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USDA-AMS-NOP
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Washington, DC 20250-0268

Docket ID # AMS-NOP-24-0081

Re. Synthetic Compost Feedstocks Discussion Document

These comments to the National Organic Standards Board (NOSB) on its Spring 2025 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 eliminate a reliance on pesticides. Our membership and network span the 50 states and the world.

Summary of these comments

Beyond Pesticides shares the concerns of those "wary of" including compostable polymers on the National List and allowing them in compost used on organic farms. Synthetics that do not meet the requirements of the *Organic Foods Production Act* (OFPA), including that they are "necessary to the production or handling of the agricultural product because of the unavailability of wholly natural substitute products" should not be added to the National List.

Compost from plant and animal materials is of fundamental importance to organic practices. Composting is one way that organic growers meet the requirement in law to "foster soil fertility, primarily through the management of the organic content of the soil through proper tillage, crop rotation, and manuring."[1] The integrity of organic production must be maintained by preserving the integrity of compost. Contaminants in broadly defined "compost feedstocks" cannot be predicted, but history suggests that more persistent toxic pollutants will be found. The NOSB must maintain control over synthetic materials allowed in organic production, as required by the Organic Foods Production Act (OFPA). Only synthetic materials that are specifically added to the National List through the prescribed process should be allowed in compost destined to be an input into organic production. Research continues to raise alarms about the hazards associated with the use of plastic, including the microplastic particles that are distributed in alarming amounts throughout the environment and taken

[1] Organic Food Production Act (OFPA) 6513(b)(1).

up by organisms, including humans. The NOSB should reopen the workplan item on contaminated inputs that is currently on hold.

Overview

Compost from plant and animal materials is of fundamental importance to organic practices. While we want to encourage composting in general, it is increasingly viewed as a dumping ground for the waste products of industrial society. Because of the potentially broad nature of the inputs, compost without parameters is incompatible with the principles of organic production. It is important to recognize that composting of "food waste" can result in widespread contamination with persistent toxic chemicals and heavy metals.[2] This can occur not only from the use of the compost in organic production, but also from its widespread use in other systems, encouraged by its acceptance in organic systems. Organic standards must maintain strict control over allowed organic inputs and seek ways to eliminate contaminated inputs.

Compost is of fundamental importance for organic production.

The requirement for organic producers to "foster soil fertility, primarily through the management of the organic content of the soil through proper tillage, crop rotation, and manuring" is a central tenet of OFPA at §6513. Composting is the principal tool used by organic producers in implementing this management requirement. Most importantly, compost introduces and augments the soil organisms that build organic fertility and sequester carbon in the soil.

The NOSB, in advising USDA on implementation of OFPA, approved "Principles of Organic Production and Handling"[3] that emphasize above all, that organic production systems "optimize soil biological activity." Organic systems also, according to the NOSB, "[r]ecycle materials of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources" and "[m]inimize pollution of soil, water, and air."

These principles are also built into NOSB guidance on compatibility with a system of sustainable agriculture and consistency with organic farming and handling,[4] to be used in National List decisions. That guidance lists as its first question, "Does the substance promote plant and animal health by enhancing the soil's physical chemical, or biological properties?"

National Organic Program (NOP) regulations also recognize the importance of composting and building soil biology at §205.203: The "[s]oil fertility and crop nutrient management practice standard" that describes practices, including composted plant and animal materials, that "maintain or improve the physical, chemical, and biological condition of soil and minimize soil erosion."

Organic Agriculture and Organic "Waste"

Although organic agriculture "emphasizes the use of management practices in preference to the use of off-farm inputs,"[5] organic farmers and gardeners are known for scavenging organic matter

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[2] EPA, 2021. Emerging Issues in Food Waste Management: Persistent Chemical Contaminants. https://www.epa.gov/system/files/documents/2021-08/emerging-issues-in-food-waste-management-persistent-chemical-contaminants.pdf. For heavy metals, see Zhujie Chu, Xiuhua Fan, Wenna Wang, Wei-chiao Huang, Quantitative evaluation of heavy metals' pollution hazards and estimation of heavy metals' environmental costs in leachate during food waste composting, 2019. Waste Management 84,: 119-128. https://doi.org/10.1016/j.wasman.2018.11.031.

[3] NOSB recommendation adopted October 17, 2001.

