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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.

Chlorine Materials (Livestock Subcommittee Petitioned Material Proposal)

Cornucopia agrees that the disparities in how producer use chlorine products and how certifiers address chlorine use causes too much confusion in the marketplace. Any changes to the standards must clarify these issues to result in improved understanding and consistent material review by certifiers, so that producers do not have unequal treatment. Clarity in the organic standards is also needed to dissuade "certifier shopping," which impacts the integrity of the organic label for consumers as a whole.

We support this language change to clarify the use of chlorine without supporting the use of chlorine materials in general. Cornucopia supports phasing out chlorine materials and requests that the NOSB recommend a timeline for sunsetting all chlorine materials on the National List.

Residue Testing for a Global Supply Chain: Regulation Review Proposal (Certification, Accreditation, Compliance Subcommittee (CACS))

This proposal recommends updates to various aspects of § 205.670 and the Unavoidable Residual Environmental Contamination (UREC) for the inspection and testing of agricultural products to be sold or labeled as "100 percent organic," "organic," or "made with organic (specified ingredients or food group(s)).

Cornucopia thanks the NOSB for all their work on this issue, as Cornucopia's followers among consumers and businesses cite agrichemical residues as one of their chief concerns and reasons for selecting organic foods.

It is very important that the organic industry gets residue testing right, and communicates these updates and efforts to the public. Misinformation surrounding the organic label is rampant—especially among online influencers—to the point of impacting the bottom line of hardworking organic farmers and retailers. Residue testing is essential for organic integrity.

Cornucopia has specific comments on each part of the proposal, delineated below.

1. Mandated testing of a minimum of 5% of operations annually by certifiers

Residue testing for agrichemicals is very important to consumers, because avoiding certain agrichemicals is why most consumers purchase organic food.

Cornucopia agrees that the §205.670(d) revisions would clarify the procedures certifiers must use when selecting the operations they must test to reach their "5%" quota. The recommendation may improve the process through which certifiers currently select operations, leading to more fair treatment across the marketplace spectrum. Including language that requires certifiers to use certain procedures for testing selection may also help prevent "certifier shopping." Certifier shopping undermines organic integrity, and leads to schisms in the marketplace because different products are being held to different standards. This also creates a ripe environment for fraud.

As it stands, we agree that residue testing is currently more appropriate as a verification tool for fraud detection, rather than helping to determine an individual operation's compliance. If it was to test operation compliance, than every operation would need to be residue tested.

Using a combination of risk-based criteria and random selection for residue testing is compatible with the spirit of the organic label. How that combination is best achieved is up for debate, however.

Limiting residue testing to 5% of certified operations when a certifier has large numbers of high-risk clients poses some concern because it does encourage some "certifier shopping" and unequal treatment among certifiers. One certifier may attract only high-risk clients because of their expertise or simply by design, meaning a greater percentage of high-risk

operations may go untested over time. Because certifiers are best placed to know which of their clients are "high-risk," it makes more sense for certifiers to concentrate their 5% testing requirement on high-risk entities. So where certifiers have a very limited number of clients or an overall high number of high-risk clients, we do think that *the majority, if not all, of residue testing should be based on risk factors.*

As a fraud-deterrent, it makes more sense for the NOP to oversee randomly selected residue testing.

Cornucopia absolutely agrees with CACS that, when an entity certifies fewer than 30 operations, the selection of the one operation to receive residue testing should be based entirely on risk. This clarification may need to be put forward in guidance if not clarified in the regulation itself.

In the future, Cornucopia would like to see residue testing to be incorporated as one "check mark" to determine an operation's compliance, by residue testing all bulk loads at a minimum. However, the industry does not have the resources for that work at the moment.

2. Certifiers conducting all testing at their own expense

Cornucopia agrees with CACS that residue testing costs should have specific triggers allowing certifiers to pass the cost of testing onto an operation. The triggers as currently laid out (part of a credible complaint or investigation, and contamination that ultimately results in a noncompliance or adverse action) do not entirely address the balance of testing costs.

One of the reasons smaller and low-risk operations are leaving the organic label (or not joining in the first place) is that operations that are low-risk are subsidizing those that are high-risk. Residue testing is one area this plays out, despite the 2012 Periodic Residue Testing final rule (because certifiers are still spreading out the cost of testing across their client base).

The CACS recommendation to revise the regulatory text at §205.670(b) & (c) does not ultimately address the concern that residue testing costs are, by and large, burdening small and low-risk operations, because reimbursements can be tied up in the non-compliance appeal process. Plus, one expects the majority of the 5% residue testing to come from adverse events like complaints—meaning certifiers are likely to continue to include residue testing costs as part of their certification fees.

Cornucopia agrees with commenters that there is an inherent conflict of interest with certifiers both conducting and charging for residue testing. If the NOP directs residue testing, it helps alleviate some of the inherent conflicts of interest in the certifier-client relationship, and eases some of the financial burden on certifiers (and their lower-risk clients) at the same time. Ideally, the NOP should conduct more of its own residue testing

(unannounced, to help combat fraud) and reimburse certifiers for their residue testing costs to help buffer these conflicts. The NOP is also better situated to work with state departments of agriculture to conduct testing and audits tracking interstate or international fraud.

