

Culture Wars

How the Food Giants Turned Yogurt, a Health Food, into Junk Food



Navigating the Dairy Case to Find Quality, Safety and Nutritional Value

A Report by The Cornucopia Institute | November 2014



C O R N U C O P I A
I N S T I T U T E



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The Cornucopia Institute is dedicated to the fight for economic justice for the family-scale farming community. Through research and education, our goal is to empower farmers and their customers in the good food movement, both politically and through marketplace initiatives.

Cornucopia’s Organic Integrity Project acts as a corporate and governmental watchdog assuring that no compromises to the credibility of organic farming methods and the food it produces are made in the pursuit of profit. We actively resist regulatory rollbacks and the weakening of organic standards, to protect and maintain consumer confidence in the organic food label.

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Executive Summary

Yogurt, made the traditional way, is one of humanity's traditional, nourishing foods. Milk from organic pasture-raised cows, rich in calcium, protein, beneficial fats and other healthy nutrients, is fermented using live cultures, resulting in a wholesome, live food teeming with beneficial microorganisms.

But giant food corporations, led by General Mills (Yoplait) and Groupe Danone (Dannon), and now joined by many others including Walmart and PepsiCo, have all too often managed to turn this health food into quasi-junk food.

Many yogurt products on store shelves today are marketed and hyped as healthy, but a close inspection of the ingredients list, sugar content, and how the ingredients are produced paints a very different picture.

Conventional yogurt of today is produced with milk from cows that are nearly always confined and unable to graze on pasture, and fed genetically engineered grains. Chemical defoamers, banned in organics, are commonly added to milk during the processing of lowfat yogurt. Add in artificial sweeteners or high doses of sugar and high fructose corn syrup, artificial colors, synthetic preservatives, and the gut-wrenching thickener carrageenan, and it's plain to see that many yogurt products are essen-

tially junk food masquerading as health food.

But these products are marketed as healthy in part by displaying the industry's "Live and Active Cultures" seal, which supposedly assures a high level of beneficial microorganisms, also known as probiotics. The seal is found on nearly all conventional yogurt by popular brands owned by corporations such as General Mills and Groupe Danone. However, the popular marketing approach is not used by organic brands, largely because of the cost of the program testing. Consumers may be tempted to choose products with the Live and Active Cultures seal, perceiving it as healthier, over products without it—which may mean choosing conventional yogurt over organic.

Testing commissioned by The Cornucopia Institute, performed by the University of Nebraska-Lincoln's Food Processing Center, revealed that many organic farmstead yogurt products, without the Live and Active Cultures seal, actually contained higher levels of probiotics than conventional yogurt with the seal.



Yoplait Go-Gurt—"fruity" drinkable yogurt in a tube marketed to children—has no actual fruit but tastes and looks like fruit yogurt due to artificial colors and artificial flavors. Go-Gurt also contains the harmful ingredient carrageenan along with artificial preservatives and synthetic nutrients. The milk is conventionally produced, from CAFO (confined animal feeding operation) dairy cows fed genetically engineered corn and soybeans. And on a price-per-ounce basis, the Go-Gurt brand, owned by General Mills, costs more than many organic yogurt products.

Cornucopia's analysis also found that some conventional yogurt products on store shelves do not meet the legal definition to be labeled as "yogurt." The FDA has a "standard of identity" for yogurt that specifies which types of ingredients can and cannot be added to a product labeled and sold as "yogurt." Artificial sweeteners, preservatives, milk protein concentrates and artificial nutrients other than vitamins A and D do not appear on the FDA's list. Therefore, any product containing these ingredients should not be marketed and sold as "yogurt"—including products from most of the Yoplait, Dannon and other conventional brands, as well as products from most store label brands, including Walmart's Great Value.

The addition of certain ingredients is not simply a question of legality; it also raises an important question about the healthfulness of the food. Many ingredients found in yogurt, such as aspartame and artificial colors, have been the subject of controversy as to their adverse health effects. For example, research has linked the artificial sweetener aspartame to brain tumors and neurological disease in laboratory animals. Carrageenan, a food thickener, has been shown to promote colon tumors and cause inflammation and digestive disease in laboratory animals. Artificial colors have been linked to attention deficit hyperactivity disorder in children. These ingredients and others commonly found in yogurt have no place in a food marketed as healthy.

This report outlines the various reasons people should choose organic yogurt over conventional. The USDA Organic seal on a yogurt product is much

more important, in terms of healthfulness, than the Live and Active Cultures seal, the "Greek" label or any other marketing claim or label.

What This Report Covers

SECTION I explores the emerging science to better understand the *human microbiome*, the hundred trillion microbes that inhabit our bodies and play a central role in our health. Research suggests that cultivating a healthy community of gut bacteria is not as simple as ingesting a daily dose of probiotics, but instead depends on overall dietary choices. This includes avoiding artificial sweeteners, which may be toxic to beneficial microorganisms. Avoiding chemical additives in foods in general is likely a good rule to support a healthy microbiome, which is why it is important to avoid foods, including yogurt, with these ingredients.

Section I also assures consumers that organic yogurt without the Live and Active Cultures seal is a good choice, as it often contains higher levels of live and active cultures than yogurt products with the seal. Moreover, courts and the Federal Trade Commission have ruled that advertisements and health claims related to probiotics are misleading. These advertisements attempt to convince consumers to choose conventional yogurt with designer strains of probiotics, but scientific proof that these strains are superior to the ones commonly found in traditional organic yogurt is weak.

SECTION II explores the many benefits of organic yogurt over conventional. Only organic yogurt assures that the milk used to produce the yogurt came from cows that grazed on pasture, were given a non-GMO organic feed and were not treated with antibiotics or synthetic growth hormones. Conventional yogurt can be processed with chemical defoamers, which is prohibited in the manufacturing of organic yogurt.

Defoamers, and many other "processing aids," are not required by the FDA to be listed on the ingredient label even though residues of these materials remain in food products.

Testing by the University of Nebraska–Lincoln's laboratory showed that there are also nutritional benefits to eating whole-milk organic yogurt: better ratios



Many ingredients found in yogurt brands, such as artificial sweeteners, have been the subject of controversy as to their adverse health effects.

of omega-3 to omega-6 fatty acids and higher levels of other beneficial fats including conjugated linoleic acid (CLA).

SECTION III responds to marketing claims that paint “Greek yogurt” as a healthier choice than other types of yogurt, including organic whole-milk yogurt. Authentic Greek yogurt is yogurt that has been further processed (*strained*) to remove the liquid whey.

Lesser quality Greek yogurt products add thickening agents/stabilizers to achieve thicker “mouth feel” or even imported milk protein concentrate. (There are no FDA standards for what constitutes Greek yogurt.) The remaining solids result in a product with a thicker consistency and higher levels of protein. Greek yogurt is marketed as healthy and touted by weight-loss programs as beneficial for its high protein and low fat content.

Chobani, a pioneering manufacturer of Greek yogurt in the U.S., has taken the yogurt market by storm. Yet most Greek yogurt products are not certified organic. The milk used to produce Chobani yogurt, like most other conventional yogurt products, comes from conventionally managed cows, many of which are raised in industrial-scale operations on a diet of conventional, genetically engineered corn and soybeans.



The Cornucopia Institute encourages people who buy yogurt to buy minimally processed organic brands, both to support organic farmers and to support their family’s health. Cornucopia’s Yogurt Buyer’s Guide, available at www.cornucopia.org, provides a resource for consumers who seek the highest-quality yogurt.



Many yogurt products contain high levels of added sugars, in many cases exceeding the American Heart Association’s recommended maximum daily intake *in a single serving*.

Many of the Greek yogurt brands that followed in Chobani’s footsteps are made with milk protein concentrate (MPC), which is primarily imported from other countries in powdered form as a way to avoid the time-consuming straining process. MPC imports drive down the price of domestically produced dairy, squeezing many dairy farmers out of business.

In addition to the use of MPC and the waste problem associated with the strained whey, this section points out that many Greek yogurt products contain high amounts of added sugar and are not as “healthy” as advertised. And when consumers choose protein-rich Greek yogurt, they are missing out on the many beneficial fats essential for health which are found at higher levels in organic whole-milk yogurt.

SECTION IV outlines the ingredients commonly found in yogurt, other than the milk and live cultures. Many yogurt products contain high levels of added sugars or high fructose corn syrup, including corn syrups with exceptionally high levels of fructose, misleadingly labeled as “fructose.”

Other ingredients of concern commonly found in yogurt include aspartame, linked to brain tumors and neurological disease in laboratory animals; carrageenan, an additive that has been linked to gastrointestinal inflammation and disease; and artificial colors, which have been linked to attention deficit hyperactivity disorder in children.

SECTION V is a cost comparison of conventional versus organic yogurt products that challenges the myth that organic is always more expensive. In markets around the country, from member-owned co-ops in urban centers to Whole Foods Market in upscale suburbs to Walmart in rural communities, organic yogurt products can often be bought for less on a price-per-ounce basis than many conventional yogurts.

For example, organic yogurt from farmstead dairies in 32-ounce containers often costs less on a per-ounce basis than most conventional yogurt in 6-ounce containers. And most traditional organic yogurt costs less than conventional Greek-style yogurt, especially the high-priced name brands like Chobani. (Although always relatively high priced,

Chobani raised prices by 30% in 2014, according to the dairy industry journal *The Milkweed*.) Organic yogurt also often costs less than heavily processed yogurt in special packaging marketed to children, like Yoplait's Go-Gurt and Dannon's Danimals, with their long lists of artificial ingredients.

In conclusion, conventional yogurt makers deceptively market their products as "healthy," especially yogurt with the Live and Active Cultures seal and Greek varieties. Yet the documented best choice, in terms of healthfulness, is organic yogurt with a short ingredients list. After all, all that is required for making healthy yogurt is fresh, organic milk and live cultures—with added organic fruit or unrefined sweeteners, if so desired.

Section I: Yogurt, Probiotics and the Microbiome

What Is Yogurt?

Yogurt is made by adding specific bacterial cultures to milk. The bacteria (*Lactobacillus bulgaricus* and *Streptococcus thermophiles*) convert the natural sugars of milk (lactose) into lactic acid. This process thickens the milk and creates the characteristic sour taste and thick and creamy texture of yogurt. It also acts as a natural preservative in several ways. By colonizing the milk with beneficial bacteria, it prevents harmful bacteria from contaminating the milk. The higher levels of lactic acid in yogurt also act as a natural preservative, since lactic acid inhibits the growth of pathogenic bacteria.



Yogurt is made by adding bacterial cultures to milk. Prior to the invention of refrigeration, culturing was a technique used to preserve fresh milk.

Today, the U.S. Food and Drug Administration (FDA) requires that any product labeled “yogurt” must contain cream or milk cultured with *Lactobacillus bulgaricus* and *Streptococcus thermophilus*.¹ The agency allows other ingredients to be added, including sweeteners, flavoring ingredients, color additives and stabilizers. But yogurt makers have added more than just the allowed optional ingredients. Additives that are commonly found in yogurt and that raise concerns will be listed and explained in Section V of this report.

Probiotics

The marketing of yogurt as a health food revolves in large part around the presence of probiotics. The term “probiotic” is a relatively new word meaning “for life”; it refers to bacteria found in foods that are associated with beneficial health effects.²

Probiotics were defined in 1907 by a French pediatrician, Dr. Henry Tissier. He found that children suffering from diarrhea had a low number of “bifid” bacteria, which were abundant in healthy children. He suggested that these bacteria, also used to ferment yogurt, could help children with diarrhea, restoring their gut microflora and digestive health.³

At around the same time, a Russian biologist, Dr. Elie Metchnikoff, was fascinated by the longevity of Bulgarian peasants. He believed that aging was caused in large part by toxic bacteria in the gut, and he hypothesized that the Bulgarians’ copious consumption of fermented milk (yogurt) played a role in their health.⁴

Decades later, when the French-based dairy conglomerate Groupe Danone launched yogurt in the American market, yogurt advertisements often featured the longevity of people whose traditional diets included yogurt or other fermented milk products. For example, a 1977

Dannon commercial showed active and healthy old—very old—Soviet Georgian peasants eating yogurt.