[4] NOSB recommendation adopted April 29, 2004.

[5] NOSB Principles of Organic Production and Handling, adopted October 17, 2001.

from surrounding farms and communities. When organic farmers can make use of manure, grass clippings, vegetable waste, and other organic materials that would otherwise cause problems for others, it appears to be a mutually beneficial arrangement.

However, there are often other parties involved, some of whom may be unknown to both the organic farmer and the supplier of the materials. Manure may come from animals that have been treated with antibiotics, other drugs prohibited in organic production, or pesticides. Grass clippings may be from lawns that were treated with pesticides (including insecticides, herbicides, and fungicides) and synthetic fertilizers. Straw may come from a crop that was treated with pesticides and synthetic fertilizers.

Many of these contaminants can be broken down to harmless constituents by composting and other practices used on organic farms, but some may not. In addition, use patterns can affect residues of pesticides–such as when herbicides are used as harvest aids.

Organic Methods in Environmental Cleanup

Bioremediation is the use of biological agents, such as bacteria, fungi, or green plants, to remove or neutralize contaminants, as in polluted soil or water. In doing so, it uses methods long employed by organic farmers, such as composting and plants that accumulate specific substances.

The process of composting uses organisms, including earthworms, bacteria, and fungi, to break down organic matter to a form more readily available to soil life, which releases nutrients for plants. Since many pesticides and industrial pollutants are organic (carbon-based) chemicals, they may be broken down by the same process. Bioremediation of contaminated sites uses microorganisms and fungi selected or engineered for feeding on specific contaminants.

Organic farmers may also use plants that accumulate certain macro- and micronutrients. If these plants are composted, they make those nutrients more available to crops. Bioremediation may also make use of plants and fungi that hyperaccumulate heavy metals in phytoextraction. In this case, the harvested crop can be moved off the site and contaminants recovered through composting or incineration. This may even become an economically viable source of the metals.[6]

Industrial Byproducts as Organic Inputs

The penchant of organic farmers for scavenging inputs has not gone unnoticed by industry. As a result, the National Organic Program has received petitions to allow several materials that are byproducts of industrial processes. These include ash from burning poultry manure, sulfurous acid, tall oil, corn steep liquor, and vinasse. The NOSB has sometimes—though not always—treated these materials as being incompatible with organic production. In part, the incompatibility arises from a reluctance to be reliant on industrial byproducts. In the case of ash from manure burning–a nonsynthetic material prohibited for use because of the dependence of organic production on the carbon and nitrogen that manure provides—the NOSB has stated, “Utilizing burning as a method to recycle millions of pounds of excess poultry manure inadvertently supports the business of CAFOs by creating an organic industry demand for ash. Utilizing ash from manure burning in order to assist

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[6] Raskin, I., Smith, R. D., & Salt, D. E. (1997). Phytoremediation of metals: using plants to remove pollutants from the environment. *Current opinion in biotechnology*, *8*(2), 221-226.

CAFOs in their reduction of environmental and human health contamination is not a compelling argument for consideration for addition to the National List."[7]

Contaminants are more pervasive, with negative impacts in smaller concentrations, than were previously known.

We are daily confronted with examples of two forms of this pervasive contamination—microplastics and poly- and per- fluoroalkyl substances (PFAS).

Plastic

Research continues to raise alarms about the hazards associated with the use of plastic, including the microplastic particles that are distributed in alarming amounts throughout the environment and taken up by organisms, including humans. A study published by researchers at Columbia and Rutgers universities in the January 2024 Proceedings of the National Academy of Sciences reports that the average liter of three brands of bottled water in the U.S. contains almost a quarter of a million bits of microplastics, of which 90 percent are at the nanoscale.[8] The other ten percent are slightly larger, at microscale.

Last December, researchers at Norway's MicroLEACH project published a study that analyzes the components of 50 items in common use—plastic bags, disposable cups, dishwashing gloves, car tire granules, children's toys and balloons.[9] The researchers found, as in previous studies, that many hazardous chemicals are in the plastics as well as many that **could not be identified** because they were not listed in the major chemical substance databases. Only 30 percent of the chemical compounds identified in the study were present in two or more products. This suggests that most plastics contain many unidentified chemicals, far beyond the known impurities, metabolites and degradation products. Further, it suggests that in the environment plastics are chemically reactive and forming new compounds not anticipated and whose toxicity is unknown.

