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Doc. No. AMS-NOP-22-0063

Regulatory Information Number (RIN 0581–AE13)

## **Re: National Organic Program; Market Development for Mushrooms and Pet Food**

The Cornucopia Institute uncovers the truth behind organic food and advocates for an organic label you can trust. Through research and investigations into agriculture and food issues, we provide needed information to family farmers, consumers, and other stakeholders in the organic agriculture community.

Cornucopia agrees that there is a need for market development rulemaking: there has been a clear lack of standards, leading to schisms in the marketplace (especially with respect to organic mushrooms).

Fungi products in general are increasing in popularity, and there is no better time to clarify the regulations surrounding their place in the certified organic marketplace. Pet food is also an area where we expect more growth once the rules are clarified.

### **Mushroom Proposed Rule**

Cornucopia supports strict, clear rules that allow for greater consistency in how mushrooms (and other fungi) are cultivated and certified. The unique nature of fungi makes them hard to distinguish from their conventional counterparts without strict rules for sourcing of spawn and substrate.

In general Cornucopia is supportive of much of the language in the mushrooms portion of this proposal. However, we have deep concerns about several aspects of the proposal which may undermine the purpose of this rulemaking and potentially risk opening loopholes, inconsistencies, and concerns for plant production as well as fungi, due to the proposal lumping fungi into the Crops Scope. The bulk of our comments will address these concerns.

### **Summary of Comments**

The following are the highlights of the comments on the organic mushroom proposed rulemaking:

- Instead of “mushrooms” the regulations should refer to “fungi” as the classification for rulemaking. This comment will refer to “fungi” in place of “mushroom” where applicable.

- Including fungi under the Crops Scope without meaningfully distinguishing them from plants is problematic and will lead to inconsistency with both organic crops and fungi. Fungi should have their own scope.
- All substrate and spawn should be limited to certified organic products where those products are agricultural.
- Any agricultural substrate ingredients must be certified organic *without* an added “commercial availability” exception.
- Broadening the definition of compost is concerning and should be done with care if at all.
- From a procedural perspective, it’s important to use National Organic Standards Board’s (NOSB) recommendations, as those recommendations were developed with full community engagement.

### **“Fungi” rather than “mushroom” is the appropriate term for regulation**

While the term “mushroom” can certainly be defined in the regulations, that is the incorrect term for this regulation. The term “mushroom” is limited to the fruiting body of specific fungi and is not broad enough for the purposes of this rule.

The proposed rule does not go far enough in that it only considers fruiting bodies produced in a very narrow range of cultivated process. The organic marketplace already includes fungi products that are certified organic but *are not* mushrooms. The rule should encompass these products and leave enough room to consider market growth as well.

There are many products already on the market that are certified organic which would not fall under the narrow scope within the proposed rule. For example, there are many certified organic nutritional yeast products on the market now. Yeasts are eukaryotic, single-celled microorganisms belonging to fungi kingdom. Nutritional yeast is clearly a final food product, and not a processing aid (as could be argued for baking yeast and cheese molds), and yet there is no clear delineation of how the proposed standards could be applied to an edible yeast product. Supplements derived from the mycelium, or fungal biomass material, are not covered under the current definition of “mushroom.” Because these supplements often contain the substrate material itself, consumers will ingest these materials. The rapidly growing organic supplement industry must be regulated.

Another question relates to supplements derived from lichen should be covered under this scope as well. Lichens are a complex life form that is a symbiotic partnership of two separate organisms, a fungus and an alga. We note that there are currently many supplement products labeled as certified organic that are sourced from lichens (for example, vegan vitamin D). Cornucopia asks that the Agricultural Marketing Service (AMS) consider where lichen-derived products fit in the next iteration of this rulemaking.

It's important to address all the fungi products that are currently in the marketplace with this rulemaking, while also anticipating future products in the organic marketplace as well. Keeping the applicable grouping broad by using the term “fungi” anticipates this need while addressing the current shape of the marketplace.

