



## **BEYOND PESTICIDES**

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September 24, 2020

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**Docket ID # AMS-NOP-20-0041**

### **Re. CS: Paper pots**

These comments to the National Organic Standards Board (NOSB) on its Fall 2020 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.

We very much want to work out something that would allow organic growers to take advantage of paper pot systems without violating the values central to organic and the standards of the law. As we said in previous comments, we believe that, in terms of materials going into the soil, paper pots as petitioned are unlikely to be worse (in terms of environmental and health impacts) than paper that is currently allowed in mulch and compost. We believe that opinion is supported by the new Technical Review (TR). However, now that more information is available, the petition for paper pots needs to be judged according to the criteria in the Organic Foods Production Act (OFPA), rather than in comparison to recycled newspaper and other paper allowed as mulch and compost feedstock.

Unfortunately, the Crops Subcommittee (CS) is applying the standard, “if the fibers and adhesives are allowed in the other listings for paper, then their use in pots should be allowed as well.” At the same time, the CS is establishing a precedent for allowing virgin paper—a precedent that may lead to petitioning for the use of virgin paper for mulch as well, without a clear understanding of the original prohibition on the use of virgin paper.

We are happy to see, on the other hand, that the CS has attempted to develop a definition and an annotation that it hopes will ensure that the listing meets OFPA criteria. Hopefully, the NOSB will learn from the experience of biobased biodegradable mulch film—rushing into approval can lead to problems down the road. We hope that the CS proposal can be tweaked so that it truly meets OFPA criteria.

## Paper in Organic Production

We find it necessary to put this discussion into a broader context.

Many things have changed since the passage of the Organic Foods Production Act (OFPA). Organic production has grown, and the size of many organic growing operations has grown. The way materials on the National List are used has changed—and many growers have become more dependent on those added synthetics. In addition, the materials themselves have changed. All of these changes are manifested in newspaper, other recycled paper, and other proposed uses of paper.

### **Mulches**

Natural organic mulches should be the norm in organic production. The use of natural organic materials in compost and mulch is foundational to organic. In 2001, the National Organic Standards Board (NOSB)<sup>1</sup> gave this definition:

Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. These goals are met, where possible, through the use of cultural, biological, and mechanical methods, as opposed to using synthetic materials to fulfill specific functions within the system.

The NOSB went on to say that, among other things, an organic production system is designed to: “optimize soil biological activity;” “utilize production methods and breeds or varieties that are well adapted to the region;” “recycle materials of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources;” and “minimize pollution of soil, water, and air.” The use of natural mulches—including cover crops—contributes to all of these values.

Organic production systems are also intended to mimic natural ecosystems. In natural systems, plants are fed by the action of soil organisms breaking down plant residues and excreting substances that are plant nutrients. Natural mulches provide a steady diet of organic matter for those soil organisms. This function is one way that we can judge the compatibility of synthetic mulches with organic values.

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<sup>1</sup> NOSB Principles of Organic Production and Handling. NOSB Recommendation Adopted October 17, 2001.

## Newspaper and Other Recycled Paper

When OFPA was passed, and when the first NOSB was working on the first rule, organic growers saw newspapers as a natural, or nearly natural, solution to difficult mulching situations. In those cases, newspaper or other repurposed paper could be combined with other natural mulches to provide a more impermeable layer between plants—a layer that would decompose, adding organic matter to the soil, thus enhancing soil biological activity. It was also seen as recycling plant-based material in order to return nutrients to the land, thus minimizing the use of non-renewable resources.

When newspaper was first evaluated for the National List in 1995, it was seen as basically wood pulp with additives. The additives in black ink were considered to be mostly innocuous, while colored inks and glosses were prohibited because of the hazards they posed. The listing of recycled paper was a fulfillment of the value that organic agriculture should “recycle materials of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources.”

Now fast-forward to the most recent TR on newspaper and other recycled paper in 2017. Although being mostly composed of cellulose, starch, and lignin, the TR finds:<sup>2</sup>

Modern paper products also use a wide variety of synthetic polymers and co-polymers that change the functionality and performance of the paper compared with simple cellulose-starch blends. Aluminum foil and paraffin waxes are added to paper and paperboard used in food packaging. Newspaper and other printed matter have inks, dyes and toner (a solid powder used for electrostatic or electrophoretic printing). Most ink in newsprint and office paper is black, but colored inks and dyes are used on various printed material and packaging. With the advent of color printing processes, more newspapers and office paper applications involve colored ink. More printing is done with colored toner as well. Some papers do not use inks or toner for printing. Thermal paper changes color when heat is applied. The prevalent reactant acid used in thermal paper is bisphenol A (BPA). BPA is also used in flyers, magazines, newspapers, napkins, paper towels, toilet paper and paper cups.

