

## **Cornucopia Institute Carrageenan ‘Report’ Touts Flawed Science and Cherry-Picked Data**

The trade/lobbying group Cornucopia Institute has issued a ‘report’ that alleges a ‘smoking gun’ in carrageenan data published more than 10 years ago on an industry-supported website.

The Cornucopia report was issued just as the National Organic Standards Board (NOSB) is conducting ‘sunset reviews’ of additives that may or may not be included in U.S. foods labeled as organic.

The announcement of the report and the full-length report itself is fraught with anti-industry bias and fails even to accurately describe its research subject.

The Cornucopia report is consistent with the group’s ideology and baseless attacks on carrageenan. Cornucopia believes in three central themes that are evident in all its carrageenan discussions:

1. If you cannot argue decades of peer-reviewed science, then argue the research funding.
2. If you cannot argue the truth, then allege conspiracy.
3. If all else fails, cherry-pick the data.

### **Carrageenan is not Poligeenan**

In announcing its report, Cornucopia alleges that ‘the industry’s hidden data’ in a report prepared by Marinalg, a hydrocolloid industry group, showed that all food-grade carrageenan contains a “carcinogenic contaminant – low molecular weight poligeenan.”

According to Cornucopia’s Senior Staff Scientist, Linley Dixon, PhD, “Now, the industry’s own data has revealed that all twelve food-grade carrageenan samples tested did in fact contain poligeenan in varying quantities up to 25%.”

She, and Cornucopia, fail in the most basic reporting of the facts.

Poligeenan is not used in food. Poligeenan has no functionality in food and is not a food additive.

Poligeenan is a completely different chemical from carrageenan. Poligeenan is produced from carrageenan that has been subjected to very high temperatures (more than 170 degrees Fahrenheit) and extreme acidic conditions for up to 6 hours. Poligeenan is used in medical imaging and has no food use. Poligeenan's processing conditions in both temperature and acidity are impossible to attain during human digestion.

Given how drastically different these two substances are, and the fact that definitions are readily available at the click of a mouse, confusing carrageenan with poligeenan can only be seen as willful ignorance.

### **Low Molecular Weight Testing – Understand the Facts**

Cornucopia's senior staff scientist is confusing poligeenan with that small portion of carrageenan that is called the 'low molecular weight tail' (LMT).

First, and foremost, all carrageenan carries a low molecular weight tail. Molecular weight is measured in what are called 'daltons' (Da). The European regulations define the LMT of carrageenan as a specific fraction below 50,000 Da. Cornucopia fails to mention that European regulatory authorities looked into the LMT in detail and in their review stated that "... there is no evidence of any adverse effects to humans from exposure to food-grade carrageenan, or that exposure to degraded carrageenan from use of food-grade carrageenan is occurring..."

There are no specific U.S. regulations regarding low molecular weight definitions in carrageenan, but what is considered food-grade carrageenan has an average molecular weight between 200,000 and 800,000 Da.

If you plucked the red seaweed straight from the ocean it would have the same variation.

The bulk of the low molecular weight tail of carrageenan found in what Cornucopia calls the 'smoking gun' tests were between 40,000 and 50,000 Da.

By contrast, poligeenan is defined as between 10,000 and 20,000 Da.

Cornucopia's senior scientist, Dixon, maintains a notion that carrageenan contains as much as 25% low molecular weight tail. This idea comes from a preliminary series of attempts to measure the percentage of low molecular weight tail in food-grade carrageenan.

What Dixon failed to mention is that only one out of eight test results in one batch of food-grade carrageenan showed the LMT estimate at 25%. Here are the other test results from the same batch of carrageenan: three tests showed the level at 0%, two other tests at 1%, one test at 2% and one test at 4%.

While the 25% number was clearly aberrant and entirely inconsistent with other results, Cornucopia failed to mention that simple fact. They also conveniently failed to mention that half the carrageenan in the 25% test result was not even measured. The full details of all the testing was publicly available for anyone to read or, in this case, to manipulate or ignore.

Cornucopia includes the full test results in an appendage to its report but never discusses this wide discrepancy. It was discussed in written remarks by William Blakemore in written comments to the NOSB and is available at <https://www.regulations.gov/#!documentDetail;D=AMS-NOP-15-0085-1765>

## **Industry Science Is Credible, Independently Reviewed**

Cornucopia's report goes on to laud research alleging harmful effects of carrageenan and disparages all research funded by industry as if it is inherently corrupt.