## **Fungi should have their own separate scope in the regulations**

The role of the National Organic Program (NOP) includes establishing national standards governing the marketing of certain agricultural products as “organically produced,” to assure consumers that organically produced products meet a consistent standard.

The Agricultural Marketing Service (AMS) acknowledged in the rulemaking materials that fungal crops are cultivated under unique and specialized conditions. Fungi belong to their own kingdom and should therefore have their own scope, so that their unique qualities can be better addressed in the organic regulations.

Mushrooms and other fungi are dissimilar enough from terrestrial plants that adding them to the Crops Scope does not make sense. Unlike plants, fungi gain the whole of their nutrition from digesting whatever substrate they are grown on. In this respect, fungi are more akin to livestock, and some organic certifiers have been using the Livestock Scope to certify fungi in the absence of specific standards. Fungal life cycles and reproduction also differ from those of plants and animals. While many fungi can be cultivated in ways that superficially resemble plants, the process under the surface varies quite a bit. Other fungal products are grown with methods that do not resemble that of terrestrial plants at all.

The Crops Scope already illustrates the differences in plant and fungal production: by emphasizing what makes a *plant* organic. These qualities include that it was grown in soil that is managed organically – not only without non-organic inputs, but also through nutrient cycling, soil health, and attention to the conservation of natural resources. It does not make sense to shoehorn fungi into the Crops Scope where so many exemptions must then be applied.

Having a separate scope will support the expansion of interstate commerce in organic fungi products. For the marketplace for organic mushrooms and other fungi products to expand, it's important that consumers trust what they are getting. Having clear and enforceable standards protects organic integrity.

The exemptions in the proposed rule also confuse the Crop Scope and open the door to various loopholes. Not only does this raise questions of consistency and integrity for organic fungi production, but it muddies the existing requirements for plants as well. The exemptions are confusing and suggest that operations and certifiers can pick and choose among the standards based on production type.

As made clear in the discussion surrounding the proposed rule, many of the sections of the Crops Standards are completely inapplicable to fungi or mushrooms. For example, mushroom production does not involve seeds or planting stock, and fungi are not typically grown in soil, or with rotations for fertility or disease suppression. This makes some of the foundational organic requirements for *plants* completely inapplicable.

While we disagree with this route, if fungi *are* kept under the Crops Scope, it will be necessary for them to have their own sections and language, rather than broad exemptions to the existing language.

We understand creating a new scope may seem daunting in terms of workload, but we insist that getting it right this time around – by creating a separate scope for fungi – will lead to more consistency in the standards and marketplace and lead to less work in the future. In addition, much of the proposed language can be repurposed in new regulatory sections without changing the actual text. This is not a daunting task – simply a procedural one.

A separate scope will also allow separate listings in the National List for fungi production without resorting to complicated annotations. (For example, Microcrystalline cheesewax for mushroom production should be moved to a new section 205.608, Synthetic substances allowed for use in organic fungi production.) Existing National List materials should not automatically apply to fungi anyway, because of how unique fungi are. Instead, materials should be separately petitioned for fungi in their own section of the National List.

## **Comments on the definition of compost**

Cornucopia does not support the proposed changes to the definition of “compost.”

The suggested change to the compost definition is as follows:

*Compost. The product of a managed process through which microorganisms break down plant and animal materials into more available forms suitable for application to the soil or as a component of mushroom substrate.*

This proposed definition is far too broad and would lead to unintended consequences, including conflicting with current organic regulations. Many activities completely unrelated to compost could meet this broad definition (for example, fermented products like yogurt and beer). In fact, the proposed definition is so broad as to be meaningless.

While we agree that the current definition of “compost” includes compost production requirements (minimum time and temperature) that may be specific to plant production, the proposed change raises concerns of food safety for plants produced under the existing Crops Scope. This change would muddy certification of terrestrial plants in pursuit of accommodating the fungi kingdom.

In addition, it is not clear that the current definition does not accommodate fungi production. Cornucopia questions whether this proposed definition change is even needed.