“In Soviet Georgia, there are two curious things about the people. A large part of their diet is yogurt. And a large number of them live past a hundred,” says the commercial’s narrator.⁵ “We’re not saying that Dannon yogurt will help you live longer, but Dannon lowfat yogurt is a wholesome natural food rich in nutrition,” the narrator continues.

At least in the 1977 commercial, the company behind the Dannon brand, Groupe Danone, acknowledged that yogurt might not be the magic bullet to help you live longer. In recent years, it has cost the company millions of dollars to settle false advertising lawsuits that alleged that the company misrepresented the health benefits of its products, specifically related to its probiotics. Dannon’s marketing rhetoric has left the company vulnerable to legal action. However, there are a number of documented benefits from eating cultured foods, including yogurt.

Probiotics are beneficial for the gastrointestinal health of individuals who are taking a course of antibiotics for medical reasons. When antibiotics disrupt the microorganisms living in the gastrointestinal tract, eating foods with high levels of probiotics can be beneficial.

Data suggest that diarrhea and other gastrointestinal symptoms that often accompany a course of antibiotics are likely caused by a surge in the population of the bacterium *Clostridium difficile*. While this microorganism appears in the gut of healthy individuals, the disruption of many indigenous gut microorganisms by antibiotics can lead to abnormally high levels of *Clostridium difficile* and cause diarrhea. Eating or drinking fermented milk products with probiotics creates competition for *Clostridium difficile* bacteria and helps ensure their numbers do not rise too high.⁶

A 2011 Cochrane Review evaluating 3,432 children who received probiotics co-administered with antibiotics, from 16 studies, concluded that the overall evidence suggests a protective effect of probiotics in preventing antibiotic-associated diarrhea.⁷

The American Academy of Pediatrics supports the recommendation of probiotics for prevention, but not treatment, of antibiotic-associated diarrhea.⁸

Adults who are undergoing a course of antibiotics may also benefit from probiotics. Two clinical trials, one using DanActive (Dannon)⁹ and another using a proprietary probiotic blend containing *L. casei* and *L. acidophilus*,¹⁰

found patients given the higher dose of probiotics concurrent with antibiotics had fewer occurrences of diarrhea.

Several studies have found probiotics to be beneficial for individuals suffering from irritable bowel syndrome (IBS), although other studies found no benefits.¹¹ Researchers acknowledge that the exact causes of IBS remain unknown and “the evidence of benefit is not sufficiently strong to support the general recommendation of probiotics for IBS.”¹²

But researchers caution against drawing sweeping conclusions regarding the benefits of probiotics. “The capacity of probiotics to modify disease symptoms is likely to be modest and varies among probiotic strains—not all probiotics are right for all diseases,”¹³ writes Matthew Ciorba, a gastroenterologist at Washington University’s St. Louis School of Medicine.

Probiotics may not have as great an effect on the microflora of healthy individuals as yogurt makers claim on product packages and commercials. In order to see why, it is important to understand the emerging science on gut microflora and the human microbiome. This research supports the idea that the overall diet—including avoiding certain food additives commonly found in yogurt products that have been linked to negative health impacts, like artificial sweeteners and carrageenan—affects gut microflora greater than simply increasing the consumption of probiotics.

The Microbiome

Our bodies are a collection of cells. That is old news. But recent research reveals that cells carrying our own DNA—human DNA—make up only 10 percent of our bodies. The rest of “us” is made up of trillions of microscopic creatures, primarily bacteria.

“We’re not individuals, we’re colonies of creatures,” says Dr. Bruce Birren, a professor at the Massachusetts Institute of Technology who is also co-director of MIT’s Genome Sequencing and Analysis Program.¹⁴ “When I get up from my chair, 10 times more bacterial cells get up than human ones.”

Scientists now refer to the totality of these bacteria in our bodies—our partners in life—as our *microbiota*. The collective genetic makeup of our microbiota is referred to as our *microbiome*. In terms of weight, a human microbiota constitutes 1% to 3% of a human body.¹⁵ But in terms



The human body is made up of trillions of microscopic creatures, referred to as our microbiota.

of the absolute number of cells and genetic material, we are more microbe than human: As many as 100 trillion bacterial cells reside in or on our body,¹⁶ and these microorganisms carry 300-fold more unique genes than are present in our own genome.¹⁷

Bacteria live in and on every part of our body—from behind our ears to between our toes and everywhere in between. Some parts of our bodies have especially high numbers of microbes, with our gut having not only the largest number but also the greatest diversity.

In recent years, scientists have made fascinating discoveries regarding the role of the microbes that inhabit us. “We as humans are a superorganism, with our biology determined by the genes encoded in our DNA together with the genes of our microbial partners,” says Dr. Claire Fraser, director of the Institute for Genome Sciences, at the University of Maryland School of Medicine.¹⁸

In fact, it is becoming increasingly clear that there is only so much about the fate of our health that can be explained by our own genes and how they interact with our environment. Many of the mysteries that have baffled scientists may be explained by the microbiome, including questions regarding how food affects our health.

The microbiome may not present us with instant answers to old mysteries about the interactions between food and health, but its discovery opens a new way of thinking about food. After all, with trillions of microbes residing in our gut, we can no longer restrict our questions about food to how it interacts with our own cells. We must also consider how the foods we eat affect our resident microorganisms.

The Microbiome and Health

Emerging science suggests that the hundred trillion microbes in our bodies are far from “hitchhikers” or “free-loaders.” They are essential to our health.

To better understand the human microbiome, the National Institutes of Health initiated the Human Microbiome Project, which is often referred to as the “second Human Genome Project.”

When additional findings of the Human Microbiome Project were published in June 2012 in the journal *Nature*, the authors noted the incredible diversity and complexity of the microbiome. “We found the diversity and abundance of each habitat’s signature microbes to vary widely even among healthy subjects,” the authors wrote.

This is important when considering diet and health. The foods and drinks we ingest end up in our gut, where its components interact not only with our own cells but with the bacteria that make up our microbiome. In fact, some components of foods may be beneficial to our health for the sole reason that they nourish our resident bacteria.

For example, the human digestive tract cannot digest certain fibers, and for years researchers scratched their heads as to why these “nutrients” were found in human milk. After all, if these components were not digested by the baby’s digestive tract, why would the mother’s body go to the trouble of creating them? It turns out that these fibers may be indigestible for our own cells but provide an important food source for our microbial partners. These fibers are now referred to as “prebiotics”: food for microbes.

Research suggests that the microbiome may play a critical role in energy harvesting and metabolism. In other words, our microbiome may decide how the calories and fats in the foods we ingest are used and distributed. For example, different types of gut bacteria may have an impact on whether those calories are burned as energy or stored as belly fat.¹⁹

The microbiome of pregnant women has been shown to change dramatically over the course of pregnancy.²⁰

Researchers have also found differences in populations of microbes between lean and obese people. Scientists are quick to caution that much still remains unclear about the role of the microbiome in weight gain,²¹ but it is also increasingly clear that the gut microbiome is an ecosystem that cannot be ignored when making food choices.

Antibiotics

While emerging science suggests that obesity may be linked to imbalances or disturbances of our microbiome, there is, in a way, nothing “emerging” about this science. The scientific experiment of what happens when antibiotics eradicate an animal’s gut microflora has been conducted for decades, on our nation’s factory farms. Here, some of the fattest and unhealthiest beings live out their short lives on a constant diet of microbiome-killing antibiotics.

Veterinary scientists discovered that administering constant low levels of antibiotics to farm animals leads to rapid weight gain. Veterinary scientists do not understand the exact mechanism by which the administration of sub-therapeutic doses of antibiotics leads animals to put on the pounds at an accelerated pace.

It is worth connecting the recent studies of the human microbiome with the observations that animals on antibiotics—drugs that are designed to kill the microbes that make up a microbiome—gain weight more rapidly.

Without question, antibiotics are lifesavers; their value in human medicine to combat infections cannot be overstated. However, scientists involved in the Human Microbiome Project cite unnecessary exposure to antibiotics as a likely factor in the declining health of our microbiome.

Martin Blaser is a professor of microbiology at New York University’s Langone Medical Center. He asserts that antibiotics are permanently altering our microbiome, with serious health consequences.²² Dr. Blaser lists the use of antibiotics in farm animals as a possible factor in the “Disappearing Microbiota” hypothesis.²³

But while antibiotics are an obvious factor in “killing”



Antibiotic overuse in human medicine and misuse in animal agriculture are factors in the declining health of our microbiome.

our bacterial partners due to overuse in human medicine and misuse in animal agriculture, there are others to consider: the chemical additives in foods.

Groundbreaking scientific discoveries often force us to reexamine previous assumptions. The discovery of the human microbiome could shed light on the unexplained findings that replacing sugar, which is high in calories, with artificial sweeteners, with no calories, does not actually correlate with weight loss.

These findings have perplexed scientists because they defy logic—but only if that logic is based on an erroneous assumption about whom (or what) we are feeding when we ingest foods and beverages. If we are feeding only ourselves, then yes, it makes little sense that a sweet but zero-calorie ingredient would not lead to weight loss. But if we consider the microbiome, and the fact that we are feeding not just our own cells but also our microbial gut “partners,” it opens the door to new ways of thinking. What if “non-nutritive” sweeteners, as artificial sweeteners are often called, are only “non-nutritive” to our human cells, and affect our beneficial microbes in unexpected ways?

Chemical Additives and Artificial Sweeteners: Toxic to the Microbiome?

Artificial sweeteners are marketed as healthy alternatives to sugar. Aspartame, marketed as NutraSweet®, is used in several yogurt products. Aspartame is 200 times sweeter than sugar. It is metabolized by the human body, but because much smaller amounts produce the desired level of sweetness, less is consumed, so it contributes fewer calories.²⁴

Sucralose is another artificial sweetener, marketed as Splenda®. Saccharin, yet another, is marketed as Sweet’N Low®.

The safety of aspartame for human consumption remains controversial. It has been linked to brain tumors and neurological disease in laboratory animals. In 1996 the FDA removed the required warning labels on the front panel of any product containing the ingredient due to the industry’s successful lobby efforts. Concern remains over the conflict of interest behind the science reporting its safety.

Additional studies have brought into question the assumption by the food industry that artificial sweeteners help with weight control and prevent weight-related diseases such as diabetes.

Dr. Qing Yang, a professor of molecular, cellular and developmental biology at Yale University, writes: “A rise in the percent of the population who are obese coincides with an increase in the widespread use of non-caloric artificial sweeteners, such as aspartame and sucralose.”²⁶ The following data demonstrates that those trends could be related.

Several large-scale studies in the 1980s found that artificial sweeteners do not correlate with weight loss. One study examined 3,682 adults over a seven- to eight-year period and found that drinkers of artificially sweetened beverages consistently had higher body mass indexes.²⁷ Another study, by the American Cancer Society, found that among nearly 80,000 women, regular artificial sweetener users gained more weight compared to non-users.²⁸

Rat studies have also found a positive correlation between artificial sweeteners in the diet and weight gain.²⁹ Rats with artificial sweeteners as part of their diet actually ate more than rats that did not receive artificial sweeteners.³⁰



Numerous studies have found that artificial sweeteners actually increase caloric consumption, increase weight gain, and are positively correlated with diseases including diabetes and heart disease.²⁵

Artificial sweeteners likely encourage higher consumption of foods for several reasons. They “sweeten” the diet and may encourage sugar dependence and sugar cravings. Studies have shown this to be the case with other tastes: People who reduced their intake of fat³¹ and salt³² eventually became used to lower levels, and after a while actually preferred foods with less fat and salt. The same could be true for the sweet taste. “Unsweetening” the diet, rather than replacing caloric sweeteners with non-caloric sweeteners, may be more effective in encouraging a healthy diet than creating a dependence on sweet tastes with artificial sweeteners.³³

Artificial sweeteners also decouple the brain and the digestive system: The brain senses sweetness but the digestive system senses no sugar and sends a different message. This is linked to incomplete satisfaction, which may encourage the eater to seek more food—eating more than he or she would have if the body had received what the brain was led to believe it had received.