Certifiers (and specifically their inspectors) are still well-placed to *physically* conduct the collection of samples for residue testing of 5% of their clients, because they are more often on-site when risk is being assessed or when standard inspections are taking place. However, this sample collection and ultimate testing can still be credited by NOP.

Another procedural concern is that if an operation is *only* charged for testing when the complaint is credible and contamination is determined to be caused by an intentional application or failure of an operation to adhere to their OSP (i.e. results in a noncompliance or adverse action), this may get residue testing payments caught up in the appeals process for non-compliance. This concern can potentially be contracted around (in the certifier-producer relationship), or addressed by guidance if not the regulatory language itself.

3. Public access to results

Transparency is the hallmark of a safe, resilient, and trustworthy food system. OFPA (7 USC 6506(a)(9))5) requires public access to certification documents and laboratory analyses that pertain to certification. As of now, it is difficult to gain access to residue testing results as they are not always linked to the chain of custody relating to organic certification.

Cornucopia agrees with the NOSB's recommendation to link the two regulatory requirements to make results available to the public (§205.504(b)(5)(iii) and §205.670(f)). Adding a reference to 205.504(b)(5)(iii) in 205.670(f) clarifies the way in which results will be made public. However, steps should also be taken to make that information easily assessable to the public on searchable government websites, including the NOP website. It should not require a FOIA request to bring this information into the light.

Cornucopia supports the work of industry partners to continue to develop a centralized database (e.g., ORG-Tracker) and incentivize certifiers to participate, *as long as* that database is maintained with public access (and not limited to certifier-access).

4. Downstream notification of noncompliant organic product to buyers

Cornucopia generally supports the recommendation to update the regulatory text to require notification of downstream buyers.

We disagree that the notification should *only* be triggered by certain circumstances. Instead, notification should occur *at any residue level,* with that notification including references to EPA tolerances and whether the residue might indicate a willful violation or

perhaps only incidental contamination. If the industry only provides notifications when "residues exceed action thresholds (e.g., >5% of EPA tolerances)" it undermines the very standards that the organic industry and its consumers trust. Many individuals choose organic foods because they are chronically ill and/or disabled and have known, deleterious and impactful reactions to agrichemical residues at *any* level. While other consumers may not care about incidental residues below EPA limits, the health of many individuals – and the reason they choose organic in the first place – relies on this level of transparency.

Synthetic herbicide and pesticide residues are also linked to various harms to health and the environment. Anti-organic propaganda runs rampant with misinformation about agrichemicals and what organic "allows;" it's important that transparency isn't watered down or limited.

Notification should absolutely occur when willful violations have occurred as well, but because determining whether a violation is "willful" can sometimes be hard to prove and could be challenged in the legal sense, we disagree with this being included in the regulatory requirements for triggering notification. Instead, it should be included in the information that is provided in the notification whether the violation is being investigated for being "willful" and not delay notification until that can be determined definitively.

5. Unavoidable Residual Environmental Contamination (UREC)

Cornucopia agrees with the NOSB that the NOP should work to implement the NOSB's Spring 2025 Final Recommendation to update NOP 2613 guidance to provide certifiers with clearer direction for evaluating residue findings.

Cornucopia has one addition to the NOP 2613 guidance and how it is implemented in the future. As it stands, NOP 2613 requires comparison of residues with tolerances only if they exceed 0.01 ppm (10 ppb). Unfortunately, many pesticide active and "inert" ingredients have tolerances below 0.01 ppm. Any comparison of the residues with known tolerances should take place before application of a general *de minimus* standard. Cornucopia supports Beyond Pesticides' comments and expertise in this area for how to best implement both UREC and the NOP guidance.

Cornucopia additionally argues that UREC should remain as currently defined even when trying to address contamination that does not fit the current definition of UREC (but is outside the organic operator's control). While these other contamination events may be outside the control of the organic operator, they are not "unavoidable" in a larger sense. Efforts can still be made to eliminate the risk of these contamination events; this should be enough to work within the UREC framework. For example, we have advocated for the NOSB and NOP to create and implement a strategy to eliminate contaminated inputs. The NOSB and NOP should also recommend that USDA and EPA adopt policies that eliminate uses of pesticides and other prohibited substances that lead to contamination of organic operations and could constitute chemical trespass. State and regional governments may

also play a role in developing strategies to both avoid and address the consequences of chemical trespass as well.

E-Commerce Labeling Proposal (Certification, Accreditation, Compliance Subcommittee (CACS))

Cornucopia does not support waiting on the FDA's timeline to address inconsistencies and issues with online commerce. The NOP controls the organic label, not the FDA.

While certain online retailers are exempt from certification, that does not mean that they cannot be required to *truthfully label* products. As with other inconsistencies in regulation, this one presents an opportunity for fraud. The requirements for eCommerce should be brought into line with those for physical establishments. The NOSB should work to identify any obstacles to eliminating the inconsistencies between brick-and-mortar and e-commerce requirements, and propose a rule change that will cure those inconsistencies.