If the current definition is changed at all, we suggest a general definition that still addresses concerns of food safety. We also agree with keeping plant production-specific composting requirements in the regulation at § 205.203(c)(2) (the soil fertility and crop nutrient management practice standard). Fungi-specific composting requirements, as described in the proposal, should

also remain – though they should ideally be located in the separate Fungi Scope and not in § 205.210 as proposed.

Trade groups and compost producers could be consulted to create a more appropriate definition for “compost.” For example, American Association of Plant and Food Control Officials developed a new definition of “compost” in 2018, which has also been adopted by the US Composting Council:

*Compost – is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds, and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment, but may also contribute plant nutrients.<sup>1</sup>*

Cornucopia is not advocating for using this definition as it stands, but to note that it includes reference to processes and temperatures that ultimately address food safety concerns. AMS states that compost used for mushroom production is typically made using lower temperatures and shorter timeframes without offering evidence of that fact. When consulting with organic certifiers, Cornucopia heard again and again that there are operations using compost to grow mushrooms that is certified to the current definition.

All compost for fungi production could probably meet the existing definition for compost, which was developed based on scientific standards for pathogen reduction.

Another serious concern about the proposed definition relates to the impact this will have on terrestrial plant production. Even though AMS states that the plant-specific compost requirements (that address food safety) would remain, that section may not apply to many terrestrial plants due to current loopholes and inconsistencies surrounding organic-hydroponic and container operations.

The United States Department of Agriculture (USDA) is currently allowing the nonsensical certification of operations which do not follow the soil fertility and crop nutrient standards at § 205.203 because their crops are grown without soil. Removing the food safety considerations from compost production would allow soil-less operations to use compost or compost-tea that has not met the timing requirements to reduce pathogen load. This poses a serious food safety concern.

The mushroom rulemaking should not open new loopholes and inconsistencies in the marketplace by virtue of fungi being unique organisms. Cornucopia continues to oppose any terrestrial plants being “exempt” from soil fertility and crop nutrient standards solely because their producers choose not to use soil. Soil is the foundation of organic agriculture: the escalating problems with soil-less organic agriculture are further exposed by the mushroom proposal and concerns about compost.

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<sup>1</sup> UC Composting Council. “Compost Definition.”  
<https://www.compostingcouncil.org/page/CompostDefinition>

Cornucopia also opposes creating further disparities between soil-based and non-soil-based operations; the compost definition should be kept explicitly clear in its application to all uses of the material.

From a procedural standpoint the NOSB is currently reviewing the compost production requirements. We suggest that the current definition should remain the same unless and until the NOSB suggests otherwise based on stakeholder input from the community.

A final concern is the addition of *synthetic feedstocks* into compost. The question of synthetic feedstocks impacts both fungi and terrestrial plants, but is relevant to our discussion of compost here. Cornucopia asks that any compost definition explicitly require that compost feedstocks must abide by the requirements of the National List (with allowed synthetics listed after a review by the NOSB). Synthetic feedstocks should not be allowed without review and input from the NOSB and the NOSB must be consulted before *any change* in the definition of compost feedstocks.

To this end, a portion of the compost definition should at least include the following verbiage:

*Compost. The product of a managed process through which microorganisms break down plant and animal materials, and permitted synthetic compost feedstocks in § 205.601(c)...*

## **All agricultural substances used in fungi production must be certified organic**

It is essential that the regulations require substrate and spawn to be organic. There should be no allowance for lack of “commercial availability” with either substrate or spawn sourcing.

If mushrooms or other fungi are grown on non-organic agricultural materials, there would be little to distinguish them from conventional mushrooms. The NOP is required to distinguish and support a marketplace for organic products; why would any consumer pay for an organic mushroom or fungi product that has been produced through the same methods as a conventional mushroom?

As already discussed, fungi are very different from plants: fungi get all their nutrients from the substrate or spawn. In this way, fungi are more like livestock than plants in that fruiting bodies get all their nutrients from the substrate (or spawn, in the case of mycelia products). Organic livestock are only considered organic if they receive organic feed. With fungi having their biomass wholly formed from their nutrition intake (in the form of their “feed” of substrate or spawn), it is essential they only receive organic certification if they are fed wholly organic food.