There may be another factor involved in the failure of artificial sweeteners to help with weight loss: Could it be that artificial sweeteners in yogurt may be toxic to our gut microbiome?

Studies have suggested that artificial sweeteners are antimicrobials, which excited dentists who have enthusiastically written that artificial sweeteners could decrease the incidence of cavities. An article in the *Journal of Contemporary Dentistry Practice* concluded: “All the sweeteners used in this study [saccharin, aspartame and sucralose] have demonstrated significant antimicrobial activity.”³⁴

If chemical sweeteners kill cavity-causing microbes in the mouth, how do they affect the beneficial microbes in the gut?

Duke University Medical Center researchers explored this question by feeding various amounts of the artificial sweetener sucralose to rats and measuring fecal microflora and fecal pH. The researchers found that rats given sucralose had significantly lower levels of beneficial gut microflora, including the bifidobacteria and lactobacilli that yogurt provides.

Even after rats were allowed to “recover” for 12 weeks after the sucralose diet, levels of bifidobacteria remained lower than in the control group. These changes occurred at dosages of sucralose that fell well below the FDA’s Acceptable Daily Intake level.³⁵

Another study, by Dr. Gary Wu at the University of Pennsylvania’s Perelman School of Medicine, found that even small amounts of aspartame in the diet impacted the composition of our gut microbiome. According to Dr. Wu, “Diet strongly affects human health, partly by modulating gut microbiome composition.”³⁶

“The fact that an artificial sweetener can modify substantially our microbiota is remarkable and warrants further studies,” writes Dr. Alexander Moschen, at the Medical Center of the University in Innsbruck, Austria.³⁷

In a letter to the editor of the *European Journal of Clinical Nutrition*, titled “Gut Bacteria and Aspartame: Why Are



Artificial sweeteners can substantially modify beneficial microbes in the gut.

We Surprised?”³⁸ Dr. Resia Pretorius, professor of physiology at the University of Pretoria in South Africa, explained why this finding made sense:

On consumption, each molecule of aspartame releases a molecule of methanol, which metabolizes into a molecule of formaldehyde.

Formaldehyde (which is a highly reactive substance) is classified as a known human carcinogen, with no safe level of consumption.

Therefore, it is not unexpected that very small amounts of the sweetener can modify bacterial communities, as these bacteria act as the first line of intestinal defense and are therefore in direct contact with the sweetener and its metabolic compounds.

During obesity or periods of weight management, where patients might use aspartame, it is perhaps more crucial to have optimum bacterial community functioning in the intestines.³⁹

The paradoxical association between non-nutritive sweeteners and weight gain may be due to the toxic effects of these chemicals on gut microflora. If a steady supply of antibiotics, which kill gut bacteria, leads to steady weight gain, could the same be true of a steady consumption of artificial sweeteners?

Probiotic Advertisements

Studies generally show that there are few, if any, measurable differences in the microbiota of people consuming probiotics versus control groups. A study published in April 2013 in the Oxford journal *DNA Research* found “no significant changes in the overall structure of gut microbiota in

the samples with and without probiotic administration regardless of groups and types of the probiotics used.”⁴⁰

Yogurt, like any other traditional, wholesome food, should be viewed as part of a healthy diet but not a magic bullet to longevity and health. Companies making health claims regarding probiotics are likely doing so in an attempt to sell their products.

In 2008, the attorneys general in 39 states joined forces to sue Groupe Danone for its Dannon Activia advertisements. They charged that the Dannon advertisements included claims regarding health benefits that could not be substantiated by competent and reliable scientific evidence. These claims, the attorneys general charged, promised digestive health, improved regularity and improved immunity that “were misleading, deceptive and unfair.” The case was settled in 2010, when Dannon paid \$21 million to the 39 states.⁴¹

After Dannon settled with the states, Washington State Assistant Attorney General Bob Lipson said: “Dannon made up fancy names for bacteria in its Activia yogurt and dairy drink, marketed them as having unique health benefits, then milked the public’s willingness to believe those claims.”⁴²

When Lipson mentioned “fancy names for bacteria,” he was referring to the trademarked bacterial strain *Bifidus Regularis*. Dannon claimed that *Bifidus Regularis* helped promote the purported health benefit of improved regularity—a claim that many consumers believed, given the bacterial strain’s name.

Earlier in 2010, Dannon settled a separate class action lawsuit, paying consumers up to \$45 million. Again, the company had been sued for false and misleading advertising regarding the unproven health benefits of its products.⁴³

The Federal Trade Commission also issued a complaint against Dannon for its Activia advertisements in 2010, charging that the health claims could not be substantiated.⁴⁴

In Europe, health claims on foods are more tightly regulated and must be preapproved by an independent scientific panel to ensure that the health claim is backed by science before it can appear on food labels.

In June 2012, the European Food Safety Authority ruled that no health claims regarding probiotics would be permitted. Food companies submitted 74 petitions, including scientific studies to back their claims. All were rejected by the panel.

None of this has deterred the growth of the probiotic market, which is estimated at nearly \$30 billion worldwide and expected to grow 30% to nearly \$47 billion in five years.⁴⁵

Probiotics: Profits and Big Business

Since probiotics are now big business, it is no surprise that large corporations have become involved. For example, DuPont, the chemical company that got its start making explosives and is now a major manufacturer of everything chemical, from Teflon® to Tyvek®, is also a major supplier of probiotics.⁴⁶

On the website of DuPont's Danisco division, the company explains: "Specialty ingredients are the key to helping manufacturers create foods, beverages and supplements that improve health through better nutrition."⁴⁷

What the company is really saying is that there is money to be made by marketing and selling ingredients with purported health benefits. DuPont offers a Yo-Mix product, in either freeze-dried or frozen pellet form, containing the "content claim strains including *Lactobacillus acidophilus*, *Lactobacillus paracasei* and *Bifidobacterium lactis*."⁴⁸ In June 2013, Danisco released a Greek Yo-Mix culture blend.⁴⁹

Other suppliers of probiotics include the agribusiness giant Cargill⁵⁰ and the Danish dairy ingredient manufacturer Chr. Hansen.

In February 2012, these companies created a trade lobby group for probiotics, specifically to "talk with lawmakers" and try to win health claims in the European Union.⁵¹ The trade lobby group, called the Global Alliance for Probiotics (GAP), was formed in response to previous disappointing lobbying efforts. It is expected that the trade group will continue lobbying the European regulators to allow health claims related to probiotics.

"Live and Active Cultures" Seal

In the United States, food corporations convened to establish the National Yogurt Association and developed the "Live and Active Cultures" seal found on many leading yogurt products.

Members of the National Yogurt Association include Groupe Danone (Dannon), General Mills (Yoplait), Jo-



The giant chemical company DuPont is a major supplier of probiotics.

hanna Foods (LaYogurt), The Kroger Company, PepsiCo (Muller), Pinkberry, Agrana Fruits US, and Chr. Hansen (the Danish probiotics supplier).

Consumers may wonder whether yogurt without the Live and Active Cultures seal contains as many cultures as yogurt with the seal. Cornucopia sent samples to the University of Nebraska–Lincoln's Food Processing Center laboratory to find out. No organic farmstead dairies that produce yogurt, and which are highly rated in the Cornucopia Organic Dairy Scorecard, included the seal. This is likely because the testing that accompanies certification costs thousands of dollars per sample.

Cornucopia's testing revealed that many of the organic yogurt products without the Live and Active Cultures seal contained higher levels of live and active cultures than brands with the seal—brands owned by members of the trade/lobby group.



The National Yogurt Association is careful to explain on its website that the seal does not assure that live and active cultures will actually be found in the yogurt by the time the consumer eats it. Rather, the testing is performed "at time of manufacture."

The testing also revealed that some of the yogurt products with the Live and Active Cultures seal contained much lower levels of probiotics than the seal claims. Yo-

gurt products with the seal containing less than 100 million cultures per gram included Yoplait Go-Gurt, LaLa Cult, and Dannon Danimals Smoothies.

PROBIOTIC LEVELS IN YOGURT BRANDS

BRAND	LEVEL	ORGANIC STATUS	LIVE AND ACTIVE CULTURES SEAL
Dannon Light & Fit	39 billion	Conventional	Yes
Dannon Oikos	24 billion	Conventional	Yes
Fage	24 billion	Conventional	No
Cedar Summit	9 billion	Organic	No
Maple Hill Creamery	9 billion	Organic	No
Seven Stars	7.5 billion	Organic	No
Butterworks	5.5 billion	Organic	No
Yoplait Whips	5.1 billion	Conventional	Yes
Organic Valley Drinkable	910 million	Organic	No
Dannon Activia Light	710 million	Conventional	Yes
The Greek Gods	370 million	Conventional	No
Yoplait Light Thick & Creamy	340 million	Conventional	Yes
Wallaby Organic	170 million	Organic	No
Kalona Supernatural	150 million	Organic	No
Muller	120 million	Conventional	No
Noosa	92 million	Conventional	No
Stonyfield	70 million	Organic	No
Yoplait Go-Gurt	43 million	Conventional	Yes
LaLa Cult	34 million	Conventional	Yes
Dannon Danimals Smoothies	28 million	Conventional	Yes
Chobani	8.7 million	Conventional	No
Horizon	1.4 million	Organic	No
Walmart Great Value Light Nonfat	1.2 million	Conventional	No

Section II: Benefits of Organic Yogurt

Organic yogurt is superior to conventional yogurt in a large variety of ways. For the reasons detailed below, consumers should always look for the organic label on yogurt.

Genetically Engineered Ingredients

Genetic engineering is the process of manipulating the genetic material of an organism by inserting genes from a different species into the genetic makeup of the organism.

In the United States today, the USDA reports that 88% of corn and 93% of soybeans are genetically engineered (GE) to either resist pesticide applications, produce their own toxins or both.⁵²

Foods containing genetically engineered ingredients, also called GMOs (genetically modified organisms), do not require labeling in the U.S., so there is no way to know if the products you are buying contain GMOs.

In addition to genetically modified recombinant bovine growth hormone (rbGH), which increases hormone levels including IGF-1 in conventional milk, the feed given to dairy cows producing conventional milk is most likely genetically engineered given that 88% of corn and 93% of soybeans are GE.

GMO foods, including milk from cows on a genetically engineered diet, have not been adequately tested for safety. An overview of safety studies on GMO foods, published in the journal *Environment International*,⁵³ finds roughly an equal split between the number of peer-reviewed studies that conclude there are no health risks and those that conclude there are.

The vast majority of studies finding no risks with GMOs were sponsored by the corporations that stand to profit from their continued use because the law requires them to prove safety. There is limited funding for research on GMO safety from the public sector.



USDA certified organic foods expressly prohibit GMO ingredients.

Glyphosate Residues

Glyphosate is the world's most widely used herbicide, marketed by Monsanto as Roundup®. Use of the herbicide has increased dramatically since the late 1990s with the release of glyphosate-tolerant GMO seed.

GMO crops are designed to break down the herbicide glyphosate. This technology allows the farmer to broadcast spray glyphosate-based herbicides over the entire crop, killing the weeds but leaving the susceptible crop unharmed. Glyphosate is also commonly used as a "harvest aid" applied to dry out crops prior to harvest. More concentrated doses



The United States agricultural sector applied 180 million pounds of glyphosate in 2013, making it the most commonly used herbicide.⁵⁴

are now required to combat glyphosate-resistant weeds that have evolved due to repeated exposure to the herbicide.

These practices have resulted in increased glyphosate residues in our food. Field tests show that crops can contain glyphosate residues up to one year after spraying.⁵⁵ An independent study showed GMO soy contains on average 9.0 mg/kg residue of both glyphosate and AMPA, a breakdown product.⁵⁶

Due to increases in the application of glyphosate, the Environmental Protection Agency (EPA) has increased tolerance levels for residues on food. For example, in soy the maximum allowance has been increased from 20 ppm to 40 ppm.⁵⁷

Glyphosate is commonly detected in human urine due to exposure in our diet from crop residues.⁵⁸ Though studies suggest that glyphosate does not bioaccumulate (become concentrated in) the human body, testing commissioned by Mom's Across America and Sustainable Pulse in 2014 found glyphosate in the breast milk of three out of ten lactating women.⁵⁹

The finding that glyphosate may be present in breast milk warrants more research into the role glyphosate plays once ingested. It also indicates that glyphosate may be found in the milk of conventionally farmed dairy animals that are fed an exclusive diet of glyphosate-tolerant GMO grain.