POLICY AND PROCEDURES MANUAL (PMM) – Revision Proposal (Spring 2026)

Cornucopia commends the NOSB for their continuing work to improve the functionality of NOSB procedures through their work fine-tuning the PPM. Every decision by the NOSB supports or degrades organic integrity. Your decisions contribute to the survival or the destruction of family farms. We must come together to stand for what sets organic production apart from other agriculture: a dedication to healthy soil, outdoor access for livestock, and stalwart support for family farms.

Cornucopia only has a few pointed comments on the changes being proposed to the text.

A. Changes to Section III. J (3) that will authorize the NOSB Chair to request Secretary remove board members for extreme nonparticipation.

Cornucopia supports the majority of the changes to IV. H, Step 3, which clarifies when Third-Party Technical Reviews (TRs) should be conducted. We agree that TRs should be conducted for all newly petitioned substances, and we support limiting the conditions when existing information and expertise can be relied upon to evaluate petitions for National List substances. However, the language edits could make it clearer that a new TR is necessary when it's been some time since a TR was completed. Replacing the term "should" with "must" in this section improves the clarity of the procedure here.

Also, while Cornucopia enthusiastically supports the addition of "*is all the information available to the Subcommittee also available to the public?"* to the determination list, we

are concerned that research papers, studies, and reviews that the Subcommittee may rely on may be paywalled to normal members of the public. To combat this issue, the TRs could include full packets of their references, or use some other strategy to ensure the public may be fully informed by the research the NOSB uses to make their decisions.

Cornucopia also requests that TRs be evaluated for completeness and technical coverage again after public comment. In the past, commentors have pointed out holes and missed research once that TR was available for public review. In some cases, this may highlight a need for an updated TR or indicate that the TR was not sufficient in its coverage of the issues NOSB must consider for petitioned substances.

Cornucopia also recommends that the PPM be updated to delineate a clear process through which the NOSB can determine whether a new Third-Party Technical Review (TR) for any material (whether a new petition or not) might be required, simply due to the pace and weight of research. As research continues into certain substances or topics, we see that many TRs quickly become out of date with respect to the data that is valuable for NOSB review. It's not just the research in the agriculture, handling, and processing spheres of influence that must be considered, but aspects of human and environmental health as well.

B. Changes to Section VII. B. that would add a process for "Separate Annotation Changes at Sunset Review."

Cornucopia strongly supports adding a separate process for annotation changes at sunset review, as added to section VII. B. We hope that this will address the concerns that Sunset Reviews cannot fully address the need for annotation changes.

The NOSB should have the ability to tie their Sunset recommendations to annotation changes. Cornucopia recommends making it clear in the process outlined in section VII. B. that the NOSB's Sunset recommendation *can be tied to* a recommended annotation change. For example, the NOSB may vote to keep a substance on the list, but only if that substance is updated with a new annotation change. In short, the NOSB should be able to recommend that a substance be removed from the National List *unless* it is updated to include the new annotation.

2026 Research Priorities Proposal (Spring 2026)

Cornucopia supports the research priorities in the Materials Subcommittee proposal. The most urgent research investigates how and where the organic industry can better evolve and survive in a world of increasing global stressors due to climate, infrastructure fragility, and food insecurity.

Cornucopia also supports and encourages any research that would investigate how supporting soil fertility and cycling of resources can be done on-farm *without* the routine

application of off-farm inputs. Organic production has become reductive, and allowing inputs without looking at the broader picture adds to this problem of oversimplifying complex ecological systems. To promote ecological balance and conserve biodiversity, it is necessary to consider global factors such as loss of biodiversity and climate change, *as well as* local and regional variation.

Cornucopia specifically supports and encourages focus on the following research priorities that are listed by the NOSB, with these additional comments on said priorities:

INTERDISCIPLINARY

1. **Increasing access to organic foods.** Cornucopia recommends looking at the domestic and international agroecological efforts to address hunger. Organic practices are very compatible with agroecological theory. The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. FOA has an Agroecology framework and work product that may be helpful in shaping many of the NOSB's research priorities.
2. **Whole farm ecosystem service assessments to determine the economic, social, and environmental impact of farming system choices.** Anti-organic rhetoric has been increasing in recent months, and the benefits of organic production to ecosystem services are being devalued in consumer messaging. Clearer data on how and where ecosystem services play a part in the whole-farm ecosystem are needed – not just to shape organic practices, but to move agriculture as a whole toward a more resilient model.
3. **Organic yield gaps and system-level productivity.** Cornucopia recommends looking into novel ways to address so-called "yield gaps," because trying to fit an organic model of farming into a conventional food system has always come with flaws. Organic should not look to conventional food systems for answers: it should be the reverse, especially in an age of increasing food insecurity, climate stressors, and social unrest. We recommend re-thinking what we mean by "yield gap," because comparing a conventional monoculture to an organic monoculture an unfair handicap. Instead, polyculture and permaculture should be considered to address the real question: how much nutritious food (of any kind) can we produce on a certain space of land?
4. **Organic agroforestry and perennial-based systems.** Cornucopia strongly supports this research priority. Existing research shows that polycultures, silvopasture, agroforestry, and more diversified farming models have compounding benefits to human health, the environment, and food security. We need more data to show anti-organic detractors how beneficial these systems are – especially when