Another concern with allowing non-organic agricultural substrate has to do with the supplement marketplace, which is a significant market for certified organic fungi products. Many consumers using medicinal fungal supplements (such as reishi, cordyceps, etc.) specifically seek out organic products because they assume fungi are grown using organic spawn and/or substrate.

Some supplements are derived from the fruiting body, while others use the mycelium. In the mushroom cultivation process, pure mycelium is essentially used as the seed; it is introduced and

grown on a carrier material, often rice, rye, or wheat. This material is referred to as “grain spawn.” Some supplement companies grow their mycelium on this grain base, which is then dried and ground into mushroom powder, while others use the grain spawn to “seed” substrate to grow fruiting bodies. It would be incredibly misleading to consumers if the product they have is certified organic but was grown on conventional grain!

Wood and manure products also raise some questions for organic certification. The NOSB’s 2001 recommendation suggested allowing nonorganic wood products (like sawdust) in mushroom substrate if the source trees have not been treated with prohibited substances for three years prior to harvest and have not been treated with prohibited substances after harvest.

Cornucopia agrees with this process for wood products used in fungi production. Materials derived from wood that are used for substrate or spawn must originate from trees that have been grown free from contact with prohibited materials for at least three years and must not have been treated with a prohibited substance after harvest. If wood products are not limited in this way, fungi produced on those wood products will uptake those prohibited substances, making them incompatible with organic certification.

Certifiers we’ve consulted with have noted that it would not be hard to get a simple written statement from log suppliers that their woods have been free of prohibited substances for three years. Cornucopia believes that this route for ensuring wood products are appropriate for organic production is reasonable and should be incorporated into the rulemaking. Cornucopia would also support regulation that would provide a clear route to certifying wood products, either now or in the future.

The European Union has stricter standards than those in this proposal and they address some of the wood product and manure concerns directly. The European Union requires organic animal manure (from transitioning or organic farms) and organic substrate. They also allow peat and wood if the wood has not been treated since the wood was felled. Cornucopia believes AMS should echo several aspects of the European Union rules while improving upon them with more specificity (for example, adding the requirement that spawn must be certified organic).<sup>2</sup>

Cornucopia believes what we are advocating for in terms of spawn and substrate sourcing is a clear and enforceable standard that would provide ample consumer confidence in the label.

## **Remove any “commercial availability” language from the mushroom rulemaking**

Cornucopia strongly opposes allowing any kind of “commercial availability” allowance for fungi substrate, spawn, or other inputs. In our review of the marketplace, adding commercial

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<sup>2</sup> See REGULATION (EU) 2018/848 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007. [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.150.01.0001.01.ENG&toc=OJ:L:2018:150:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.150.01.0001.01.ENG&toc=OJ:L:2018:150:TOC)



availability to the equation opens up opportunities for abuse, certifier shopping, and fraud. There is also no need for a commercial availability exception, as there should be ample organic spawn and substrate options available.

In 2001 the NOSB understood this conundrum and required organically produced agricultural materials in mushroom substrate without a commercial availability exception. We agree with their stance here.

While the NOSB did recommend a commercial availability exception for spawn products at that time, in the following years it has become clear that spawn is used for organic mycelia products that include spawn remnants in the consumer product. This industry change and expansion necessitates that any agriculturally sourced spawn materials are 100% organic going forward.

There is no indication that there wouldn't be a source for organic grain for mushroom production. In fact, many domestic grain producers have reported during public comment periods that they don't have a market for their grain products. Removing the commercial availability exception would possibly open up another use for their crops.

Consumers cannot rely on *any* organic fungal product to be legitimate if commercial availability exemptions for substrate or spawn are allowed.

## **The NOSB's input, and input of more diverse stakeholders, should be better considered**

As noted by AMS, the NOSB recommended organic mushroom standards in April 1995 and in October 2001.