Choosing organic yogurts eliminates the potential exposure to glyphosate in conventional milk. When they are fed grain, in addition to pasture, organic cows consume exclusively organic grain free of glyphosate residues.

Finally, several studies by scientists who are not affiliated with or commissioned by the biotechnology indus-

try have raised concern over the safety of eating GMOs. Laboratory animal studies have shown that genetically engineered food damaged the intestines and peripheral immune systems,⁶⁰ caused reproductive problems,⁶¹ and increased the incidence of malignant tumors.⁶²

Growth Hormones

Conventional dairy cows can also be treated with GMO growth hormones, which are strictly prohibited in organic production. Monsanto, the biotechnology corporation that markets the majority of GMO crops, also developed these hormones, but has since sold the Posilac brand due to decreased sales and consumer concerns.

The hormones known as recombinant bovine growth hormone, or rbGH, are injected in dairy cows for the purpose of increasing milk production. Consumer backlash against rbGH and its questionable impact on farm profitability have reduced its overall use in conventional dairy. Current usage is highly skewed toward the larger industrial-scale dairies.

In 2007, the Cancer Prevention Coalition, chaired by University of Illinois cancer expert Dr. Samuel Epstein, filed a petition⁶³ with the FDA requesting the prohibition of GMO growth hormones in milk production.

The petition cited numerous studies indicating that milk from cows treated with synthetic growth hormones has higher levels of the hormone IGF-1. According to studies cited in the petition, IGF-1 is readily absorbed from the intestines into the bloodstream. In 19 scientific publications



Conventional milk is commonly commingled, meaning it comes from several different farms, from different breeds of cows, and is mixed together during transport before it reaches the processing facility. Consumers who wish to avoid the synthetic rbGH hormone should always choose organic.



Look for the USDA Organic seal, but be aware that some certified organic farmstead dairies choose not to display the label. (Its use on certified organic packaging and marketing materials is optional.) Instead, their products will state “organic” on the front of the package and will list the organic certifying agent on the back panel of the container.

it has been shown to increase the risk of breast cancer; in 10 publications, the risk of colon cancer; and in 7 publications, the risk of prostate cancer.⁶⁴

While the FDA has not acted to protect public health, some conventional yogurt manufacturers have made a commitment to source milk from cows not treated with growth hormones.⁶⁵

However, while non-rbGH claims on yogurt are increasingly common, such claims generally are not third-party certified unless the product is certified organic. Injecting dairy cows with growth hormones is explicitly banned in organic production.⁶⁶ Certified organic remains the best assurance that yogurt was produced without the use of genetically engineered synthetic growth hormones.

Studies have also indicated that injecting cows with rbGH increases the rate of clinical mastitis by 25%.⁶⁷ This raises the concern that increased rates of mastitis require ever increasing therapy with antibiotics in dairy herds.

Many conventional yogurt products also contain numerous minor ingredients that are derived from corn, which is likely GMO corn. These ingredients include modified corn starch and citric acid, which are present in many Dannon and Yoplait products.

Organic foods provide a safe haven from GMOs. The USDA strictly prohibits the use of genetically engineered feeds in organic animal farming.⁶⁸

Grazing Dairy Cows vs. Feedlot Diets: Beneficial Fats and Other Nutrients

Fats

Organic yogurt also provides better nutrition than conventional yogurt. Yogurt labeled “natural,” like most Chobani products (they are releasing a small percentage made with organic milk), is conventional and does not provide the same nutritional benefits as organic yogurt, in large part because of the way the milk cows are raised and what they eat.

Natural/conventional yogurt uses milk from conventional cows, which are predominantly raised in confinement rather than grazing on pasture. The feed of conventional cows relies heavily on corn and soybeans. The adage “you are what you eat” applies to cows as well as humans, including the milk a cow produces.

Providing a dairy cow feed ration that is excessively high in corn leads to an overall diet with an unhealthy ratio of omega-6 to omega-3 fatty acids, and a cow fed a diet predominantly consisting of grain will produce milk with a similar unhealthy fatty acid ratio.

The organic standards require that organic dairy cows be on pasture during the grazing season and obtain a minimum of 30% of their nutrition from pasture; some exceptional organic dairies feed 100% pasture and hay. Compared with dairy cows raised in conventional confinement dair-



The Cornucopia Organic Dairy Scorecard lists brands that produce exemplary yogurt and other dairy products by greatly exceeding the minimum grazing standards required by the USDA. Access it at www.cornucopia.org under the Scorecards tab.

ies, organic dairy cows eat much better, and this affects the nutritional quality of the milk they produce.

When cows graze on pasture, research has shown that their milk has a much more favorable fats profile. Two 2012 meta-analysis studies found higher levels of beneficial fats, including conjugated linoleic acid (CLA), in organic dairy.⁶⁹ Scientists at the University of Massachusetts–Amherst write about the benefits of CLA: “CLA reduces body fat, cardiovascular diseases and cancer, and modulates immune and inflammatory responses as well as improves bone mass.”^{70, 71, 72, 73}

A study by researchers at São Paulo University in Brazil found higher levels of beneficial fats, including polyunsaturated fatty acids and CLA, in organic fermented milk compared with conventional.⁷⁴

To find out whether organic yogurt on supermarket shelves is indeed higher in beneficial fats than conventional yogurt, The Cornucopia Institute sent seven yogurt samples to an accredited food testing laboratory at the University of Nebraska–Lincoln. The results corroborated what published research has already shown: Organic yogurt contains higher levels of the beneficial fat CLA and omega-3 fats, and a more favorable ratio of omega-6 to omega-3 fats than conventional yogurt.

The clear winner in terms of “good fats” was Cedar Summit Farm, a 100% grass-based organic dairy in Minnesota. Cedar Summit was also the top-rated brand in the U.S. in prior testing conducted by *The Milkweed*, a dairy industry publication.

The loser was Chobani, which had the least favorable omega-6 to omega-3 ratio and the lowest levels of CLA. In fact, the difference was staggering: Cedar Summit Farm contains 19 times as much of the health-promoting CLA as Chobani, nearly 15 times as much as Dannon, and 10 times as much as Yoplait, as shown in the table at right. Trader’s Point, a grass-based Indiana dairy, and Vermont’s Butterworks yogurt also had high CLA content.

CLA CONTENT OF YOGURT BRANDS

BRAND	PRODUCT	CLA CONTENT (MG PER G OF YOGURT)
Cedar Summit Farm	Whole milk	0.359
Trader's Point Creamery	Whole milk	0.257
Butterworks Farm	Whole milk	0.248
Stonyfield Farm	Whole milk	0.124
Yoplait	Lowfat	0.035
Dannon	Lowfat	0.024
Chobani	2%	0.019

Because The Cornucopia Institute set out to compare popular and widely available yogurt products offered by Yoplait, Dannon and Chobani, their lowfat (2% milk fat) versions were tested. Whole-milk versions by these conventional brands are either unavailable or difficult to find. For the organic yogurt, we tested whole-milk versions.

Since Yoplait, Dannon and Chobani remove a portion of the naturally occurring fats, it is not surprising that their CLA content would be lower. So we also measured specific types of fats as a percentage of the overall fat content. When measured in this way, the results are even more astonishing.

Over 1.1% of the total fats in Cedar Summit Farm yogurt is CLA, compared with just 0.26% in Chobani. Organic yogurt ranged from 0.58% to 1.1% CLA, whereas conventional yogurt ranged from 0.26% to 0.36% CLA.

Omega-6 to Omega-3 Ratio

Omega-3 fatty acids have health benefits, but it is not enough to simply increase one’s intake of omega-3s in the diet or through supplementation. Omega-6 fatty acids compete in the body with omega-3s, and it is therefore important to ensure a balanced intake of omega-6s relative to omega-3s.

Dr. Artemis Simopoulos, a physician-scientist who has published over 300 scientific papers and is president of the nonprofit Center for Genetics, Nutrition and Health, writes in the preface of *Omega-6/Omega-3 Essential Fatty Acid Ratio: The Scientific Evidence*: “Excessive amounts of omega-6 polyunsaturated fatty acids (PUFA) and a very high omega-6 to omega-3 ratio, as is found in today’s

Western and Indian diets, promote the pathogenesis of many diseases, including cardiovascular disease, cancer, and inflammatory and autoimmune diseases, whereas increased levels of omega-3 PUFA (and lower omega-6/omega-3 ratio), exert suppressive effects.”⁷⁵

It is estimated that the intake of omega-6 to omega-3 fatty acids in the diet of early humans was 1:1.⁷⁶ In the typical American diet today, a high intake of vegetable-based fats as well as meat and dairy from grain-fed animals has skewed the ratio, with intake ratios estimated at nearly 10:1. Experts recommend an intake ratio of 2:1.⁷⁷

Given the importance of a balanced omega-6 to omega-3 ratio in the overall diet, we also tested the ratios of the seven brands of yogurt. Again, the results showed the most favorable ratios in the organic, grass-based dairies’ yogurt and the most unfavorable ratios in the three conventional yogurts. One of the yogurts contained a ratio of less than 2:1, in other words, a more than ideal ratio. Chobani again appears at the bottom of the list, with a ratio of 4.47:1.

OMEGA-6 TO OMEGA-3 RATIOS IN YOGURT BRANDS

BRAND	RATIO OF OMEGA-6 TO OMEGA-3	PRECISE RATIO
Trader’s Point Creamery	2:1	(1.75 omega-6 : 1 omega-3)
Cedar Summit Farm	2:1	(2.2 omega-6 : 1 omega-3)
Butterworks Farm	2:1	(2.4 omega-6 : 1 omega-3)
Stonyfield Farm	2:1	(2.5 omega-6 : 1 omega-3)
Yoplait	3:1	(3.0 omega-6 : 1 omega-3)
Dannon	4:1	(3.6 omega-6 : 1 omega-3)
Chobani	4:1	(4.47 omega-6 : 1 omega-3)



Yogurt from dairies that graze their cows is much healthier than yogurt from dairies that feed “hot rations” (predominantly corn and soybeans). It is likely that the conventional cows supplying major brands like Yoplait and Dannon have never touched a fresh blade of grass during their productive lifetimes, while being milked.

Vitamins and Other Nutrients

Since grasses, clover and other forage—the “ingredients” in a pastured cow’s diet—contain other healthy nutrients, it stands to reason that milk from pastured cows is higher in these nutrients as well. Research has shown that cows on a diet of nutrient-rich pasture produce milk that is healthier and richer in nutrients. Significantly higher levels of the antioxidants lutein and zeaxanthin, important for eye health, have been found in organic milk versus conventional milk.^{78, 79}

Organic milk from pastured cows has also consistently been found to have higher levels of naturally occurring beta carotene (vitamin A) and tocopherols (vitamin E).^{80, 81}

Conventional Fruit and Pesticides

Many conventional yogurt products on store shelves contain no fruit at all, even if the label pictures fruit and the product bears the name of a fruit. Instead, these products contain artificial colors and artificial flavors.

Even so, conventional yogurt that *does* contain fruit comes with its own hazards. Conventional fruits commonly contain residues of synthetic pesticides. According to the National Academy of Sciences, “Depending on dose, some pesticides can cause a range of adverse effects on human health, including cancer, acute and chronic injury to the nervous system, lung damage, reproductive dysfunction, and possibly dysfunction of the endocrine and immune systems.”⁸²



According to the American Academy of Pediatrics, “There is a growing body of literature that suggests that pesticides may induce chronic health complications in children, including neurodevelopmental or behavioral problems, birth defects, asthma, and cancer.”⁸³

The American Academy of Pediatrics has stated: “Organic produce contains fewer pesticide residues than does conventional produce, and consuming a diet of organic produce reduces human exposure to pesticides.”⁸⁴

The oncologists on the President’s Cancer Panel agree: “Exposure to pesticides can be decreased by choosing, to the extent possible, food grown without pesticides or chemical fertilizers.”⁸⁵

The United States Department of Agriculture (USDA) annually tests common foods, both conventional and organic, for pesticide residues. Results show that conventional foods commonly contain pesticide residues, whereas organic foods are generally a safe haven.