No longer can paper be regarded as “basically wood pulp.” However, it is still valuable to keep newspaper and other paper out of the waste stream, where it is still the largest category of municipal solid waste. This issue folds into the issue paper pots (and other production aids), in which the petition calls for using virgin paper.

However, more fundamental than the issue of balancing resource recovery against potential soil contamination—that is virgin vs. recycled paper—are the issues of whether these uses of paper meet OFPA criteria: Are these uses of paper harmful to human health or the environment, taking into account their entire life cycle? Are they “necessary to the production

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<sup>2</sup> 2017 TR, Newspaper or Other Recycled Paper. Lines 51-63.

or handling of the agricultural product because of the unavailability of wholly natural substitute products”? Are they “consistent with organic farming and handling”?

As every technical review and NOSB review has stated, there are many natural materials that can be used as mulch. In addition, weed control alternatives include “cultivation, living mulches, hand weeding, flame weeding, crop rotation, and biological control of weeds.” For the use of newspaper or other recycled paper to meet the criterion of necessity—as opposed to convenience—it would be required not only that other sources of mulching materials be unavailable, but also that other means of weed control be unavailable.

## **Paper manufacture**

The manufacture of paper pots begins with the manufacture of kraft paper. The TR summarizes environmental impacts of paper production:

The environmental impacts of manufacturing virgin paper are considered to be significantly greater than recycling paper (Roberts 2007; Martin and Haggith 2018). Harvesting trees to make virgin pulp and paper predictably results in soil erosion and water sedimentation through road-building activity, exposure of bare soil, and accelerated water runoff (Corbett, Lynch, and Sopper 1978; Croke and Hairsine 2011; Anderson and Lockaby 2011). While forestry best management practices (BMPs) may mitigate these effects, BMPs are not always implemented and there are still environmental quality concerns that have not been addressed by BMPs (Anderson and Lockaby 2011). Reduction of forest disturbance by recycling is seen as an environmental benefit (Villanueva and Wenzel 2007). One ton of virgin kraft paper requires 4.4 tons of trees to produce; the same amount of recycled kraft paper requires 1.4 tons of recovered paper to produce (Roberts 2007).

The ability of the forest to sequester carbon is curtailed by harvest (Martin and Haggith 2018). Additionally, recycling waste paper consistently uses less energy and results in fewer greenhouse gas emissions compared with landfilling or incinerating it (Björklund and Finnveden 2005; Villanueva and Wenzel 2007; US EPA 2011; Ghinea et al. 2014). Agricultural by-product sources of pulp fiber can mitigate the adverse impacts of the reliance on wood from forests (USDA 2017; Martin and Haggith 2018). However, the workers who are making the paper pots are more likely to be exposed to chemicals that have adverse health effects than the farmers and farmworkers using the paper pots or those who eat the food grown from the transplants.

Recycled paper products generally have greater contaminant content than virgin paper (Biedermann and Grob 2010; Blechschmidt et al. 2012; Rosenmai et al. 2017). Inks, dyes, and other chemicals not applied to virgin paper will still be present in recycled paper, with only the highest grades of recycled papers being free of impurities and contaminants (Blechschmidt et al. 2012). Recycled paper can include a wide variety of chemical contaminants that are either not present or found at much lower levels in virgin paper. These include heavy metals that may be used in inks and dyes; synthetic

polymers used in gloss and as reinforcement; and various adhesives, including the ones being considered in this Technical Review (Borchardt 2006).<sup>3</sup>

The 2017 TR on newspaper and other recycled paper goes into greater depth concerning discharges from manufacture:

Pulp and paper manufacturing has a history of being a heavy polluter of water and air. Effluents from paper manufacturing include the chemical treatments used in the pulping process, dyes, fillers and bleaches (Hamm 2012). Pulp and paper facilities are regulated in the United States as point sources of water pollution under the Clean Water Act. As such, they are required to obtain permits for the discharge of effluents into water, to limit those effluents according to the permit, and to be subject to monitoring and fines by the EPA [40 CFR 430]. The effluent limits are technology based. Some of the treatments and reaction products may be classified as toxic pollutants subject to the Toxics Release Inventory program of EPA, including dioxins and furans (U.S. EPA 2006). Heavy metals are also discharged into water. In most years, pulp and paperboard manufacturing has been one of the top industrial sources of lead, cadmium and mercury released into Canadian water (Environment and Climate Change Canada 2016).