While it's clear the proposed rule incorporated some of the NOSB's advice, we have concerns about the time it took to get the NOSB's recommendation to the rulemaking table, and the ways the proposed rule deviates from the NOSB's intent in 2001.

This proposal deviates from the NOSB recommendation in several key areas. For example, it would allow for mushroom substrate to contain non-organic agricultural materials, wood products produced from lumber that was treated with prohibited substances within the last three years, and compost that does not meet the time, temperature, and turning requirements for organic compost. All of these allowances contradict the 2001 NOSB recommendation.

When the AMS deviates significantly from NOSB recommendations, it undermines industry and consumer confidence. The NOSB is intended to represent stakeholders and their recommendations give the industry a "heads up" about what rule changes are in the pipeline and some clue on how to prepare for them. In the absence of regulation, certifiers and producers often refer to NOSB recommendations to help them interpret and guide their work. Significant departures from NOSB recommendations come with risks to all these stakeholders. For example, a producer's well-intentioned use of an NOSB recommendation to build facilities and production will open them to risks of being undercut by cheaper methods if the final rulemaking is much



weaker than the NOSB recommendation. The same is true for certification, since many certifiers rely on NOSB recommendations to guide their interpretation of the rules.

In the proposal, AMS stated they “... also engaged directly with mushroom experts, producers, and trade associations about organic mushroom production.” Unfortunately, consulting with the industry that has already developed under the inconsistent practices which this rulemaking is hoping to address comes with an inherent concern of bias. Industry stakeholders typically advocate for the least strict interpretation of the rules.

Organic certifiers, non-governmental organizations, and consumers are more relevant stakeholders for this discussion. The NOSB’s original recommendation was based on feedback from these stakeholders, in addition to industry and trade organization input.

Many of the organic certifiers Cornucopia has engaged with around this topic note they were not consulted about their current mushroom (and fungi) certification practices. Certifiers also agreed that they were capable of meeting the NOSB recommendation, at a minimum.

Cornucopia’s main audience is consumers, as both an advocate and educator. We’ve heard from consumers that they seek out organic fungal products, both for food and for nutritional supplements, and believe that organic fungal products have advantages over conventional products. It’s also clear that if non-organic spawn or substrate were allowed in any instance, it would undermine consumer trust in organic fungal products altogether. This would have a negative effect on marketplace growth and undermine the purpose of this rulemaking entirely.

Certified producers of substrate materials are also ready for a new standard that would require organic sourcing, in line with NOSB recommendations. In fact, many companies were surprised to see nonorganic materials would be allowed.

We hope that AMS will take the comments of these groups seriously during this comment period.

## **Implementation timeframe for fungi rulemaking**

Cornucopia does not support the proposed rule as written. However, if the rule is improved with our suggested changes requiring only certified organic spawn and substrate, Cornucopia would support a *one-to-two-year* implementation timeframe. We believe the industry could quickly get up to speed with stricter standards.

## **Pet Food Proposed Rule**

Cornucopia appreciates the effort in bringing the proposal on organic pet food forward to rulemaking. This is an area we have seen more growth in recently and, similar to mushrooms, greater clarity will allow market growth without the schisms and inconsistent application of rules. This clarity should also help to smooth out the current inconsistencies between certifiers, ultimately increasing consumer trust in their organic pet food.

Cornucopia supports the adoption of this rule with some suggestions.

As this market develops, it is important that any materials added to the National List now and in the future be appropriately annotated. One purpose of the organic regulations is to ensure that any use of synthetic materials is strictly limited to where there is a necessary and compatible use. For pet food, we believe that specific minerals and amino acids should be annotated with the specific species they are allowed for.

Another concern tangentially related to pet food is the continued allowance of carrageenan in organic products. Carrageenan is used as a gelling agent in some pet foods. Given the increasing evidence that carrageenan causes harmful health effects in both humans and non-human animals, carrageenan should not be allowed in organic pet food. There are alternatives to carrageenan and it is not necessary to the production of pet food. (We additionally hope the NOP will revisit this material and remove it from the National List, banning its use in *any* certified organic materials.)