When buying yogurt with fruit, it is especially important to choose organic to ensure the fruit was produced without the use of toxic pesticides.

Processing Aids

Once milk enters a conventional yogurt plant, it can be treated with chemical processing aids. Dimethylpolysiloxane is a chemical defoamer added to milk used for lowfat yogurt.⁸⁶ Chemical processing aids such as dimethylpolysiloxane are prohibited in the production of organic yogurt.

While a review of animal studies by the World Health Organization (WHO) and by the Environmental Protection Agency (EPA) found no adverse health effects associated with dimethylpolysiloxane,⁸⁷ most of the safety studies were performed or commissioned by Dow Corning Corporation (owned in part by the chemical giant Dow Chemical Company) and General Electric Company.

The corporations concluded that dimethylpolysiloxane is nontoxic based on rat studies showing no mortality at high doses. But what about other health effects? At high doses, one study found an increase in cell tumors in rats, but the EPA dismissed the study’s findings as “at most marginal/suggestive.”⁸⁸

Avoiding chemical processing aids, such as the defoamer dimethylpolysiloxane, is another good reason to choose organic. Processing aids are not legally required to be listed on the label even if residues persist in the product.

Section III: Greek Yogurt

Group Danone and Yoplait dominated the yogurt market until Chobani's explosive growth made it a market leader with its Greek yogurt.⁸⁹ Groupe Danone calls Greek yogurt "the new American revolution."⁹⁰

American households buying Greek yogurt shot up from 9% in 2010 to 47% in 2012.⁹¹

In terms of market share, Groupe Danone believes that Greek yogurt accounted for more than 35% of a market estimated at \$6 billion at the end of 2012.⁹² The founder and CEO of Chobani, Hamdi Ulukaya, believes Greek yogurt has captured even more of the yogurt market. According to Ulukaya, Greek yogurt made up 0.2% of the yogurt market in 2007 and today makes up roughly 50%.⁹³

Yet despite the growing popularity of Greek yogurt, the industry has its share of controversies, described in this section.

Milk Protein Concentrate

Yogurt makers interested in following in Chobani's footsteps have turned to cheap additives to create Greek-style yogurt. Rather than undergo the time-consuming process of physically straining the liquid whey out of the yogurt to create the thicker consistency and higher protein content, some yogurt makers have simply added corn starch or milk protein concentrate (MPC) powders to regular yogurt in order to increase the protein content and create a thicker texture.

Unlike fresh milk used to manufacture yogurt, MPCs do not come from Grade A facilities and are not regulated for purity. This is cause for concern because without proper oversight, milk may be diluted with water followed by further adulterations to raise the crude protein content. Recent protein adulteration scandals include the use of melamine, cyanuric acid, ammeline and ammelide to inflate the apparent protein content of concentrated proteins.

Farmers and consumer groups have been concerned

about the use of MPCs for years. The consumer advocacy group Food and Water Watch writes: "Unregulated imports of cheap milk protein concentrates are driving down the price of domestically produced milk and putting American dairy farmers out of business."⁹⁵

Leading the challenge of the legality of imported MPCs on behalf of the farm community is the Wisconsin-based advocacy group Family Farm Defenders, along with the influential dairy industry journal *The Milkweed*.

The FDA has still not listed MPCs as GRAS (generally regarded as safe) or even defined what they should constitute. Given the recent protein adulteration scandals, there is justification for strict regulation and enforcement. Given lax oversight of imported foods, consumers have reason to avoid yogurt with MPCs.

Moreover, MPCs are not listed as an allowed ingredient



MPCs are primarily imported from other countries, driving American dairy farmers out of business. The majority of MPCs come from New Zealand, Canada and India. Australia, Germany, Denmark and Hungary have also exported MPCs to the U.S.⁹⁴

in yogurt by the FDA. Therefore, lawsuits against General Mills' Yoplait Greek yogurt allege that it could not be sold as "yogurt." In December 2012, a judge in Minnesota dismissed a class action lawsuit against General Mills, stating that "the resolution of this question falls squarely within the competence and expertise of the FDA."⁹⁶ Although the FDA still has not acted, it is hard to prevail in a lawsuit proving a federal regulatory agency is acting in "an arbitrary and capricious manner" by not enforcing the law.

Yoplait reformulated its Greek-style yogurt products in June 2013 to remove MPCs. Other yogurt makers continue to add MPCs, and consumers should read the ingredients list to avoid them.

Environmental Concerns— Acid Whey Waste

When Greek yogurt is produced using traditional methods, without milk protein concentrate, it is made by straining the liquid whey from the milk, creating a byproduct: high-acid whey. This is why Greek yogurt is more expensive: It requires two to three times more milk than traditional yogurt.

An investigation by Justin Elliott titled "Whey Too Much: Greek Yogurt's Dark Side," published in *Modern Farmer*, found that the Greek yogurt industry has a waste problem. The acid whey that is a byproduct of Greek yogurt production needs to be disposed of. Whey can be used as an ingredient in animal feeds and in moderate amounts as fertilizer. It can also be disposed of in methane digesters to produce energy. The article found, unfortunately, the infrastructure to handle the whey to be lacking in some regions. Greek yogurt manufacturers are scrambling for a place to safely utilize the whey byproducts.

Elliott writes:

For every three or four ounces of milk, Chobani and other companies can produce only one ounce of creamy Greek yogurt. The rest becomes acid whey. It's a thin, runny waste product that can't simply be dumped. Not only would that be illegal, but whey decomposition is toxic to the natural environment, robbing oxygen from streams and rivers. That could turn a waterway into what one expert calls a "dead sea," destroying aquatic life over potentially large areas. Spills of cheese whey, a cousin of Greek yogurt whey, have killed tens of thousands of fish around



Manufacturers are increasingly diverting whey, productively, into manufactured byproducts. Even so, Greek yogurt's waste problem provides another reason why "plain old" yogurt might be a better choice environmentally. No whey byproduct is produced in the manufacture of traditional yogurt.

the country in recent years. The scale of the problem—or opportunity, depending on who you ask—is daunting.⁹⁷

Is Greek Yogurt "Healthier"?

According to Groupe Danone, Greek yogurt's success is "no mystery. Its creamy texture appeals to American tastes; its high protein content makes it satisfying; and with very little fat and sugar, it's a healthy choice."

It is true that most Greek yogurt has "very little fat," but is that a good thing? Fat from grass-fed cows is like fat from wild salmon, rich in beneficial fats that the body needs.

And is it true that Greek yogurt has "very little sugar"?

Chobani adds 14.5 grams of sugar to every cup of its vanilla-flavored Greek yogurt. Dannon adds 18 grams of sugar to every cup of Oikos. The lowest added-sugar content of Greek yogurt brands is Stonyfield's, which contains 10 grams of added sugar.

Whole-milk plain yogurt from pasture-raised organic cows provides a much better choice than conventional

Greek yogurt in terms of nutrition and cost, while offering a similar creamy and satisfying texture. Regional organic dairies like Butterworks Farm and Maple Hill Creamery (Northeast) and Cedar Summit Farm (Upper Midwest) offer creamy whole-milk yogurt with a much more favorable fats ratio and much lower levels of sugar than Chobani and other conventional Greek yogurts. They have the additional advantage of having the option of no added sugar and the brands never add synthetic sugar substitutes.

Butterworks Whole Milk Maple yogurt contains 10 grams of added sugar in the form of organic maple syrup, which is well below the 14.5 grams of processed sugar in a cup of Chobani. And it is much less expensive at \$4.99 per 32-ounce container, compared with \$6.29 for a similar-sized container of conventional, lower-fat and higher-sugar Chobani.



A teaspoon of sugar contains roughly 4.2 grams. A cup of Dannon Greek yogurt contains more than 4 teaspoons of sugar, a cup of Chobani yogurt contains 3.5 teaspoons of added sugar, and a cup of Stonyfield Oikos contains roughly 2.5 teaspoons of sugar.

Section IV: Ingredients in Yogurt

Sweeteners

Sugar

Large multinational corporations market yogurt as a health food even when the products contain high levels of sugar or high fructose corn syrup. Many flavored yogurt varieties have as much sugar as a candy bar—and sometimes more. Organic brands are not necessarily exempt. Sweeteners are added to satisfy the sweet tooth of the typical American consumer and also to mask the natural acidity and somewhat sour flavor profile of fermented milk.⁹⁸

Excess consumption of refined sugar is tied to many health problems. Research studies have pointed to possible links between high sugar consumption and cancer,⁹⁹ diabetes (independent of obesity rates)¹⁰⁰ and reduced brain function including memory and learning.¹⁰¹

A recent study from the Centers for Disease Control and Prevention, consistent with previous research conducted, found an increased risk for death from cardiovascular disease (CVD) and the consumption of added sugar.¹⁰²

The American Heart Association (AHA) recommends that no more than 5% of calorie intake come from sugars. This means limiting added sugar intake to six teaspoons per day for women¹⁰³ and nine teaspoons for men.^{104, 105, 106}

Yogurt contains naturally occurring sugars, which is why the Nutrition Facts for unsweetened, plain yogurt will typically list up to 9 grams of “sugar” per 6-ounce serving for whole-milk plain varieties and up to 12 grams for non-fat plain yogurts. These sugars are naturally occurring, not added sweeteners. The bacterial cultures in yogurt break down some, but not all, of the naturally occurring lactose into simpler sugars, glucose and galactose, which are easier to digest.



The American Heart Association says most Americans consume between 22 and 30 teaspoons of added sugar per day—many times what is considered a healthy limit. The recommended limit can come in a single serving of sweetened yogurt.

Yogurt is marketed as a healthy alternative to junk food, but the added sugar content in yogurt can be just as high as in candy. Yoplait pushes its light yogurt as a “swappportunity” to substitute a dessert with one of their 100-calorie yogurt cups. What they don’t say is that sugar is still number two, three or four on the ingredients list, depending on the flavor, and it’s backed up by the artificial sweeteners sucralose, acesulfame potassium or aspartame to cut a few more calories.

New yogurt “dessert” products released in 2014 are being marketed as “relatively low calorie,” including Dannon Creamery and Chobani Indulgent. In fact, calorie counts of around 200 per 5.3-ounce pot (plain yogurt has about 40 calories) are on par with most candy bars.

Yoplait Original yogurt cups all contain 26 to 27 grams of sugar. In comparison, a 3.27-ounce bag of Peanut M&Ms has 23 grams of sugar.

Dannon’s Oikos Greek non-fat and traditional yogurt in 5.3-ounce containers lists just 6 grams of naturally occurring sugar (lactose) in the plain yogurt but 17 to 21 grams of sugar in the flavored options. That means up to 15 grams of sugars, or 3.5 teaspoons, were added to the single-serving containers.

According to the AHA, women should limit their added sugar consumption to six teaspoons per day. One cup of Crowley Lowfat yogurt contains nearly 10 teaspoons of added sugar, in the form of high fructose corn syrup, corn syrup and sugar.

