informed public debate through the venue of NOSB materials decision-making process will build support for whatever outcome is decided. Until such a process takes place, it is clear that the substance cannot be used in organic processing or handling, and that any food that comes into contact with cross-linked styrene-divinylbenzene ion exchange polymers would lose its organic status.

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