using organic practices and inputs to support a resilient agro-ecosystem. Another concern is the existing pre-harvest withdrawal period for livestock grazing in certain organic orchards. Agroforestry and silvopasture producers already struggle with the withdrawal period being so long; it was built to address the safety risks of concentrated manure spread via equipment onto crops growing in or near the soil. However, livestock grazing in many orchard systems, like nut production, is fundamentally different, and the postharvest interval length effectively bans livestock during the entire growing season. There is no clear and actionable definition of what constitutes "manure application" in silvopasture. Enforcement also appears to be inconsistent across certifiers.

CROPS

A. **Assess the extent and impact of plastic use in organic crop production, and identify ways organic producers can lead in reducing it and aligning with consumer concerns.** Cornucopia strongly supports this research. We need to research how to eliminate plastics in all aspects of organic production and handling. This need to move away from plastics applies to all agriculture, because plastics are manufactured from fossil fuels and other synthetics which have wide-ranging environmental and human health impacts. Of particular concern are mulch films, packaging, and the plastics that are ubiquitous with crops grown without soil (hydroponic, aeroponic, and container methods). Overall, Cornucopia opposes the use of plastic in agriculture.
B. **Conduct whole-farm ecosystem service assessments to determine the economic, social, and environmental impact of farming system choices.** In this case, Cornucopia urges research into this area to include predictions about how whole-ecosystems will be impacted by the myriad of climate risks. We need research into how to maintain a somewhat-stable source of food production, and existing research suggests polycultures and working toward naturalized ecosystems is the best route for resilient soils.
C. **Increase the availability and supply of organic seeds by developing cultivars with improved performance. More breeding of cover crops is also needed. Also, conduct regional comparative trials to evaluate the performance and quality of organic varieties, seeds and planting stock.** Again, Cornucopia urges researchers to focus on crops and cultivars that show good resilience to climate stressors and use fewer resources (including outside water and other inputs). The focus should not be on existing crops alone, but include “novel” commodities that may provide a more sustainable food source for both humans and livestock. For example, one potential crop that could be investigated for domestic production is the Bambara

Groundnut (*Vigna subterranean*). This crop is relatively drought-tolerant, and requires limited agricultural inputs for production; it thrives with limited rainfall and under poor soil fertility conditions, where many crop species would fail to be produced; additionally, it acts as a nitrogen-fixer.

D. **Develop alternatives to PFAS and implement remediation strategies to mitigate contaminated areas.** Cornucopia does not think the organic industry should work on finding PFAS alternatives, because PFAS contamination mostly arises from contamination events or plastics.

LIVESTOCK

i. **Barriers to increased organic insect production.** Insect agriculture is one of the most vital and urgent things for the organic industry (and agriculture as a whole) to get right – and get right soon. Insects are the future of food sustainability and the organic marketplace will be left behind if this research is not prioritized. Some of the known barriers to insect agriculture are regulatory. Currently, valuable insects including Black Soldier Fly Larvae (BSFL) and crickets sit in a regulatory "limbo" without a clear pathway to acceptable use.

Some certifiers allow insect feeders without restrictions, while others restrict their use. Some certifiers, and even the NOP at times, have said that for insects to be qualified for organic production they must only receive certified organic feed (treating them like livestock falling under the livestock regulations, essentially). While some insect agriculture can be incorporated into organic systems seamlessly (such as BSFL systems incorporated into organic wineries, where they feed almost entirely on organic grape skins), it does not make sense to limit insects to the current livestock regulations as they stand. Like the regulatory and enforcement problems faced with organic mushrooms, insects have their own specific concerns and needs that must be taken into account—rather than shoehorned into a framework intended for ruminant livestock and poultry.

It does not make sense that insects like BSFL won't be allowed if they use conventional food waste as fodder, when that same food waste is allowed to be composted for use in organic crops. Fish meal is also allowed in organic production, but fish are not treated as "organic livestock" and do not receive organic feed. In fact, fish are often fed conventional cereals and GMO crops!

The waste, or "frass," from insects is also a valuable natural source of fertility that could be used on organic crops. Insects can also be used to control manure on organic farms, and in some conditions, also out-compete pest flies.

ii. **Evaluate natural alternatives to DL-Methionine in a systems approach for organic poultry feed program.** DL-Methionine is a synthetic which should be

removed from the National List as soon as possible. Alternatives like sesame meal, sunflower meal, and insects are all promising and show that synthetic methionine may not be necessary.

Handling Substances Sunset § 205.605(a), § 205.605(b), & § 205.606

Carrageenan (§205.605(a))

Cornucopia strongly opposes the relisting of Carrageenan.

Carrageenan should be re-classified as a synthetic substance and removed from the National List due to the substance not meeting the requirements for use in organic food and handling. Carrageenan also fails to meet the high bar requirements for non-organic substances allowed in organic food and processing.