Pulp and paper mills generally use wood and waste paper as fuel, releasing carbon dioxide into the atmosphere and contributing to greenhouse gas emissions. In the United States, pulp and paper mills are considered stationary sources of air pollution and are subject to EPA regulation under the Clean Air Act [40 CFR 63]. In addition to greenhouse gases, paper mills also emit hazardous air pollutants (HAPs) that are generated as part of the pulping and chemical treatment of paper. The highest emitted HAPs from pulp and paper mills in 1996 were acrolein, acetaldehyde, o-cresol, carbon tetrachloride, chloroform, cumene, formaldehyde, methanol, methylene chloride, methyl ethyl ketone, phenol, propionaldehyde, 1,2,4-trichlorobenzene, and o-xylene (U.S. EPA 2001). The HAPs are produced by both the sulfite and Kraft processes, as well as by various treatments such as bleaching.

## **Virgin Paper, Paper Production Aids**

In August of 2018, the NOSB received a petition to add chain paper pots to the National List for growing and transplanting plants. This petition introduced a number of new issues for consideration:

- The use is not for mulching or composting, but as a pot that would be placed in the ground along with the transplant.
- Although paper pots are not necessary, the chain paper pot system allows transplanting in a relatively low-tech process (without motorized propulsion) that saves the grower much tedious work.

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<sup>3</sup> Paper Pots and Containers TR, 2019. Lines 601-631.

- The paper, as petitioned, contains synthetic ingredients that are not on the National List, but which do occur in recycled paper that is currently allowed.
- The paper is not recycled, but is virgin paper, produced from unbleached Kraft pulp and adhesives. Non-paper synthetic fibers have been used up to 15% in the paper pots, but the manufacturer has proposed that these fibers be replaced by a natural hemp fiber.
- Some of the ingredients may not be biodegradable.
- The Crops Subcommittee also considered expanding the listing to other uses of paper.

From an environmental perspective, the most significant aspect of the paper pots petition is the use of virgin paper. Using recycled paper as a farm input does add a number of synthetic chemicals—not all known—to the farm. However, the use of virgin paper has far-reaching environmental impacts. As summarized by the 2019 TR,<sup>4</sup>

The environmental impacts of manufacturing virgin paper are considered to be significantly greater than recycling paper. Harvesting trees to make virgin pulp and paper predictably results in soil erosion and water sedimentation through road-building activity, exposure of bare soil, and accelerated water runoff. While forestry best management practices (BMPs) may mitigate these effects, BMPs are not always implemented and there are still environmental quality concerns that have not been addressed by BMPs. Reduction of forest disturbance by recycling is seen as an environmental benefit. One ton of virgin kraft paper requires 4.4 tons of trees to produce; the same amount of recycled kraft paper requires 1.4 tons of recovered paper to produce.

The ability of the forest to sequester carbon is curtailed by harvest. Additionally, recycling waste paper consistently uses less energy and results in fewer greenhouse gas emissions compared with landfilling or incinerating it. Agricultural by-product sources of pulp fiber can mitigate the adverse impacts of the reliance on wood from forests. However, the workers who are making the paper pots are more likely to be exposed to chemicals that have adverse health effects than the farmers and farmworkers using the paper pots or those who eat the food grown from the transplants.

The harvest of trees results in the loss of soil and water-holding capacity in forests and reduces atmospheric carbon sequestration. Biomass cultivation can result in potential loss of biodiversity, soil carbon depletion, increased soil erosion, deforestation, and increased greenhouse gas emissions.”

### **Virgin paper from wood pulp is not acceptable.**

As far as we have been able to determine, virgin paper has not been allowed or petitioned for use in organic production. The allowed paper is, consistent with organic principles, organic material that is removed from the waste stream, which allows the NOSB to ignore the impacts of paper manufacture that are outlined above. If, instead, virgin paper is

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<sup>4</sup> TR Paper Pots and Containers, 2019. Lines 601-622; 675-678.

used—especially virgin paper made from wood pulp—then the NOSB must take into account these sizeable environmental impacts.