In the Columbia/Rutgers study, the researchers checked for seven types of plastic, but they were only able to identify about ten percent of the nanoparticles they found. Polyethylene terephthalate (PET) was a common ingredient, probably because many water bottles are made of it. However, they also found polyamide, polystyrene, polyvinyl chloride, and polymethyl methacrylate. (Tap water also contains microplastics in many places, although in much lower concentrations.) The team found that the number of individual chemical compounds varied wildly among products, ranging from 114 to 2,456, leading them to conclude that "assessing the toxicity of plastic chemicals present in a product based on testing individual target chemicals has limited value." Norwegian scientists also exposed cod eggs, embryos and larvae to water containing microplastics. The toxic effects they observed include spinal deformities reminiscent of scoliosis in humans.

Another new study finds that, out of a total of 257 patients who completed the study, polyethylene was detected in carotid artery plaque of 150 patients (58.4%), with a mean level of 2% of plaque; 31 patients (12.1%) also had measurable amounts of polyvinyl chloride, with a mean level of

[7] Spring 2015 proposal on petition for annotation of ash from manure burning on §205.602 of the National List.

[8] Qian N, Gao X, Lang X, Deng H, Bratu TM, Chen Q, Stapleton P, Yan B, Min W. Rapid single-particle chemical imaging of nanoplastics by SRS microscopy. Proc Natl Acad Sci U S A.

[9] Summary at https://phys.org/news/2023-12-toxicity-standard-plastic-products.html.

0.5% of plaque.[10] Yet another study concludes that microplastic particles have even shown up in the brain as well as the placenta.[11]

PFAS

With health risks,[12] including developmental, metabolic, cardiovascular,[13] and reproductive harm, cancer, damage to the liver, kidneys, and respiratory system, as well as the potential to increase the chance of disease infection and severity,[14] per- and polyfluoroalkyl substances (PFAS) and their toxic trail of contamination in the environment is wreaking havoc with all life. Gestational (during pregnancy) and childhood exposure to PFAS increases cardiometabolic risk, or the risk of heart diseases and metabolic disorders, later in life, according to a Brown University study published in *Environment International*.[15] The use of PFAS in industrial and commercial applications has led to widespread contamination of water and biosolids used for fertilizer, poisoning tens of millions of acres of land and posing a significant threat to the biosphere, public health, gardens, parks, and agricultural systems. Farmers and rural communities, in particular, bear the brunt of this contamination, as it affects their drinking water, soil quality, and livestock health.

There are more than 9,000 synthetic (human-made) chemical compounds in the PFAS family, which includes the most well-known subcategories, PFOS (perfluorooctane sulfonate) and PFOA (perfluorooctanoic acid). These PFAS compounds have been dubbed "forever chemicals" for their persistence in the environment (largely because they comprise chains of bonded fluorine–carbon atoms, those bonds being among the strongest ever created). PFAS contamination of drinking water, surface and groundwater, waterways, soils, and the food supply, among other sources, is a ubiquitous and concerning contaminant across the globe.

The widespread exposure to these compounds arises from multiple sources, both past and present. PFAS is used as an active ingredient in as many as 1,000 products, which can contaminate compost. Although some of the uses have been or are being phased out, many persist, including several related to food processing and packaging.[16] The flooding of the materials stream with thousands of persistent synthetic PFAS compounds since their first uses in the 1950s allows them to remain widespread in the environment and in human bodies.