Food-grade carrageenan does not meet any of the criteria used to evaluate substances for the National List (7 U.S.C. 6518(m)). Of particular concern to Cornucopia is the fact that carrageenan does not meet the required bar for human health and necessity. Particularly:

- Food-grade carrageenan has negative effects on human health, particularly among sensitive individuals (see 7 U.S.C. 6518(m)(4).
- Alternatives to carrageenan are available in the marketplace and carrageenan is not necessary to produce the processed products it is used in (see 7 U.S.C. 6518(m)(6).

Cornucopia thanks the NOSB for commissioning a limited scope TR that addresses conflicting claims that have been made in the past and examines more recent evidence. We believe it's clear that the evidence summarized by the 2026 Technical Review shows that carrageenan does cause adverse human health effects.

When reviewing the research into human health concerns, the source of the research should be transparent (including author affiliations, funders, etc.). Previous reviews were all completed by individuals or researchers with ties to the carrageenan industry. Further, a lot of the research previously cited in support of the human safety of carrageenan was based in industry-funded research, while independent research showed serious risks to human health. There is a serious concern of conflicts of interest that needs to be addressed in the NOSB's substance review.

The NOSB must use the "precautionary principle" in light of the studies showing human health impact at a minimum. The facts that there are environmental concerns, and that the product is not necessary for organic products, only puts more weight on this decision. The NOSB must accept the existence of science pointing to serious health consequences associated with the consumption of carrageenan and act to protect organic consumers.

Reference Document for Carrageenan Research

Since the NOSB's last review of this substance, a significant body of research has been done that indicates carrageenan's danger to human health. The 2026 Technical Review summarizes carrageenan's adverse human health effects, but a closer look at a summary of each research paper's processes and findings may help the NOSB's decision-making process for carrageenan.

Cornucopia has developed an extensive internal reference document of relevant human-health research papers – with the conflicts of interest clearly laid out – which can be shared with the NOSB if it would be at all helpful.

Classification In §205.605(a)

Carrageenan, is currently listed in § 205.605(a) as an allowed nonsynthetic for ingredients in or on processed products labeled as "organic" or "made with organic."

Although food-grade carrageenan is extracted from a natural product, the manufacturing process for food-grade carrageenan physically alters the substance. Virtually all carrageenan on the market is synthetically produced via alkaline extraction.

The extraction and manufacturing processes for industrial production of carrageenan meet the definition of "synthetic" in OFPA. The carrageenan used in the marketplace is processed and extracted using strong alkali solutions at high temperature that cause chemical changes to occur in the algal extracts.[1] Raw carrageenan must be further refined and extracted to produce usable forms of the polysaccharide for industrial food production.[2] The strength of the alkali treatment, time of the extraction, and other factors all effect the functional properties of the resulting carrageenan, indicating it is not chemically the same substance as the carrageenans found in the natural source (seaweeds). This process of extraction is not equivalent to "heating or burning of biological matter…" as referenced in the NOP Handbook and definitions.

Though the same terms may be used colloquially for traditional extracts and industry uses, the different types of carrageenan are not the same functionally or chemically.

The USDA did not follow the NOSB's recommendation for the 2018 sunset, stating their reasoning as: "[we] found sufficient evidence in public comments to the NOSB that carrageenan continues to be necessary for handling agricultural products because of the

[1] *See* The Food and Agriculture Organization (FAO). "Carrageenan." http://www.fao.org/3/y4765e/y4765e0a.htm
[2] The Food and Agriculture Organization (FAO). "Carrageenan." http://www.fao.org/3/y4765e/y4765e0a.htm

unavailability of **wholly natural substitutes**."[3] [Emphasis added.] The USDA's own language suggests the agency believed carrageenan did not qualify as a natural substance despite its continued listing on §205.605(a).

Human Health Concerns

Cornucopia does not believe that the current scientific evidence on the human health impacts of food-grade carrageenan remains "mixed." If you remove studies that show conflicts of interest with the carrageenan industry, a pattern of human-health concerns appears. Organic food also stands apart from other labels in that it asks questions about acceptable risk and consumer transparency by its very design. The Organic Foods Production Act requires that organic foods conform to *a higher standard* for human safety than other foods. Allowing carrageenan into organic products when there is good evidence that it causes harm – even if it's only serious harm to "sensitive individuals" – is a disservice to the whole label.[4]

The NOSB notes that the amount of carrageenan people eat is an important factor in whether it is safe for human consumption. While it's true that the amount of carrageenan used in individual food products may represent a small fraction of the volume of each product, many consumers are exposed to carrageenan multiple times every day. Carrageenan is routinely consumed in the typical Western diet; in 2017 an average individual was predicted to consume roughly 2 to 4 grams/day.[5] As for predicted "application rate", an industry-sponsored study suggested an average daily intake of 1.08 to 7.2 g/day in a 132lb person.[6,7]

Carrageenan intake has *increased* in Western diets since carrageenan was last reviewed by the NOSB. Currently, the highest consumption occurs in the United States.[8] Many routes of

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[3] Federal Registrar. April 4, 2018. "National Organic Program: USDA Organic Regulations." https://www.federalregister.gov/documents/2018/04/04/2018-06867/national-organic-program-usda-organic-regulations

[4] Komisarska, Paulina, Anan Pinyosinwat, Mutaz Saleem, and Małgorzata Szczuko. 2024. "Carrageenan as a Potential Factor of Inflammatory Bowel Diseases" *Nutrients* 16, no. 9: 1367. https://doi.org/10.3390/nu16091367 . https://www.mdpi.com/2072-6643/16/9/1367

[5] Sumit Bhattacharyya, *et al*. Jan 1, 2017. "A Randomized Trial of the Effects of the No-carrageenan Diet on Ulcerative Colitis Disease Activity." 181 – 192. DOI: 10.3233/NHA-170023.