The following products contained more than the daily recommended maximum intake by women (six teaspoons) of added sugar per cup of yogurt:

SUGAR CONTENT OF YOGURT BRANDS

BRAND	PRODUCT	TEASPOONS OF ADDED SUGAR PER CUP OF YOGURT
Crowley	Lowfat, Strawberry Banana	9.75
Fage	0% Fat, Honey	9.34
ShurFine	Lowfat, Blueberry	8.67
Muller	Lowfat, Chocoballs	8.12
LaYogurt	Lowfat Probiotic, Cherry	7.95
365	Greek 0%, Honey	7.71
Yoplait	Thick 'n Creamy, Strawberry	7.59
Stonyfield	Blends Fat Free, Strawberry	7.22
Yoplait	Simply Go-Gurt, Strawberry	7.07
Yoplait	Go-Gurt, Blueberry Blast	7.07
Muller	FrutUp, Peach	6.89
Stonyfield	Blends Fat Free, French Vanilla	6.87
Liberte	Whole Milk, Blueberry	6.87
YoCrunch	Lowfat Oreo, Strawberry Oreo	6.87
Stonyfield	YoKids Greek, Strawberry	6.74
Great Value	Lowfat, Vanilla	6.67
365 Organic	Fatfree, Vanilla	6.50
Yoplait	Fruplait, Strawberry	6.17
Yoplait	Simplait, Strawberry	6.15
Stop 'n Shop	Lowfat Fruit on the Bottom, Peach	6.15
Chobani	Blended Vanilla Chocolate	6.13

There are some yogurt brands that add very little sweetener or add only unrefined sweeteners like maple syrup or honey. Examples include Butterworks Farm, Seven Stars, Erivan, Meadow Gold, Pavel's, White Mountain,

Hawthorne Valley Farm, Side Hill, and Cedar Summit Farm. For the full listing, consult the Yogurt Buyer's Guide at www.cornucopia.org.



THE BEST LOW-SUGAR OPTION

When it comes to buying yogurt with the lowest sugar content, the best option is always to buy plain yogurt and add your own fresh organic fruit or natural/unprocessed sweetener, such as honey or maple syrup. That way you will be in control of not only which sweetener you use but also how much you add.

High Fructose Corn Syrup, Fructose, Dextrose and Other Processed Sugars

High fructose corn syrup (HFCS) is a sweetener ubiquitous in soda and many types of junk food. It is found in some types of yogurt as well, sometimes labeled “high fructose corn syrup” on the ingredients list but often simply “fructose.”

To make corn syrup, HFCS and fructose, corn undergoes a process called wet milling. The process begins with soaking clean, shelled corn in tanks of warm water containing 0.1% to 0.2% sulfur dioxide.¹⁰⁷ The starch is then converted to syrup with the use of acid and/or enzymes.¹⁰⁸

High levels of fructose are not found in natural diets of wholesome, real food. Breast milk, vegetables and meat contain essentially no fructose or very low levels, and

WHAT IS “FRUCTOSE”?

“Fructose” is simply high fructose corn syrup (HFCS) with extremely high levels of fructose. A more appropriate label would be “super-high fructose corn syrup.” Yet it is commonly called “fructose” on ingredient labels, likely in an attempt to mislead consumers who avoid HFCS. Somehow, “fructose” sounds “cleaner” and less processed—but it is actually worse than HFCS.

fruits like grapes, blueberries and raw apples have a fructose content of only 5% to 10% by weight.¹⁰⁹

Several studies link high dietary levels of fructose with the formation of body fat.¹¹⁰

While most HFCS contains either 42% or 55% fructose, a third variation of high fructose corn syrup exists called HFCS-90. It contains 90% fructose and, according to the Corn Refiners’ Association, “syrups with 90% fructose will not state high fructose corn syrup on the label, they will state ‘fructose’ or ‘fructose syrup.’”¹¹¹

Agave was once thought to be a good alternative to sugar because it has a low-glycemic index, meaning it doesn’t spike your blood sugar. Yet agave is 90% fructose.

Scientists now know that fructose is digested in the liver where it releases uric acid and free radicals that damage cells as well as triglycerides that contribute to heart disease.¹¹²

One of the yogurt makers that uses fructose is Dannon. On its FAQ webpage, Dannon tells its customers that “fructose is a simple sugar derived from fruit. It adds sweetness to yogurt. High fructose corn syrup is a type of corn syrup sweetener that contains a combination of fructose and glucose, another simple sugar.”¹¹³ In an email response to a consumer inquiry, a Dannon consumer representative wrote that the source of their fructose is “proprietary information,” and would not or could not tell their customers whether the source is corn or not.

Given increasing consumer awareness about the health effects of high fructose corn syrup, Yoplait followed through on their commitment to remove the ingredient from all its products.

Many yogurt makers continue to add high fructose corn syrup, as shown in the table on the next page.

Artificial Sweeteners

The FDA does not allow the addition of chemical sweeteners to foods labeled “yogurt.” Yet this does not stop some yogurt manufacturers, including Dannon and Yoplait. Aspartame, acesulfame potassium and sucralose are artificial sweeteners that appear in many yogurt products that are marketed as “light.” While consumers may associate “light” with “healthy,” research casts serious doubt on the healthfulness of foods containing these chemical additives.

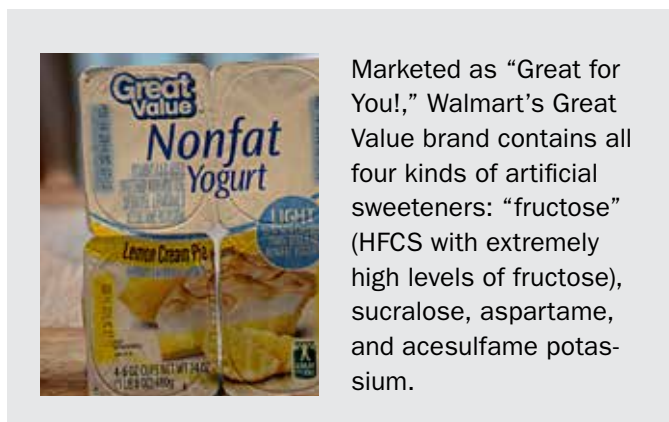
YOGURT BRANDS CONTAINING HFCS

BRAND	PRODUCT	HOW LABELED
Dannon	Oikos	Fructose
Dannon	Activia	Fructose
Dannon	Activia Light	Fructose
Dannon	Activia Drink	Fructose
Dannon	Danimals Coolision	Fructose
Dannon	Light 'n Fit Greek	Fructose
LaYogurt	Lowfat Fruit Flavored	Fructose
Great Value (Walmart)	Lowfat Fruit and Light Nonfat Fruit Flavored	Fructose
Berkeley Farms	Prestirred Lowfat Yogurt	High Fructose Corn Syrup
Alta Dena (Dean Foods)	Lowfat Fruit Flavored	High Fructose Corn Syrup
ShurFine	Lowfat Fruit Flavored	High Fructose Corn Syrup
YoCrunch	With Oreos (HFCS in the Oreos)	High Fructose Corn Syrup
LaLa	Yogurt Smoothie	High Fructose Corn Syrup
Crowley	Lowfat Yogurt	High Fructose Corn Syrup
El Mexicano	Drinkable Yogurt	High Fructose Corn Syrup
Kroger	Blended	High Fructose Corn Syrup
Great Value (Walmart)	Lowfat Vanilla	High Fructose Corn Syrup

In addition to the likelihood that these chemicals alter the gut microbiota in a negative way, as outlined in Section I: Yogurt, Probiotics and the Microbiome, there are other health concerns related to artificial sweeteners.

Aspartame has been linked to brain tumors in animal studies. Researchers at the Washington University Medical School wrote in 1996, “There is need for reassessing the carcinogenic potential of aspartame.” Their conclusion was based on a review of existing scientific literature, including an animal study showing “an exceedingly high incidence of brain tumors in aspartame-fed rats compared to no brain tumors in concurrent controls.” They also noted that the rates of brain tumors in the U.S. have increased concurrently with the introduction and increased usage of aspartame.¹¹⁴

In response to these calls for further research, scientists at the Cesare Maltoni Cancer Research Center in Bologna, Italy, performed a study using rats. They found that aspartame in the rats’ diet caused an increased incidence



of malignant tumors, an increase in lymphomas/leukemias, and an increased incidence of cell carcinomas of the renal pelvis and ureter in females. The researchers concluded that carcinogenicity studies performed in the 1970s and 1980s were inadequate, and that aspartame “is a multipotential carcinogenic agent.”¹¹⁵

In 2007, *Environmental Health Perspectives*, the official journal of the U.S. National Institute of Environmental

Health Sciences, published the results of a three-year trial using laboratory animals. Like the Italian study, it revealed higher rates of malignant tumors, lymphomas/leukemias and mammary cancer in animals fed aspartame in their diet.¹¹⁶

A 2010 study published in the *American Journal of Industrial Medicine* confirmed that aspartame is a carcinogenic agent in multiple sites in rats and mice (males only).¹¹⁷

Consumption of aspartame can also cause headaches, insomnia and seizures in sensitive individuals, as reported in the *European Journal of Clinical Nutrition*.¹¹⁸ A team of South African researchers at the University of Pretoria even suggested that “excessive aspartame ingestion might be involved in the pathogenesis of certain mental disorders.”¹¹⁹

In June 2014, Yoplait announced that it would remove aspartame from its Yoplait Light brand in response to consumer demand. A front label on Yoplait Light reads “Now No Aspartame.” Yoplait Light is now sweetened with sucralose (Splenda), which has safety issues of its own, including concerns about cancer and effects on gut microflora.^{120, 121}

Another artificial sweetener, acesulfame potassium (sometimes listed as acesulfame K), has also been linked to higher cancer rates in animal studies. Most of the safety tests, commissioned by the manufacturer of the chemical, have been criticized as inadequate. But even these

inadequate studies indicate an association between the sweetener and carcinogenesis, as reported in a 2006 Environmental Health Perspectives review.¹²² For example, a 1991 study found higher rates of malignant mammary tumors in rats given acesulfame potassium compared with controls.¹²³

The third commonly used artificial sweetener in “light” yogurt is sucralose. The Center for Science in the Public Interest downgraded the status of sucralose from “safe” to “caution” in June 2013 based on unpublished results by an independent Italian laboratory that found higher rates of leukemia in mice that consumed sucralose.¹²⁴

Thickeners

Traditional yogurt, made with only milk and bacterial cultures, can vary in texture and is generally thinner than yogurt with added gels and thickeners. Traditional yogurt also “separates,” which means the watery whey that collects on top should be stirred back into the yogurt, used for cooking or pet food, or poured down the drain. These natural traits of traditional yogurt are viewed as undesirable by some yogurt manufacturers and uninformed consumers, hence the addition of thickeners and stabilizers.

Thickeners and stabilizers found in some yogurts are

YOGURT BRANDS CONTAINING ARTIFICIAL SWEETENERS

BRAND	PRODUCT	ARTIFICIAL SWEETENER	OTHER SWEETENERS
Great Value (Walmart)	Strawberry Light Nonfat	Sucralose, aspartame, acesulfame potassium	High fructose corn syrup (fructose)
LaLa	Light	Sucralose, acesulfame potassium	Sugar
Hiland	Light	Sucralose, acesulfame potassium	
Dannon	Activia Light	Aspartame, sucralose, acesulfame potassium	High fructose corn syrup (fructose)
Dannon	Light 'n Fit	Sucralose, acesulfame potassium	Fructose
Yoplait	Light, Thick 'n Creamy	Sucralose, acesulfame potassium	Sugar
Yoplait	Greek 100	Sucralose, acesulfame potassium	Sugar
Belfonte	Nonfat	Aspartame	
Sunnyside Farms	Nonfat Light	Sucralose	
Ralph's	Carbmaster	Sucralose, acesulfame potassium	

highly processed ingredients. They include carrageenan, xanthan gum, modified corn starch, food starch, pectin and gelatin. The addition of these processed ingredients is rare in farmstead organic yogurt, made with simple ingredients over highly processed ones.

While all thickeners and stabilizers are highly processed, some are more problematic, and potentially injurious to human health, than others.

Carrageenan

Carrageenan, the “poison ivy of the ocean,” is a food additive extracted from red seaweed. For the past four decades, scientists have warned that the use of carrageenan in food is not safe. Animal studies have repeatedly shown that food-grade carrageenan is associated with gastrointestinal inflammation and higher rates of intestinal lesions, ulcerations and even malignant tumors.