The petitioner has suggested that hemp could replace tree pulp, which would reduce the impacts of harvesting trees, but would add impacts of agricultural hemp production. Those impacts have not been assessed in the technical reviews. However, other authors have assessed the environmental impacts of hemp production and found them to be smaller in terms of input requirements and discharges than other major crops, while yielding higher quantities of dry matter.<sup>5</sup> The petition states that non-bleached kraft paper is used in the Nitten pots, which is significant, due to the contribution of chlorine bleach and its reaction products to the effluent stream.

## Additives

Wood or hemp pulp is cellulose and readily degrades in the soil. Paper pots may also contain strengtheners, reinforcement fibers, adhesives, and antimicrobials. We do not consider the fact that these additives are currently used in other paper, which may end up in recycled paper on organic farms, to be a reason *per se* to accept them in paper pots.

The strengtheners cited in the petition are magnesium chloride, which is considered to be nonsynthetic, and the urea resin dimethylol dihydroxy ethylene urea (DMDHEU). DMDHEU is a resin that is also used in permanent press fabrics, where it is known as a formaldehyde-releasing substance that may cause formaldehyde-allergic reactions.<sup>6</sup> Aside from the dermal sensitivity, DMDHEU is considered to have low acute toxicity.<sup>7</sup> It is suspected by the European Union of causing cancer through inhalation exposure and mutations.<sup>8</sup> It does not bioconcentrate, and its biodegradation half-life is 4.67 days.<sup>9</sup> The petition says, “The new line of paper pot products (which are the focus of this petition) will replace one of the synthetic ingredients in the paper with a natural substitute: hemp fiber.” This refers to vinylon, so apparently the DMDHEU will remain. Urea-formaldehyde resin is allowed in paper and paperboard used in food packaging.<sup>10</sup>

The petition says that the adhesives used in paper pots are ethylene vinyl acetate (EVA) resin, polyvinyl acetate resin (PVAc), and acrylic acid ester (AAE) copolymer. An adhesive related to these is polyvinyl alcohol (PVA), to which PVAc is readily degraded. All three are used

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<sup>5</sup> Werf, H., 2004. Life Cycle Analysis of field production of fibre hemp, the effect of production practices on environmental impacts. *Euphytica*, 140.

<sup>66</sup> De Groot, A.C., Le Coz, C.J., Lensen, G.J., Flyvholm, M.A., Maibach, H.I. and Coenraads, P.J., 2010. Formaldehyde-releasers: relationship to formaldehyde contact allergy. Part 2. Formaldehyde-releasers in clothes: durable press chemical finishes. *Contact Dermatitis*, 63(1), pp.1-9.

<sup>7</sup> <https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1025140#toxicity-values>.

<sup>8</sup> <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/notification-details/25960/745920>.

<sup>9</sup> <https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1025140#env-fate-transport>.

<sup>10</sup> Paper Pots and Containers TR, 2019. Table 2. FDA Status of Selected Paper Additives.

for food contact surfaces and/or food packaging.<sup>11</sup> PVA, EVA, PVAc, and magnesium chloride are all on EPA List 4B, Minimum Risk Inert Ingredients.<sup>12</sup>

Fiber reinforcement may also be added. The Nitten paper pots use vinylon, but will substitute hemp fiber in the new line of pots—although the CS reports that substitution has not so far been successful.

The final—and most objectionable—additives are antimicrobials. These would not be allowed in packaging for organic foods, according to OFPA §6510(a)(5). Nitten certifies that their pots do not contain any fungicides, preservatives, or fungicides.

We conclude from the petition and TR that the Nitten pots, at least, do not contain any additives that could not be found in organic food by virtue of presence on food contact surfaces or food packaging. The remaining issue is the extent to which these additives biodegrade in the soil.

## Microplastics

Scientists are increasingly concerned about the impacts of microplastics—plastic fragments less than 5 mm in size—in size—on a wide range of organisms. Although concerns were first raised about microplastics in the marine environment, impacts on terrestrial organisms are increasingly documented.

A major source of microplastics in surface water is wastewater treatment plants. Although microplastics in soil have been less studied, presumably, microplastics in soil make their way in runoff to surface water. Agricultural soils may receive microplastics from sludge/compost fertilization, plastic mulches, and wastewater irrigation.<sup>13</sup>

Microplastics can cause harmful effects to humans and other organisms through physical entanglement and physical impacts of ingestion. They also act as carriers of toxic chemicals that are adsorbed to their surface. Some studies on fish have shown that microplastics and their associated toxic chemicals bioaccumulate, resulting in intestinal damage and changes in metabolism.<sup>14</sup> Soil organisms and edible plants have been shown to ingest microplastic particles.<sup>15</sup> Earthworms can move microplastics through the soil, and microplastics can move through the food chain to human food.<sup>16</sup> Microplastics can have a wide range of negative impacts on the soil, which are only beginning to be studied, but include reduction in

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<sup>11</sup> Paper Pots and Containers TR, 2019. Table 2. FDA Status of Selected Paper Additives.