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[10] Marfella R, Prattichizzo F, Sardu C, Fulgenzi G, Graciotti L, Spadoni T, D'Onofrio N, Scisciola L, La Grotta R, Frigé C, Pellegrini V, Municinò M, Siniscalchi M, Spinetti F, Vigliotti G, Vecchione C, Carrizzo A, Accarino G, Squillante A, Spaziano G, Mirra D, Esposito R, Altieri S, Falco G, Fenti A, Galoppo S, Canzano S, Sasso FC, Matacchione G, Olivieri F, Ferraraccio F, Panarese I, Paolisso P, Barbato E, Lubritto C, Balestrieri ML, Mauro C, Caballero AE, Rajagopalan S, Ceriello A, D'Agostino B, Iovino P, Paolisso G. Microplastics and Nanoplastics in Atheromas and Cardiovascular Events. N Engl J Med. 2024 Mar 7;390(10):900-910. https://www.nejm.org/doi/full/10.1056/NEJMoa2309822.
[11] https://www.nytimes.com/2024/03/09/health/microplastics-sxsw-health-plastic-people.html.
[12] https://www.atsdr.cdc.gov/ToxProfiles/tp200-c2.pdf.
[13] https://beyondpesticides.org/dailynewsblog/2021/04/exposure-to-pfas-the-forever-chemical-during-pregnancy-results-an-increase-in-heart-and-metabolic-problems-among-adolescence/.
[14] https://www.theguardian.com/environment/2022/mar/10/pfas-covid-infection-forever-chemicals-studies.
[15] Nan Li, Yun Liu, George D. Papandonatos, Antonia M. Calafat, Charles B. Eaton, Karl T. Kelsey, Kim M. Cecil, Heidi J. Kalkwarf, Kimberly Yolton, Bruce P. Lanphear, Aimin Chen, Joseph M. Braun, Gestational and childhood exposure to per- and polyfluoroalkyl substances and cardiometabolic risk at age 12 years, Environment International, Volume 147, 2021, 106344, ISSN 0160-4120, https://doi.org/10.1016/j.envint.2020.106344.
[16] https://www.fda.gov/food/process-contaminants-food/authorized-uses-pfas-food-contact-applications#:~:text=Paper%2Fpaperboard%20food%20packaging%3A%20PFAS,from%20leaking%20through%20the%20packaging.

PFAS compounds have been found to contaminate water, irrigation sources, and soils themselves—often through the use of fertilizers made from so-called "biosludge" (biosolids) from local waste treatment plants. Thankfully, the drafters of OFPA rules had the foresight to prohibit the use of sewage sludge, or biosolids. Sewage plants may discharge millions of gallons of wastewater into waterways, contaminating them; current waste and water treatment generally does not eliminate PFAS compounds from the treated effluent. Biosolids and wastewater have long been sources of exposure concerns related to pesticides, industrial chemicals, pharmaceuticals, personal care products, and household chemicals; PFAS contamination is now rising as a specific and concerning addition to that nasty list.

These forever (and perhaps "everywhere") compounds may be contaminating nearly 20 million acres of productive agricultural land in the U.S. A significant portion of farmers, perhaps 5%, is using biosludge from local treatment plants as fertilizer on their acreage.[17] The use of biosludge was thought by many, a decade ago, to be a sensible use of the waste products from treatment; it was even encouraged by many state agricultural department programs, but now it is recognized that these products present threats when spread on fields that produce food—or anywhere that presents the possibility of human, organism, or environmental exposures to potentially toxic PFAS compounds. Notably, there are currently no federal requirements to test such sludge "fertilizers" for the presence of PFAS.[18]

Meanwhile, we must not lose sight of the fact that PFAS chemicals are not the only legacy contaminants. Others include wood preservatives, DDT, dioxins, and the termiticide chlordane. Unfortunately, some of these continue to be added to the environment, sometimes inadvertently, but also intentionally, particularly through pesticide use.

Furthermore, PFAS and microplastics—both contaminants little known a few years ago—act synergistically to threaten fish and wildlife, as well as humans.[19]

Need for a contaminated inputs strategy

What is avoidable contamination? As has been pointed out by the CS, "It is widely acknowledged that some level of pesticides, heavy metals, PFAS, glass, plastic, etc. enters the composting process."

Beginning with a discussion document in Fall 2014, the NOSB began to grapple with the problem of contamination of inputs that have been traditionally used in organic production.[20] OFPA addresses residues in agricultural products. §6506(a)(6) of OFPA requires certifying agents to test for "any pesticide or other nonorganic residue or natural toxicants." §6511 requires that, "If the Secretary, the applicable governing State official, or the certifying agent determines that an agricultural product sold or labeled as organically produced under this chapter contains any detectable pesticide or other nonorganic residue or prohibited natural substance the Secretary, the applicable governing State official, or the certifying agent shall conduct an investigation to determine if the organic certification