Publicly funded scientists have recently conducted studies using human cell cultures and have found that carrageenan activates particular immune pathways, similar to those activated by other “natural” poisons, such as pathogenic bacteria (including Salmonella).¹²⁵

It is important to note that recent research has used food-grade carrageenan, as opposed to “degraded” carrageenan, and doses that are representative of what an average consumer would ingest. Degraded carrageenan is used in pharmaceutical experiments to predictably induce inflammation in laboratory animals. In addition, several studies have shown that food-grade carrageenan converts to degraded carrageenan through the process of digestion.

Carrageenan manufacturers have a trade group, Marinalg, which lobbies government agencies to continue allowing carrageenan in foods, despite medical evidence pointing to harm. Marinalg also commissions scientists to “prove” that carrageenan is safe for human consumption. As a result, some studies conclude that carrageenan is safe, but they have all been either performed by scientists employed or sponsored by corporate agribusiness or commissioned by the carrageenan trade lobby group.

When a Chicago Tribune investigative journalist asked Marinalg for studies not funded by the carrageenan industry that indicate carrageenan is safe to consume, the trade group was unable to produce a single study.¹²⁶

As a result of the inflammatory properties of carragee-

nan, many people experience gastrointestinal symptoms after consuming foods containing the ingredient. Common reported symptoms range from bloating, loose stool, frequent need to defecate and diarrhea to serious disease including inflammatory bowel disease (IBD), “spastic colon,” ulcerative colitis and Crohn’s disease.

As of July 2014, over 930 people had filled out Cornucopia’s online questionnaire, developed in collaboration with medical researchers. They have reported that removing carrageenan from their diet considerably improved their gastrointestinal health.



Many people experience gastrointestinal symptoms after eating foods containing carrageenan, including many yogurt brands.

Though carrageenan adds no nutritional value or flavor to foods or beverages, the food industry uses it in several types of yogurt, most notably in squeezable yogurt pouches that are marketed specifically to children. This harmful ingredient is found in General Mills’ Yoplait Go-Gurt, WhiteWave’s Horizon Tuberz, and Groupe Danone’s Stonyfield Farm Squeezers. Although WhiteWave announced in 2014 that it is removing carrageenan from all of its products by the end of 2016, in the interim consumers should look carefully for the suspect ingredient.

Chobani’s Champions Tubes product, marketed much like Danimals and Go-Gurt, does not contain carrageenan, discrediting the claims that carrageenan is an essential ingredient in such products.

One of the ironies of adding carrageenan to yogurt is that many consumers with gastrointestinal symptoms, especially mild uncomfortable symptoms like bloating, turn to yogurt as a health food, believing it might improve their symptoms. While the probiotics in yogurt could improve gastrointestinal health, the inflammatory effects of carrageenan could counteract these benefits.

By ingesting a harmful ingredient in an otherwise healthy food, many consumers who turn to yogurt for its benefits may unwittingly be doing more harm than good to their digestive health.

YOGURT BRANDS CONTAINING CARRAGEENAN

BRAND	PRODUCT
Alta Dena	All Products
Brown Cow	Chocolate on the Bottom
Crowley	Lowfat Yogurt
Dannon	Oikos
Dannon	Activia
Dannon	Danimals Coolision
El Mexicano	Drinkable Yogurt
Horizon	Tuberz
Karoun	Yogurt Drink
My Essentials	Nonfat and Lowfat
Nancy's	Lowfat Yogurt
ShurFine	Lowfat Yogurt
Stonyfield	Oikos Caramel
Stonyfield	Squeezers
Trader Joe's	Squishers
Yami	Organic Yogurt
Yoplait	Go-Gurt

Pectin

The most common starting material for making pectin is the peel of citrus fruit. Even in organic yogurt, pectin from the peel of conventional fruit is allowed, despite the use of pesticides on conventional fruit crops.

Pectin is made by extracting citrus peel, apple pomace or beet pulp with hot dilute acid. The extract is then filtered, and pectin is precipitated from the clear extract with the synthetic solvents ethanol, isopropanol,¹²⁷ or hexane, a neurotoxin and hazardous air pollutant.¹²⁸

According to USDA testing, conventional citrus fruit commonly contains residues of toxic pesticides. Testing



Conventional citrus fruit, used as the starting material for making pectin, commonly contains pesticide residues.

detected thiabendazole residues on nearly half of orange samples.¹²⁹ Thiabendazole is a fungicide and parasiticide that is classified as a “probable human carcinogen.”

The USDA also found 93.9% of imported and 73.8% of domestic conventional oranges contained imazalil residues. The U.S. Environmental Protection Agency (EPA) classifies imazalil, a fungicide, as “likely to be carcinogenic in humans.”¹³⁰

While these test results are disconcerting, it is truly alarming when considering the USDA testing protocol: Laboratory technicians are asked to wash or peel the fruit before testing, reflecting how an average consumer would consume the fruit. For oranges, this means the residues were found in the fruit. The levels on the peel, which would not have been tested since consumers do not ingest the peel, are unknown, and are likely much higher. Yet pectin is produced using the peel. The USDA has never tested residues in pectin as part of its Pesticide Data Program.

Citrus is not the only starting material for making pectin, although it is the most common. Other starting materials include apple peel and sugar beet. Apples are also one of the fruits that tend to be highly contaminated with pesticide residues (again, pesticide residues would concentrate on the peel). Conventional sugar beets are commonly treated with many pesticides, including neonicotinoids, which are toxic to honeybees.^{131, 132, 133, 134}

It is certainly possible to make yogurt without pectin. Organic yogurt brands including Butterworks, Cedar Summit Farm, Trader’s Point Creamery, Hawthorne Valley Farm, Seven Stars Farm, Kalona Supernatural Cultural Revolution, Pavel’s, Maple Hill Creamery, Straus Family Creamery, White Mountain, Lifeway, Helios, Nancy’s and others do not add this ingredient.

Pectin is allowed in organic yogurt, even though it is derived from non-organic fruit. While the organic standards allow the use of pectin, the USDA specifies that only “non-amidated” forms of pectin may be used in organic foods.¹³⁵ Amidated pectin is produced by suspending dried pectin in alcohol and then treating it with ammonia, which changes the chemical structure of the pectin.¹³⁶ Amidated pectin, treated with ammonia, is prohibited in organic yogurt but could be used in conventional yogurt.¹³⁷

Xanthan Gum

The thickener xanthan gum is derived from a fermented slime-producing bacteria. Unlike carrageenan, much less research has been conducted to determine xanthan gum’s effects on gastrointestinal health.

A study conducted in 1993 at the University of Sheffield in the United Kingdom gave 18 healthy male volunteers 19 to 34 years old, pills containing 5 grams of xanthan gum with meals three times daily. The findings included a highly significant increase in flatulence in all but one of the volunteers.¹³⁸ This is a high dose of xanthan gum at every meal, and not representative of doses in a typical diet.

Moreover, the volunteers in this study are not representative of the human population. It is unclear how xanthan gum would affect people other than healthy males ages 19 to 34. People suffering from gastrointestinal symptoms should be aware of the potential of xanthan gum to contribute to the problems.

Recently, xanthan gum was implicated in the deaths of premature infants whose formula was thickened with the additive. The FDA found a “distinct illness pattern” in 22 cases, linking necrotizing enterocolitis with the ingestion of formula thickened with xanthan gum. The article was published in the *Journal of Pediatrics* in 2012 and cited 7 deaths and 14 infants who required surgery.¹³⁹

While xanthan gum is allowed in organic foods, no organic yogurt products currently contain this thickener.

Modified Corn Starch

Modified corn starch is found in many highly processed conventional yogurt products. Even Yoplait’s Simplait, which is marketed as “containing just 6 simple ingredients,” contains corn starch.

What does it mean for the corn starch to be “modified”? FDA regulations allow food starch to be modified using the following techniques:

- By treatment with hydrochloric acid or sulfuric acid or both;
- Bleaching with ammonium persulfate or potassium permanganate;
- Oxidizing with chlorine;
- Esterified by treatment with various chemicals, including acetic anhydride, adipic anhydride, 1-octenyl succinic anhydride, phosphorus oxychloride and vinyl acetate; and
- Etherified by treatment with various chemicals, including acrolein (a biocide used in herbicide applications), epichlorohydrin and propylene oxide (a probable human carcinogen).

Modified corn starch is prohibited in organic foods. The following conventional yogurt brands contain it in most of their yogurt products:



When the ingredient is listed as “modified corn starch,” this does not refer to genetic modification of the corn but to the way the corn starch is processed. At the same time, given that 88% of corn in the U.S. is genetically engineered, corn starch or modified corn starch in conventional yogurt is almost assuredly derived from GMO corn.

YOGURT BRANDS CONTAINING MODIFIED CORN STARCH

Dannon	Great Value	Stop 'n Shop
Muller	Cabot	Kroger
Voskos	LaLa	Sunnyside Farms
Yoplait	Upstate Farms	Kirkland
Ralph's	Crowley	My Essentials
Yami	Belfonte	
LaYogurt	Hiland	

Gelatin

Gelatin is added to some yogurt for consistency and texture. According to its suppliers, gelatin has a “unique, melt-in-your-mouth feeling” that is different from vegetarian thickeners like pectin.¹⁴⁰ Since it is processed from a protein found in animal parts, like fish skin or cow and pig hides, tendons and bones, it is also a convenient way to utilize the vast quantity of slaughter byproducts in our food system.

Processing methods include the use of industrial chemicals. Gelatin from pigs is processed by first dehairing and degreasing pigskins, usually with the use of heat and steam, but possibly with the use of hydrogen peroxide or even petroleum-based solvents such as tetrachloroethylene (TCE). The skins are then soaked in hydrochloric acid, phosphoric acid or sulfuric acid before they are further processed into gelatin. Bovine gelatin is obtained primarily from hides (kosher) and bones of cows¹⁴¹ and uses processing aids such as hydrochloric acid or sulfuric acid.¹⁴²

Gelatin in yogurt is often labeled “kosher gelatin,” which refers to Jewish food rules, and makes the yogurt acceptable to Jews who follow kosher laws. Kosher gelatin does not mean that it is derived from a vegetarian source, simply that it is derived from an animal or an animal part that was deemed kosher by a rabbi. The basis of kosher gelatin can be fish or the hides of kosher cows.^{143, 144}

Gelatin is allowed in organic foods, but few organic yogurt products contain this thickener. Many conventional brands do include gelatin, including Yoplait and Dannon. Though considered GRAS (generally recognized as safe) since 1975, the FDA considered changing this status in 1997 because gelatin can harbor prions of Bovine Spongiform Encephalopathy (commonly known as mad cow disease).¹⁴⁵ Gelatin has minimal nutritive value and is an unnecessary “filler” supplanting nutritious ingredients.



Yogurt is a staple food for many vegetarians. Yet many yogurt brands contain gelatin, which is derived from slaughter byproducts such as fish skin or cow and pig hides, tendons and bones.

Colors

Artificial Colors

In 1973, California allergist Dr. Benjamin Feingold proposed that a diet without artificial flavors and artificial colors (along with certain other dietary changes) could reduce the incidence of hyperactivity in children.

His proposal became known as the “Feingold hypothesis.”¹⁴⁶ While attacked by the food industry, the theory that artificial food colors are detrimental to children’s behavioral development has since been supported by scientific research.

Dr. Bernard Weiss, the director of the Environmental Health Sciences Center at the University of Rochester School of Medicine and a professor of toxicology, in 1982 wrote in the *Journal of the American Academy of Child Psychiatry*: “The Feingold hypothesis postulates that many children who exhibit disturbed behavior improve on a diet devoid of certain food additives. Its validity has been examined on the basis of controlled trials. The total evidence, although not wholly consistent, nevertheless suggests that the hypothesis is, in principle, correct.”¹⁴⁷

Today, in the United Kingdom, foods containing any of six specific artificial colors require a label that reads: “Warning: Alurra Red AC E129 [or one of the other five colors] may have an adverse effect on activity and attention in children.”¹⁴⁸



THE “SOUTHAMPTON SIX”

The six artificial colors that are believed to be harmful to children are often referred to as the “Southampton Six,” after a 2007 study by a British university. In the U.S., these ingredients continue to be found in many conventional yogurt products marketed as a “health food” to children, without a warning label.