<sup>12</sup> Paper Pots and Containers TR, 2019. Line 115.

<sup>13</sup> Zhu, F., Zhu, C., Wang, C. and Gu, C., 2019. Occurrence and ecological impacts of microplastics in soil systems: a review. *Bulletin of environmental contamination and toxicology*, 102(6), pp.741-749.

<sup>14</sup> Li, J., Liu, H. and Chen, J.P., 2018. Microplastics in freshwater systems: A review on occurrence, environmental effects, and methods for microplastics detection. *Water Research*, 137, pp.362-374.

<sup>15</sup> Zhu, F., Zhu, C., Wang, C. and Gu, C., 2019. Occurrence and ecological impacts of microplastics in soil systems: a review. *Bulletin of environmental contamination and toxicology*, 102(6), pp.741-749.

<sup>16</sup> He, D., Luo, Y., Lu, S., Liu, M., Song, Y. and Lei, L., 2018. Microplastics in soils: analytical methods, pollution characteristics and ecological risks. *TrAC Trends in Analytical Chemistry*, 109, pp.163-172.



growth and reproduction of soil microfauna.<sup>17</sup> When looking at the impact of microplastics, it is important to include the impact of associated substances. As noted above, they can carry toxic chemicals. A review by Zhu et al. cites several studies showing, “[M]icroplastics can serve as hotspots of gene exchange between phylogenetically different microorganisms by introducing additional surface, thus having a potential to increase the spread of ARGs [antibiotic resistance genes] and antibiotic resistant pathogens in water and sediments.”<sup>18</sup>

## Back to Paper

The consideration of microplastics should remind us that both recycled paper and virgin paper used in paper planting aids often contain polymers. These polymers—including polyethylene, polyacrylamides, and polyesters<sup>19</sup>—which may persist after the degradation of the cellulose and lignin from wood pulp, are microplastics and present similar hazards to the microplastics discussed above.

## Biodegradability of Additives in Pots

### PVA/PVAc

PVAc is commonly known from its use in Elmer’s Glue-All.<sup>20</sup> It is related to polyvinyl alcohol (PVA) in that PVA is manufactured from PVAc by hydrolysis. The TR says, “Natural degradation of PVA can be readily 100 percent biodegradable in 30 days under ideal conditions.”<sup>21</sup> Other authors state, “PVA is an outstanding example showing that conditions are crucial for biodegradation. Quantitative degradation is described in wastewater treatment plants run with an activated sludge containing an adapted microbial population; however, the biodegradation rate decreases significantly in systems lacking such a prepared microbial population. This must be kept in mind because degrading organisms or communities are not evenly distributed in all biotopes.”<sup>22</sup>

Unfortunately, details about the rate of degradation of PVAc are harder to determine. PVAc is degraded by fungi—specifically, it is known to be degraded by *Aspergillus* spp. and *Penicillium* spp.<sup>23</sup> Both fungal genera are ubiquitous and found in soil environments.<sup>24</sup> Vinyl

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<sup>17</sup> He, D., Luo, Y., Lu, S., Liu, M., Song, Y. and Lei, L., 2018. Microplastics in soils: analytical methods, pollution characteristics and ecological risks. *TrAC Trends in Analytical Chemistry*, 109, pp.163-172.

<sup>18</sup> Zhu, F., Zhu, C., Wang, C. and Gu, C., 2019. Occurrence and ecological impacts of microplastics in soil systems: a review. *Bulletin of environmental contamination and toxicology*, 102(6), pp.741-749.

<sup>19</sup> 2017 TR, Newspaper or Other Recycled Paper. Lines 21-216.

<sup>20</sup> Paper Pots and Containers TR, 2019. Lines 161-163.

<sup>21</sup> Paper Pots and Containers TR, 2019. Line 481.

<sup>22</sup> Amann, M. and Minge, O., 2011. Biodegradability of Poly (vinyl acetate) and Related Polymers. In *Synthetic Biodegradable Polymers* (pp. 137-172). Springer, Berlin, Heidelberg.