[6] See Sumit Bhattacharyya, *et al*. Jan 1, 2017. "A Randomized Trial of the Effects of the No-carrageenan Diet on Ulcerative Colitis Disease Activity." 181 – 192. DOI: 10.3233/NHA-170023. https://content.iospress.com/articles/nutrition-and-healthy-aging/nha170023

[7] *See* Barbara Borsani, et al. September 27, 2021. "The Role of Carrageenan in Inflammatory Bowel Diseases and Allergic Reactions: Where Do We Stand?" Nutrients, 13(10), 3402; https://doi.org/10.3390/nu13103402. https://www.mdpi.com/2072-6643/13/10/3402

[8] Komisarska, Paulina, Anan Pinyosinwat, Mutaz Saleem, and Małgorzata Szczuko. 2024. "Carrageenan as a Potential Factor of Inflammatory Bowel Diseases" *Nutrients* 16, no. 9: 1367. https://doi.org/10.3390/nu16091367 . https://www.mdpi.com/2072-6643/16/9/1367

exposure and "application rate" for carrageenan have never been considered by the NOSB during their Sunset reviews of this substance (including the possible use of protective film coatings in organic fruits and produce). Because carrageenan is often "undeclared" on food products and its other applications, most estimates for carrageenan exposure are likely underestimates. Carrageenan is also found in supplements and nutraceuticals, adding to the routes and volume of human dietary exposure.

Carrageenan has been shown to trigger intestinal ulceration and inflammation.[9] Much of the research in both animal and human models showing negative health implications (especially those linking carrageenan to insulin resistance and glucose intolerance) used application levels of carrageenan *much lower* than those levels found in the typical Western diet.[10,11] This is concerning!

The potentially high rate of exposure to carrageenan in the domestic Western diet, paired with the manufacturing process for carrageenan, makes its current listing as an allowed nonsynthetic inappropriate and outright dangerous to consumers.

The Food and Drug Administration (FDA) does not require that processing aids be displayed on the ingredient label.[12] This means carrageenan routinely *does not have to appear on the ingredient panel*. This alone poses a serious concern for human health. Individuals who are sensitive or allergic to carrageenan cannot avoid it in organic foods.

In addition, carrageenan exposure may not be limited to packaged and processed foods. Carrageenan has been reported to be in use as edible packaging and in protective films for fruits and other produce (again where no labeling is required).[13] These films, which are also used in meat products, are used to prevent shrinkage, microbial contamination, and surface discoloration by delaying moisture transport (which extends shelf-life).[14] It is

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[9] Kimilu, Nina, Katarzyna Gładyś-Cieszyńska, Magdalena Pieszko, Dorota Mańkowska-Wierzbicka, and Marcin Folwarski. 2024. "Carrageenan in the Diet: Friend or Foe for Inflammatory Bowel Disease?" *Nutrients* 16, no. 11: 1780. https://doi.org/10.3390/nu16111780. https://www.mdpi.com/2072-6643/16/11/1780

[10] Wagner, R., Buettner, J., Heni, M. *et al.* Carrageenan and insulin resistance in humans: a randomised double-blind cross-over trial. *BMC Med* **22**, 558 (2024). https://doi.org/10.1186/s12916-024-03771-8. https://link.springer.com/article/10.1186/s12916-024-03771-8

[11] *See Leo Feferman, et al. April 21, 2020. "Carrageenan-Free Diet Shows Improved Glucose Tolerance and Insulin Signaling in Prediabetes: A Randomized, Pilot Clinical Trial." J Diabetes Res. 2020: 8267980. doi: 10.1155/2020/8267980. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7191375/*

[12] 21 CFR § 101.100 - Food; exemptions from labeling.

[13] Elham Tavassoli-Kafrani, Hajar Shekarchizadeh, Mahdieh Masoudpour-Behabadi. 2016. "Development of edible films and coatings from alginates and carrageenans." Carbohydrate Polymers, 137: 360-374. https://www.sciencedirect.com/science/article/abs/pii/S0144861715010541 ; *See also The Cornucopia Institute's summary of the research for more papers on the uses of edible films.*

[14] Demeng Zhang, Mengxue Zhang, and Xiaoxiao Gu. January, 2018. "8 - Seaweed-Derived Hydrocolloids as Food Coating and Encapsulation Agents."Bioactive Seaweeds for Food Applications, Academic Press, Pages 153-175. https://www.sciencedirect.com/science/article/pii/B978012813312500008X

unclear how widely edible films are used within organic handling. The use of organic films, supplements, fining, and applications that go unlabeled and undeclared requires a closer look by a technical review, because it relates to both the question of intended activities and application rate.