That includes research conducted by distinguished toxicologists conducted under the rigorous standards of Good Laboratory Practices (GLP) and reviewed by independent review boards and regulatory agencies.

Dixon sees this differently. “In the past, a successful tactic by many financial interest groups, including the tobacco and fracking lobby, has been to discredit reputable, publicly funded research, and to fund their own flawed studies to create the impression that there is a scientific debate.”

What Dixon fails to acknowledge is the overwhelming response from a global scientific community that has reviewed research cited by Cornucopia, finding it unconvincing and lacking in science-based facts.

Cornucopia is not interested in alternate opinions that point out flaws in the research that they reference, including:

- Administering carrageenan in drinking water alone is not how humans consume carrageenan.
- Injecting carrageenan into an animal makes a study questionable because carrageenan administered orally (which is exactly how it is consumed in foods) is excreted by the body without ever entering the system.
- *In vitro* (cellular) studies on organs carrageenan would never reach are irrelevant.
- Carrageenan does not degrade during digestion into poligeenan.

## **The Lone Researcher Against Carrageenan: Dr. Joanne Tobacman**

Much of the science Cornucopia applauds and cites in its ‘report’ has been done by Dr. Joanne Tobacman, MD., who has conducted research and published studies attacking carrageenan.

In her webinar remarks before the NOSB last week Dr. Tobacman alleged that there are more than 9,900 references or studies related to the harmful effects of carrageenan, a claim that is mathematically impossible if you are counting actual research or reviews, even if you include all the studies whose methodologies are extremely suspect.

One of the Tobacman studies cited in the Cornucopia report is entitled *Borthakur A, Bhattacharyya S, Anbazhagan AN, Kumar A, Dudeja PK and*

*Tobacman JK (2012) Prolongation of carrageenan-induced inflammation in human colonic epithelial cells by activation of an NFkB-BCL10 loop. Biochimica and Biophysica Acta 1822(8) 1300-7.*

This study was done using colon cells that were identified as flawed by the provider, INCELL Corporation, LLC. According to the company's warning, "The overall karyotypes are similar to that observed with tumor derived cells."

INCELL warned researchers at least twice of the flaws, presumably including Dr. Tobacman.

During an NOSB webinar last week Dr. Tobacman intimated that this was not a big deal and that 'cells change all the time'. To others, research that suggests it is being done on normal human colon cells when, in fact, the cells are anything but normal is a big deal indeed.

Imagine that Cornucopia had found an industry scientist who was warned at least twice as to the toxicity of cells to be used in research and ignored those warnings.

Imagine that the industry scientist failed to retract or clarify that work in the peer-reviewed journal that published the research. Would that conduct get a one-paragraph pass from Cornucopia? Definitely not.

**If overwhelming evidence supports the safety of carrageenan, then claim 'conspiracy' and sue.**

Dr. Tobacman's work and other carrageenan science has been reviewed by regulatory agencies and independent review panels around the world and has been found to lack justification, along with much of the other research cited by Cornucopia.

Most recently, the Joint United Nation's Food and Agriculture/World Health Organization Expert Committee on Food Additives (JECFA), one of the most independent and respected review panels in the world, reviewed carrageenan with particular focus on safety to its use in infant formula. The

JECFA reviewed not only substantial new studies undertaken by industry using Good Laboratory Practices (GLP) but also Dr. Tobacman's work and a commentary submitted by Dr. Tobacman, in addition to conducting their own PubMed search.

The committee found that carrageenan was safe for use even in infant formula, including formula for infants with special dietary needs. The report is available at

[http://www.fao.org/fileadmin/user\\_upload/agns/news\\_events/JECFA%2079%20Summary%20Version%20Final.pdf](http://www.fao.org/fileadmin/user_upload/agns/news_events/JECFA%2079%20Summary%20Version%20Final.pdf)

Cornucopia failed to provide this background information. Instead, Cornucopia suggests that JECFA didn't have all the facts and raises doubts about a study of pre-weaning piglets done by an industry-supported scientist.