<sup>23</sup> Trejo, A.G., 1988. Fungal degradation of polyvinyl acetate. *Ecotoxicology and environmental safety*, 16(1), pp.25-35.

<sup>24</sup><sup>24</sup> <https://drfungus.org/knowledge-base/aspergillus-species/>; <https://drfungus.org/knowledge-base/penicillium-species/>.

acetate, the monomer of PVAc, is subject to microbial degradation to acetate and acetaldehyde.<sup>25</sup>

## **EVA**

The only information about the biodegradability of EVA we have found is this statement of purpose in a research paper: “The purpose of this work was to prepare biodegradable copolymers using a non-biodegradable (ethyl vinyl acetate) and biodegradable polymers (polylactic acid), in order to obtain biodegradable copolymers.”<sup>26</sup>

## **AAE Polymer**

The Hazardous Substances Data Bank says the following, “In the semi-continuous activated sludge test for inherent biodegradability, [acrylic acid polymer] (mean molecular weight of 4,500) removal was 40% (incubation time not specified); using a continuous-feed activated sludge test, removal was 27%.” No information was available for the identifying CAS number given in the petition. This was for acrylic acid polymer, CAS # 9003-01-4.

## **Compatibility with Organic Practices**

The use of the petitioned paper pots is compatible with the way paper has been used in organic production—as mulch and a compost feedstock. It is used as a (mostly?) biodegradable input that performs a needed function while adding carbon to the soil, without adding toxic inputs. It is compatible with small-scale farms and does not require gasoline-powered machinery.

## **Conclusion**

The use of paper pots as petitioned—hemp kraft paper, with hemp fibers for strength, and with the petitioned additives—magnesium chloride and DMDHEU as strengtheners and the adhesives PVAc, EVA, and AAE—poses no more hazard to the soil or to organic consumers than the allowed use of recycled paper, which contains many more additives. However, as we stated at the beginning of these comments, this decision should not be based on a comparison with the allowed use of recycled paper, but on compliance with OFPA criteria.

The use of the paper pots does not appear to pose any health threat. The TR says, “The only additives commonly found in virgin kraft paper that is [*sic*] likely to pose any toxicological health risks are formaldehyde resins.”<sup>27</sup> Even the urea-formaldehyde resin (DMDHEU) is allowed in food packaging used for organic food.

We are not satisfied with the lack of information on the biodegradability of the adhesives. It seems likely to us that the adhesives, encompassed in a matrix of cellulose, will

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<sup>25</sup> Nieder, M., Sunarko, B. and Meyer, O., 1990. Degradation of vinyl acetate by soil, sewage, sludge, and the newly isolated aerobic bacterium V2. *Appl. Environ. Microbiol.*, 56(10), pp.3023-3028.

<sup>26</sup> Moura, I., Machado, A.V., Nogueira, R. and Bounor-Legare, V., 2010. Synthesis of biodegradable copolymers based on ethylene vinyl acetate and polylactic acid. In *Materials Science Forum* (Vol. 636, pp. 819-824). Trans Tech Publications.

<sup>27</sup> Paper Pots and Containers TR, 2019. Lines 567-568.

probably degrade quickly. But we would like to base that judgment on data—more data than is available from the TR or other information found in our research.

The TR notes, “A comprehensive review of the manufacturing processes of all possible additives, adhesives and reinforcement fibers is beyond the scope of this review.” It is also beyond the scope of our comments; however, the NOSB should not consider it beyond the scope of its review of the petition. Based on the information in the new TR, the CS should develop a proposal that contains an annotation clarifying the materials and manufacturing processes that will be allowed. The NOSB and NOP should facilitate support for the domestic production of paper pots that are compatible with organic principles. Finally, since there will be other products that incorporate other additives, the NOSB should hold the line on allowed materials in the pots, while remaining open to amended annotations in the future.

The proposal from the CS is not satisfactory. The annotation should address these issues:

1. Virgin paper from wood pulp should be excluded. The NOSB should determine which alternative sources of cellulose would be acceptable and annotate accordingly.
2. Only nonsynthetic reinforcement fibers should be allowed.
3. The NOSB should return to the 85% requirement for biobased components, and revisit it during sunset. The only way we know to ensure this is to place an expiration date on the listing.
4. The examination of adhesives needs to address biodegradability, and the annotation should allow only those that biodegrade completely to nontoxic byproducts.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in cursive script, appearing to read "Terry Shistar".

Terry Shistar, Ph.D.  
Board of Directors