Furthermore, the NOSB has failed to acknowledge that carrageenan contains the α-Gal (alpha-gal) epitope.[15] Immunoglobulin E (IgE, the antibodies produced by the immune system) specific to α-Gal. are associated with allergic reactions commonly referred to as "α-Gal syndrome." Alpha-gal syndrome poses a high risk of life-threatening allergic reaction and is found in a significant number of people (now considered to be the 10th most common food allergy, despite not having labeling requirements).[16] This syndrome is increasing in global frequency and due to the spread of ticks due to climate change, the numbers are will likely continue to grow.[17]

Alternatives and Necessity Concerns

Cornucopia has tracked the use of carrageenan in organic products since publishing a shopping guide showing that every product made with carrageenan can be made without it. Carrageenan is a product enhancement that is not critical to product existence. For every organic product that contains carrageenan, there are a great number of similar products that do not contain the substance.

There are multiple viable alternatives readily available in the marketplace. In fact, as Cornucopia has tracked brand usage of the various emulsifiers, gelling agents, etc. it seems that many companies adjust their formulations based on availability, access, and cost. Questions of essentiality were also raised by the NOSB in 2021 because following the previous NOSB's vote to remove the substance, many brands reformulated their products to remove carrageenan.[18] The removal of carrageenan from products continues as more consumers ask for it to be removed from our food system altogether. It's not enough that a brand would "prefer" to keep using carrageenan – that's not a sign it is necessary under the requirements laid out for the National List.

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[15] Tobacman J. The common food additive carrageenan and the alpha-gal epitope. Journal of Allergy and Clinical Immunology, 2015; 136, 1708-1709. DOI: 10.1016/j.jaci.2015.08.048. https://www.jacionline.org/article/S0091-6749(15)01345-7/fulltext

[16] *See* Barbara Borsani, et al. September 27, 2021. "The Role of Carrageenan in Inflammatory Bowel Diseases and Allergic Reactions: Where Do We Stand?" Nutrients, 13(10), 3402; https://doi.org/10.3390/nu13103402. https://www.mdpi.com/2072-6643/13/10/3402

[17] Alpha-gal Information (AGI) website. 2022. "What is Alpha-gal Syndrome?" Accessed 5/18/2022. https://alphagalinformation.org/what-is-ags/

[18] US Department of Agriculture. October 21, 2021. "Transcript: National Organic Standard Board Meeting." Page 1235-1238. https://www.ams.usda.gov/sites/default/files/media/NOSBTranscriptsFall2021.pdf

When the NOSB voted against removing carrageenan from the list due to reaffirmed necessity, their reasoning surrounding 2021 Sunset Review was based on flawed use of data. The International Food Additives Council (IFAC) had commented (on the 2021 Sunset) that many new products have entered the marketplace with carrageenan listed as an ingredient. At the time, the NOSB seemed to rely on this information as evidence that carrageenan was necessary for many formulations. However, while this data was true for the marketplace as a whole, it was not true for the organic market.

Some NOSB members also seemed to rely on reviews that "refuted" or called into question the reproducibility of earlier studies showing early concerns about human health. Research since 2017 has been accumulating about the severe impact of the consumption of carrageenan. This includes definitive research showing the additive's effect on gut microbiota and its positive associations with IBD and other inflammatory processes through gut microbial modulation.[19]

Cornucopia specifically tracks organic dairy and organic dairy alternatives as they enter the market, and has noted a marked *decrease* in the use of carrageenan in new organic products. This is especially true for vegan alternatives, such as plant-based milks and cheeses. Industry proponents including IFAC cannot just state that carrageenan is necessary without explaining how the majority of products are entering the organic marketplace *without* its use.[20] In fact, even the industry will admit that the use of carrageenan in the organic marketplace is small compared to the wider conventional marketplace.[21] Unfortunately, no guide can help consumers avoid an emulsifier like carrageenan when it comes to the *unlabeled* uses of this product (when it's used as a processing aid or an edible film).

Many brands dropped carrageenan from their products when the NOSB first recommended removing carrageenan from the National List. These brands did so even without a final decision from the NOP, indicating reformulation is possible.