All those doubts were dispelled by Dr. Myra Weiner, the study's author, in webinar comments before the NOSB last week. A copy of her written comment can be found at

<https://www.regulations.gov/#!documentDetail;D=AMS-NOP-15-0085-2938>

Previously, Dr. Tobacman submitted a 'citizen's petition' to the Food and Drug Administration (FDA) urging that carrageenan be banned as a food additive.

The FDA, rather than the NOSB or Department of Agriculture, (which manages the NOSB), is ultimately responsible for food safety.

It rejected Dr. Tobacman's petition in fairly strong terms. A copy of the FDA rejection can be found at

<https://www.regulations.gov/#!documentDetail;D=FDA-2008-P-0347-0003>

Whenever Cornucopia or its allies fail in the regulatory or independent review arena, Cornucopia alleges a global conspiracy between big business and anyone who finds its science arguments without merit. In the week leading up to the NOSB hearings it has sued the USDA over its management of the NOSB process, seeing it as too industry friendly.

What it heartily approves of in its report is any study funded by the National Institute of Health (NIH) or other government organization that have funded Dr. Tobacman's work, including the Veteran's Administration (VA).

Cornucopia cannot allow an opinion that food regulatory agencies make good faith efforts every day to serve the public. Contrarily, it cannot allow an opinion that the NIH occasionally funds studies that are deeply flawed or allow anyone to wonder why the Veterans Administration (VA) – in an age when veteran suicide and health care is a very serious public health issue – would fund a study on a food additive with a long history of safe use. Both taxpayers and veterans might find this offensive.

## **No Human Studies Conducted to Prove Carrageenan Sensitivity**

Cornucopia has waged its war against carrageenan over a period of many years and sent a questionnaire that drew 1,337 responses in three years from people who claim to have suffered adverse health effects after carrageenan consumption.

No one should dismiss anecdotal reports on any illness but this number needs to be put in perspective.

No human studies have been done to confirm or refute claims of an allergy to ingested carrageenan. The best animal studies refute claims of carrageenan inflammation. It is also important to note, as Cornucopia does not, that an allergic reaction is not a toxic reaction.

If 1,337 people said they had adverse health reactions to carrageenan over a three-year period that number should be seen as a percentage of the tens of millions of people who consume carrageenan every day with no adverse reaction whatsoever.

It is even a very small number as a percentage of the approximately 1.6 million people with Crohn's Disease, ulcerative colitis or IBD.



None of the responses cited by Cornucopia in its report were confirmed during hospitalizations or doctor visits.

It is a far smaller number than the number of people who are lactose intolerant or have allergies to peanuts, strawberries, or shellfish. It is also true that a cursory search of the Internet would find anecdotal evidence of responses to all sorts of additives, including those touted by Cornucopia as potential carrageenan substitutes.

It is interesting to note that Cornucopia issues no warnings regarding the dangers of drinking raw milk. Far fewer people drink raw milk than consume carrageenan, yet many drinkers of unpasteurized milk wind up in hospitals and, on rare occasions, dead.

Carrageenan is a labeled ingredient in all foods. Cornucopia suggests that it is unlabeled in beer and some other drinks. In beer carrageenan is used as a processing agent to remove the components that make beer cloudy if unfiltered. It is not in the finished product.

Carrageenan may appear in small amounts in items sold at the retail level and be unlabeled on the retail container (though it would be labeled on the bulk container). For example, if you put cream in your coffee at your local coffee shop the cup will not list carrageenan as an ingredient, nor will the cup list any of the other alleged harmful chemicals in our daily cup of coffee.

## **Essentiality**

Cornucopia's report would have the NOSB and the public believe that stabilizers and emulsifiers are all pretty much the same in functionality.

But Cornucopia offers no scientific evidence to support this claim. In fact, each stabilizer offers weaknesses and strengths based on the food application, the ingredients used and the processing conditions for the food product.



In other applications, only one additive is approved. Carrageenan is the only listed non-synthetic stabilizer used in U.S. organic infant formula and reviewed by JECFA specifically for use in infant formula and infant formulas for special medical purposes.

An overview of science and independent reviews on carrageenan is available at: <http://www.foodsciencematters.com/an-abridged-history-of-research-into-the-safety-of-carrageenan/>

You can wade through all the science, or you can do what Cornucopia prefers – believe in what Cornucopia claims is a vast conspiracy of seaweed farmers, manufacturers, scientists, independent review panels and regulatory authorities all over the world.