[17] https://www.ewg.org/news-insights/news/2022/04/ewg-forever-chemicals-may-taint-nearly-20-million-cropland-acres.
[18] https://www.epa.gov/biosolids/regulatory-determinations-pollutants-biosolids and https://www.epa.gov/cwa-methods/frequent-questions-about-pfas-methods-npdes-permits.
[19] https://www.bayjournal.com/opinion/forum/how-pfas-microplastics-join-forces-as-a-synergistic-threat/article_634b24b6-d25e-11ee-adc1-d7d52920fb27.html.
[20] Unfortunately, this workplan item is currently on hold. https://www.ams.usda.gov/sites/default/files/media/NOSBWorkAgenda.pdf.

program has been violated, and may require the producer or handler of such product to prove that any prohibited substance was not applied to such product." It also provides for the removal of organic certification if the substance is found to be intentionally added or present at excessive levels. §6518(k) makes it a responsibility of the NOSB to "advise the Secretary concerning the testing of organically produced agricultural products for residues caused by unavoidable residual environmental contamination."

§205.203(c) of NOP regulations requires that, "The producer must manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances." §205.671 states, "When residue testing detects prohibited substances at levels that are greater than 5 percent of the Environmental Protection Agency's tolerance for the specific residue detected or unavoidable residual environmental contamination, the agricultural product must not be sold, labeled, or represented as organically produced." Other sections of the regulations relate to the testing for residues.

In the 2014 discussion document, the NOSB cited these examples of topics that have become issues in the last few years:

- Heavy metal contamination of manure, compost, mined minerals and fish products;
- Neonicotinoid residues that could harm pollinators when taken up by plants;
- Insecticide residues such as bifenthrin that can be detected in compost
- Excessive foreign materials in compost and green waste;
- Antibiotic residues in manures that can affect soil organisms and result in tetracycline-resistant bacteria; and
- Genetically engineered plant material that may or may not break down in compost and soil.

Since then, the use of "produced water" from oil production and wastewater from hydraulic fracturing extraction of oil and gas ("fracking") for irrigation has arisen as another issue. PFAS contamination is recognized as serious. And now we have a petition from BPI to greatly expand the universe of materials allowed to be composted for use in organic production.

In the spring 2015 NOSB meeting, the Crops Subcommittee reported that it is continuing to address the contamination issue by looking at pathways by which contaminants reach organic farms and the extent to which the contamination can be mitigated by composting and other practices.

BPI petition

On August 30, 2023, the Biodegradable Products Institute (BPI) submitted a petition for rulemaking to USDA, asking NOP to engage in rulemaking to update the compost regulations. Specifically, BPI advocated adding a definition for "compost feedstocks" to the organic regulations and replacing the references to "plant and animal materials" with "compost feedstocks"—to be defined to include materials meeting ASTM International's compostability standards.

By submitting this to USDA as a petition for rulemaking, BPI attempts to circumvent the NOSB, whose responsibility it is to determine which synthetic substances may be used in organic production. BPI should instead petition for inclusion on the National List those specific synthetics that may be contained in "compost feedstocks."

Currently, the USDA organic regulations allow only newspaper and other recycled paper, through their inclusion on the National List, in addition to composting of plant and animal materials.

The devastation caused by biosolids should be a lesson about unknown risks.

The use of biosolids (sewage sludge) has never been allowed in organic production. However, in 2022, 56% of biosolids were applied to land—31% to agricultural land—and nonorganic producers who thought it was a good deal[21] are now learning otherwise. Farmers are being ordered to shut down their operations because their land and products are contaminated with poly- and perfluoroalkyl substances (PFAS).[22] It is also affecting organic farmers who bought contaminated land unknowingly.[23] The lesson from biosolids is not that certain contaminants are hazardous, but that we cannot predict the hazards coming from uncontrolled sources.

We support the CS call for communication and collaboration between the NOSB and NOP.

Questions Raised by the CS

1. **Does the current listing for newspapers or other recycled paper, without glossy or colored inks, as a synthetic compost feedstock adequately address the contamination concerns related with these types of products? Are there suggestions for improving this annotation to better reflect the role that paper has as a compost feedstock?**

We address this issue at length in our comments on sunset of the listing for paper. In short, we do not believe that the current listing for newspaper or other recycled paper adequately addresses the contamination concerns associated with these papers. The 2017 technical review on newspaper and other recycled paper finds that although being mostly composed of cellulose, starch, and lignin:[24]

> 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.