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[19] See also Pauline Raoul, Marco Cintoni, Marta Palombaro, Luisa Basso, Emanuele Rinninella, Antonio Gasbarrini, and Maria Cristina Mele. January 13, 2022. "Food Additives, a Key Environmental Factor in the Development of IBD through Gut Dysbiosis." Microorganisms; 10(1), 167; https://doi.org/10.3390/microorganisms10010167. https://www.mdpi.com/2076-2607/10/1/167/htm

[20] In reference to the Public Comment by Robert Rankin, executive director, International Food Additives Council: "[Carrageenan] provides a plant-based alternative to animal-based ingredients used in vegan and vegetarian products…" Agricultural Marketing Service. 2021. "Fall 2021 NOSB Meeting Transcript." Page 137. https://www.ams.usda.gov/sites/default/files/media/NOSBTranscriptsFall2021.pdf

[21] US Department of Agriculture. November 3, 2016. "Transcript: National Organic Standard Board Meeting." Page 424, Lines 16-20. https://www.ams.usda.gov/sites/default/files/media/NOPTranscriptsStLouisNov2016.pdf

Consumer Transparency

A serious concern regarding carrageenan is that consumers may be exposed to the substance without knowing it. Carrageenan is also a common processing aid in food, particularly in dairy, dairy alternatives, and processed meat products. It is used as a fining agent for beer[22] and wine (meaning it is used in processing but not added to the final product). Carrageenan-based films can also be used as coatings for certain processed and unprocessed foods including meat, produce, and fruit. When used as a processing aid, carrageenan is often *not listed on ingredient labels*.

OTHER COMMENTS

Inaction on Eliminating the Incentive to Convert Native Ecosystems to Organic Production

The Cornucopia Institute is focused on our collective health, access to clean and nutrient-dense food, the livelihoods of farmers who produce organic food, and the health of the planet. We object to the USDA's refusal to follow the recommendations of the NOSB—its own advisory board.

Over the years since its inception, key decisions by the NOSB have been dominated by corporate interests and the Board's power has been shifted to the USDA. The USDA secretary also demonstrates unwillingness to act on the NOSB's advice—despite that being the *statutorily required relationship between the NOSB and USDA*.

One of the most egregious breakdowns in this advisory role is the lack of action on the part of the NOP to adopt the NOSB's 2018 formal recommendation: Eliminating the Incentive to Convert Native Ecosystems to Organic Production.[23]

The issue of native ecosystems and wild lands being destroyed due to organic production is still a serious and urgent threat.

OFPA gives the NOP broad authority to enact regulation to further the aims of the statute. The formal recommendation from the NOSB in this particular case does exactly that, since organic production is explicitly required to support biodiversity and prevent environmental harm.

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[22] *For example, see:* Mihkel Saluri, Marju Robal, and Rando Tuvikene. January, 2019. "Hybrid carrageenans as beer wort fining agents." Food Hydrocolloids, 86: 26-33. https://www.sciencedirect.com/science/article/abs/pii/S0268005X17316788

[23] https://www.ams.usda.gov/sites/default/files/media/CACSNativeEcosystems.pdf

We urge the NOSB to continue to put pressure on the NOP to pass the resolution on Eliminating the Incentive to Convert Native Ecosystems to Organic Production, as well as other essential recommendations made by the NOSB.

Request for Standards for Hydroponics

Cornucopia does not support hydroponic production in certified organic agriculture, as indicated in our comments and testimony over years. The following comments should be understood in the context of that foundational stance.

Given the unfortunate 2017 vote by the NOSB to allow hydroponic and aquaponic production, Cornucopia urges the creation of *comprehensive standards* for certified organic hydroponic production *as soon as possible*.

Existing regulations pertain only to soil-based operations, with the exception of sprouts. There are no current standards for *non-soil-based agriculture*.

As a result, hydroponic operations have been allowed to spray the ground with prohibited substances immediately prior to organic certification. In blatant disregard for the three-year transition requirements, the argument has been made that applying prohibited substances is allowable because no soil is formally involved in the production system. This goes against basic and universal requirements in both OFPA and the regulations.

Additionally, research suggests that the metabolites of glyphosate volatilize into the air. [24] Nearby plants and produce are likely exposed to these metabolites, although more study is needed. Other Organophosphates in common use in non-organic agriculture produce varying levels of toxicity in humans, animals, plants, and insects.[25]

Despite suggestions that the soil under these operations is not certified, OFPA does preclude destruction of biodiversity. Also, the regulations still require that all organic producers "…foster cycling of resources, promote ecological balance, and conserve biodiversity."[26] Hydroponic and aquaponic operations cannot be exempt from these requirements. The question then becomes: which rules and regulations apply to certified

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[24] Martha Mertens, et al. February, 2018. "Glyphosate, a chelating agent—relevant for ecological risk assessment?" Environ Sci Pollut Res Int, 25(6):5298-5317. doi: 10.1007/s11356-017-1080-1. https://pubmed.ncbi.nlm.nih.gov/29294235/

[25] Gurpreet Kaur Sidhu, Simranjeet Singh, Vijay Kumar, Daljeet Singh Dhanjal, Shivika Datta & Joginder Singh. 2019. "Toxicity, monitoring and biodegradation of organophosphate pesticides: A review." Critical Reviews in Environmental Science and Technology, 49:13, 1135-1187, DOI: 10.1080/10643389.2019.1565554. https://www.tandfonline.com/doi/abs/10.1080/10643389.2019.1565554

[26] 7 CFR § 205.2. Organic production. A production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, *and conserve biodiversity*.

hydroponic and aquaponic operations? The answer cannot be “none” because the organic label is premised on federal oversight.

Clear, enforceable standards are needed for certified organic hydroponic operations. Without these, certifiers operate from a diversity of interpretations. Organic integrity is at risk.