So, paper can no longer be regarded as "basically wood pulp." Unfortunately, we have been unable to come up with a suggestion for an annotation that would limit the use of paper to that which does not pose contamination concerns during manufacture or use. Another criterion that should be applied is whether such paper is "necessary to the production or handling of the agricultural product because of the unavailability of wholly natural substitute products." We do not believe that a case has been or could be made for the necessity of paper as a compost feedstock.

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[21] https://kentuckylantern.com/2024/03/07/legislature-should-reject-sludge-regulations-that-could-harm-farmers-damage-farmland/.

[22] https://www.kcur.org/news/2024-03-11/pfas-contaminated-biosolids-state-testing.

[23] https://www.thenewlede.org/2024/03/farmers-facing-pfas-pollution-struggle-for-solutions/ .

[24] 2017 TR, Newspaper or Other Recycled Paper. Lines 51-63.

2. What are the risks and benefits to allowing all compostable polymers to be included as compost feedstocks in organic compost?

We address polymers above under plastic. We do not see benefits to allowing all compostable polymers to be included as organic compost feedstocks. Our comments on research priorities (Fall 2024 and below), address plastic in more detail.

Plastic is found in every facet of organic production and handling. Yet, the human and environmental health implications of plastic are becoming increasingly well documented. Scientists are increasingly concerned about the impacts of microplastics—plastic fragments less than 5 mm in size—on a wide range of organisms. 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.[25] Microplastics can increase the spread of antibiotic resistance genes in the environment.[26]

Soil organisms and edible plants have been shown to ingest microplastic particles.[27] Earthworms can move microplastics through the soil, and microplastics can move through the food chain to human food.[28] Microplastics can have a wide range of negative impacts on the soil, which are only beginning to be studied, but include reduction in growth and reproduction of soil microfauna.[29] 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." [30]

Additionally, it is critical that the NOSB consider and act on the fact that highly hazardous PFAS (per- and polyfluoroalkyl substances) are leaching out of plastic containers and contaminating food products, according to research published in Environment Technology and Letters.[31] The data confirm the results of prior research focused on the propensity of PFAS to contaminate various pesticide products through the storage containers.[32]

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[25] 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.

[26] Shi, J., Wu, D., Su, Y. and Xie, B., 2020. (Nano) microplastics promote the propagation of antibiotic resistance genes in landfill leachate. *Environmental Science: Nano*, *7*(11), pp.3536-3546.

[27] 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.

[28] 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.

[29] 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.

[30] 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.

[31] https://pubs.acs.org/doi/10.1021/acs.estlett.3c00083.

[32] https://beyondpesticides.org/dailynewsblog/2022/09/epa-confirms-pfas-forever-chemicals-leach-into-pesticides-from-storage-containers/ .

Plastics—both large and small—are introduced into the environment directly from sources like plastic (including biodegradable bioplastic) mulches, but a huge source of plastic is leachate from landfills, where plastic is deposited after use.[33] In addition, there is evidence that we consume microplastics directly from food containers,[34] including baby bottles.[35]

Research continues to raise alarms about the hazards associated with the use of plastic, including the microplastic particles that are distributed in alarming amounts throughout the environment and taken up by organisms, including humans. A study published by researchers at Columbia and Rutgers universities in the January 2024 Proceedings of the National Academy of Sciences reports that the average liter of three brands of bottled water in the U.S. contains almost a quarter of a million bits of microplastics, of which 90 percent are at the nanoscale.[36] The other ten percent are slightly larger, at microscale.

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In other new studies, out of a total of 257 patients who completed the study, polyethylene was detected in carotid artery plaque of 150 patients (58.4%), with a mean level of 2% of plaque; 31

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[33] Hou, L., Kumar, D., Yoo, C.G., Gitsov, I. and Majumder, E.L.W., 2021. Conversion and removal strategies for microplastics in wastewater treatment plants and landfills. *Chemical Engineering Journal*, *406*, p.126715.
[34] Fadare, O.O., Wan, B., Guo, L.H. and Zhao, L., 2020. Microplastics from consumer plastic food containers: Are we consuming it?. *Chemosphere*, *253*, p.126787.
[35] https://www.theguardian.com/environment/2020/oct/19/bottle-fed-babies-swallow-millions-microplastics-day-study.
[36] Qian N, Gao X, Lang X, Deng H, Bratu TM, Chen Q, Stapleton P, Yan B, Min W. Rapid single-particle chemical imaging of nanoplastics by SRS microscopy. Proc Natl Acad Sci U S A.
[37] Summary at https://phys.org/news/2023-12-toxicity-standard-plastic-products.html.

patients (12.1%) also had measurable amounts of polyvinyl chloride, with a mean level of 0.5% of plaque.[38] Microplastic particles have even shown up in brain as well as placenta.[39]

3. **What are the risks and benefits to continuing the current prohibition on compostable polymers' inclusion in organic compost?**

The benefit of continuing the current prohibition is limiting the problems described above (question #2). We do not see any risks to continuing the prohibition.

4. **There have been suggestions to create an allowance for compostable food contact labels (e.g. fruit stickers) and compostable waste collection bags in order to reduce contamination in compost and get more food waste out of the landfill and into compost facilities, but to prohibit compostable plastics in organic compost when they're used in single-use service wear (e.g. cups, clamshells, utensils). What are the risks and benefits to this approach?**

While removing plastic food stickers can be a nuisance, they do not degrade, so their presence in the finished compost is also a nuisance and poses risks as described above. A step in the right direction would be the prohibition of plastic food contact labels on organic produce. While organic compost may include nonorganic produce waste, prohibiting those labels on organic produce would encourage alternative ways of identifying produce. "Compostable" waste collection bags not otherwise allowed (under the listing for paper) only contribute to the problem of contamination with plastics, microplastics, and nanoplastics.

5. **What are the unique contamination risks associated with composting food waste and the associated compostable polymers that typically come with food waste?**

Beyond Pesticides has asked that the NOSB revive its work agenda item on contaminated inputs. This question deserves greater attention with regard to food waste inputs as well as others, such as manure and yard waste.

6. **What other factors should NOSB consider when evaluating compostable polymers for inclusion on the National List?**

The 2016 TR on Biodegradable Biobased Mulch Film[40] contains useful information on degradation of polymers, contaminants, impacts on plant growth, and unknowns that should be taken into consideration. We do not believe that there is a justification for allowing the intentional addition of *any* synthetic materials to compost.

7. **Is the approach to evaluating UREC and contamination, as described in this document, consistent with organic principles?**

   Yes. We particularly agree that "the difference between unavoidable residual environmental contamination and intentionally adding prohibited substances to organic crops is a bright line in organic compliance."

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[38] Marfella R, Prattichizzo F, Sardu C, Fulgenzi G, Graciotti L, Spadoni T, D'Onofrio N, Scisciola L, La Grotta R, Frigé C, Pellegrini V, Municinò M, Siniscalchi M, Spinetti F, Vigliotti G, Vecchione C, Carrizzo A, Accarino G, Squillante A, Spaziano G, Mirra D, Esposito R, Altieri S, Falco G, Fenti A, Galoppo S, Canzano S, Sasso FC, Matacchione G, Olivieri F, Ferraraccio F, Panarese I, Paolisso P, Barbato E, Lubritto C, Balestrieri ML, Mauro C, Caballero AE, Rajagopalan S, Ceriello A, D'Agostino B, Iovino P, Paolisso G. Microplastics and Nanoplastics in Atheromas and Cardiovascular Events. N Engl J Med. 2024 Mar 7;390(10):900-910. https://www.nejm.org/doi/full/10.1056/NEJMoa2309822.

[39] https://www.nytimes.com/2024/03/09/health/microplastics-sxsw-health-plastic-people.html.

[40] https://www.ams.usda.gov/sites/default/files/media/BiodegradableBiobasedMulchFilmTRCrops.pdf.

Conclusion

The integrity of organic production must be maintained by preserving the integrity of compost. The NOSB must maintain control over synthetic materials allowed in organic production, as required by OFPA. Only synthetic materials that are specifically added to the National List through the prescribed process should be allowed in compost destined to be an input into organic production. Synthetics that do not meet the requirements of OFPA, including that they are "necessary to the production or handling of the agricultural product because of the unavailability of wholly natural substitute products" should not be added to the National List. Contaminants in broadly defined "compost feedstocks" cannot be predicted, but history suggests that more persistent toxic pollutants will be found. The petition from BPI should be denied. The NOSB should reopen the workplan item on contaminated inputs that is currently on hold.

Thank you for your consideration of these comments.

Sincerely,

Terry Shistar, Ph.D.
Board of Directors