The warning labels became a requirement after a 2007 study at the University of Southampton found that artificial food colors exacerbated hyperactive behavior in 153 three-year-olds and 144 eight- and nine-year-olds. The six artificial colors that are believed to be harmful to children are often referred to as the “Southampton Six.”

In Canada, where the government does not require warning labels, researchers at the University of Alberta advised parents and children to “limit unnecessary food additives.”¹⁴⁹

Purdue University researchers conducted a review, published in 2011, and found that “two large studies demonstrated behavioral sensitivity to artificial food colors and benzoate in children both with and without ADHD.”¹⁵⁰ Other studies, done years earlier, had come to the same conclusions.^{151,152}

In the U.S., the “Southampton Six” continue to be found in many conventional yogurt products marketed as a “health food” to children, without a warning label.

Examples of products containing Red #40 include Yoplait Light (strawberry) and Yoplait’s Go-Gurt, marketed for children. Yellow #5 is found in Yami and Li’l Yami (Kool Key Lime), also targeted to children and marketed as a health product.¹⁵³

Unless a yogurt product is organic, prohibiting artificial colors, consumers need to be vigilant and check ingredient lists carefully.

YOGURT BRANDS CONTAINING ARTIFICIAL COLORS

BRAND	PRODUCT
Hiland	Lowfat Fruit
Hiland	Nonfat Fruit
Belfonte	Health Wise
ShurFine	Lowfat
Great Value (Walmart)	Lowfat
LaLa	Light
LaLa	Yogurt Smoothie
Crowley	Lowfat
El Mexicano	Drinkable Yogurt
Yoplait	Light Thick ’n Creamy
Yoplait	Go-Gurt
Yami	Lil Yami Kool Key Lime
Kroger	Lowfat Fruit on the Bottom
Kroger	Blended

Carmine Color

Carmine is extracted from the shells of the cochineal beetle, which is native to semi-arid regions of Central and South America. The beetle’s shell contains carminic acid. When carminic acid is precipitated on a base of aluminum calcium salts, it forms the pigment called “carmine.” Depending on the metal used, different shades of pink and purple can be obtained, from strawberry color to dark currant.¹⁵⁴

Exposure to aluminum in the diet is of concern because numerous peer-reviewed studies suggest the involvement of Al³⁺ ions in a variety of neurodegenerative disorders, including Alzheimer’s disease.¹⁵⁵

It is of special use to the food industry because the color resists degradation over time; it is also one of the most heat- and light-stable colorants. Food companies, including yogurt makers Yoplait and Dannon, sometimes favor it over artificial colors because it allows the label to appear more “natural.”

YOGURT BRANDS CONTAINING CARMINE COLOR

BRAND	PRODUCT
Dannon	Oikos Strawberry
Dannon	Activia Mixed Berry
Dannon	Activia Light
Muller	Corner Lowfat with Strawberry
Yoplait	Original Strawberry
Yoplait	Whips! Strawberry
Yoplait	Splitz
Yoplait	Greek 100
Berkeley Farms	Prestirred Lowfat Strawberry

Annatto

Annatto is the natural extract from the red oily outer layer of the seeds of a tropical shrub, which is commercially grown for its dye products and for its seeds.¹⁵⁶ Individuals who are sensitive to annatto may experience hives or gastrointestinal distress from ingesting it.

A 1978 study of 61 patients suffering from chronic hives found that annatto could provoke their symptoms and concluded that “natural food colors may induce hypersensitivity reactions as frequent as synthetic dyes.”¹⁵⁷

In 1991, a case study published in the *Annals of Allergy* reported that annatto dye may be a possible cause of hives, medically known as urticaria, and in rare cases may cause anaphylaxis.¹⁵⁸

The International Association of Color Manufacturers, a trade group, states: “In rare cases, annatto dye may provoke a severe, adverse reaction in individuals with an uncommon hypersensitivity, and may aggravate the symptoms of patients suffering from recurrent urticaria.”¹⁵⁹

Annatto has also been implicated as a possible trigger for irritable bowel syndrome (IBS). In 2009, a retired allergist and immunologist wrote to the *Journal of Clinical Gastroenterology* to share his wife’s experience in identifying annatto as the probable cause of her IBS.¹⁶⁰

Noting that few studies have explored the role of annatto in digestive disease, a Yale University Medical School

People suffering from irritable bowel syndrome (IBS) may want to avoid annatto, checking labels of “all natural” and organic products carefully.

physician in the Section of Digestive Disease wrote in the *Journal of Clinical Gastroenterology*: “It behooves us to begin studies in investigating the role of azo dyes such as annatto in the production of the symptoms of the IBS.”

In 2013, the USDA changed the organic standards to require organic annatto, rather than conventional, since an organic version is now commercially available. Organic annatto comes from shrubs that are grown under organic management, without the use of synthetic fertilizers and pesticides.

YOGURT BRANDS CONTAINING ANNATTO

BRAND	PRODUCT
Cascade Fresh	Whole Milk Orange Cream
Alta Dena	Strawberry Lowfat
Cabot	Greek Vanilla
Upstate Farms	Cherry Vanilla Nonfat
El Mexicano	Drinkable Yogurt, Strawberry
Stonyfield	YoBaby
Voskos	Apricot Mango Nonfat Greek
Yoplait	Original French Vanilla
Yoplait	Splitz
Brown Cow	Peach Smooth and Creamy Lowfat
Wallaby	Blended Nonfat Mango Lime
Green Valley Organics	Peach Lactose Free Lowfat

Colors from Conventional Fruit and Vegetables

While organic standards prohibit artificial colors in organic foods, this does not mean that added color ingredients in organic yogurt are certified organic.

Some organic yogurt makers achieve the desired color in their organic yogurt products by adding organic juice or organic extracts of like-colored organic fruits or vegetables. For example, organic beet juice extract, which is red,

is added to Stonyfield's organic strawberry yogurt.

But the organic standards allow for the use of color extracts from conventional fruits and vegetables if unavailable commercially in organic form. According to D.D. Williamson, a producer of food colors, "most natural colorants are derived from international fruit and vegetable crops grown in developing countries."¹⁶¹ Imported fruit has consistently been found to contain higher levels of



Consumers buying organic yogurt should carefully check the ingredients list to ensure that added color extracts, if any, are organic.

pesticide residues, including residues of pesticides that are prohibited in the U.S.

The extracts of these crops, sometimes extracted from the peel, where both color pigment and pesticide residues congregate, are added to color organic yogurt by Wallaby and Horizon, including in products marketed to children.

While they may be extracted from conventional fruits grown outside the U.S., color extracts in organics, unlike in conventional food, cannot be extracted using synthetic solvents such as hexane. Additionally, they must not contain artificial carriers or artificial preservatives. But the organic standards are silent on the use of pesticides in producing the conventional crops that form the basis of the conventional fruit and vegetable juices or extracts.

Highly Processed, Synthetic Nutrients/ Nutraceuticals

Nutrients act as marketing tools for food companies, which seek to set their products apart from those of competitors. Organic yogurt without synthetic nutritional supplements is full of naturally occurring nutrients—but these are unlikely to be identified in marketing, advertising or on labels, and they are nearly always unlisted in the simplistic Nutritional Facts panel, which focuses on a

handful of basic nutrients. "Designer nutrients" are often added by large food companies; examples include prebiotics such as fructooligosaccharides and inulin.

These additives are potentially illegal in that they are not included in the FDA's standard of identity for yogurt. The FDA does not allow any nutrients to be added to yogurt other than vitamins A and D.¹⁶²

Vitamins

Most of the added vitamins in foods are synthetic recreations of the naturally occurring versions. Nearly all conventional yogurt products contain at least one synthetic vitamin, and usually two: vitamin A and vitamin D.

Many organic yogurt makers add no synthetic vitamins. Yogurt from grass-fed cows contains numerous naturally occurring vitamins and other beneficial nutrients, in quantities and ratios as nature intended. But some organic yogurt makers do add vitamins, with vitamin D3 being the most common.

One of the world's largest manufacturers and suppliers of vitamin D3 is Zhejiang Garden Biochemical in China. According to author and former *New York Times* reporter Melanie Warner, in *Pandora's Lunchbox*, her book about the processed food industry, "Zhejiang Garden Biochemical is the world's largest maker of this vitamin—one that goes into nearly all milk Americans consume (including organic varieties), as well as ... other dairy products."¹⁶³

The Chinese company uses Australian wool grease as the starting material for manufacturing vitamin D3, and processes it with numerous chemicals to turn it into vitamin D3.

Another common vitamin added to yogurt is vitamin A, which, according to Warner, is derived from lemon-grass oil and processed with acetone, a potent liver toxin and carcinogen and the active ingredient in many nail polish removers.¹⁶⁴

Minerals

Tricalcium phosphate is added to some yogurt brands to boost the calcium content. Yet the FDA standard of identity for yogurt does not allow the addition of calcium.

YOGURT BRANDS CONTAINING TRICALCIUM PHOSPHATE

BRAND	PRODUCT
Yoplait	Original
Yoplait	Light Thick & Creamy
Yoplait	Go-Gurt (Regular and Simply Go-Gurt)
Yoplait	Kids Lowfat
Yoplait	Splitz
Horizon	Tuberz
Berkeley Farms	Prestirred Lowfat
Ralph's	Carbmaster
Upstate Farms	Nonfat
Stop 'n Shop	Light Nonfat
Kroger	Fruit on the Bottom Lowfat

Fructooligosaccharides

Fructooligosaccharides (FOS) are recently discovered nutrients that are referred to as “prebiotics” because they provide food for gut bacteria.

FOS occur naturally in fruits and vegetables. Good natural sources include onions, garlic, asparagus, bananas and artichokes.¹⁶⁵ There are two types of FOS that are sometimes added to yogurt: “neosugar” and inulin.

“Neosugar”

Some yogurts contain added FOS. For example, Horizon lists “fructan (Nutraflora®, a natural dietary fiber)” as an ingredient. Nutraflora® is a trademarked name for short-chain fructooligosaccharides.

In the food industry this ingredient is known as “neoesugar” because it is a highly processed form of sugar—processed to the point that it cannot be digested by the human digestive tract. It is also used as a non-nutritive sweetener and marketed to consumers as a prebiotic or “natural dietary fiber” because it supposedly feeds the microorganisms in our digestive tract. To produce neoesugar, manufacturers start with liquid sugar from either



NEOSUGAR IN ORGANIC YOGURT?

Neosugar, which is hydrolyzed from conventional liquidized GMO sugar beets or sugar cane, is approved for use in organic yogurt. The good news is that no organic yogurt producers use it except for one: Horizon, owned by WhiteWave Foods. Horizon lists neosugar as “fructan” on its ingredient labels. It is easy to avoid neosugar when buying organic yogurt: Just don’t buy Horizon.

Horizon also contains pectin, carrageenan, natural flavors, various “natural” colorings and tricalcium phosphate. It also has a SKU with 30 grams of sugar—7.5 teaspoons—in a 6-ounce serving.

sugar cane or sugar beets (commonly GMO), and use the enzyme *Aspergillus japonicus* to hydrolyze it. Other processing aids include hydrochloric acid, sodium hydroxide and active carbon.¹⁶⁶

As with most food components that researchers have recently identified, isolated and re-created in a factory, it is unclear whether supplemental neosugar (Nutraflora®) confers the same benefits as eating the foods that are naturally rich sources of this nutrient.

The manufacturer of Nutraflora®, GTC Nutrition, boasts that a person would have to eat “22 bananas, 15 onions, 16 tomatoes, or 383 cloves of garlic” to obtain the same levels of FOS found in its supplements.¹⁶⁷ This statement epitomizes reductionist thinking in nutrition science: Isolating a component of a healthy food item, and consuming a factory-produced version (in this case, using sugar as the starting material) in large quantities is unlikely to do much good, and may very well turn out to be harmful.

According to Dr. Michael Blaut, a researcher at the Department of Gastrointestinal Microbiology at the German Institute of Human Nutrition, “It is questionable

whether a wholesome diet rich in fruit and vegetables needs to be supplemented with prebiotics for optimal health effects.”¹⁶⁸

But concerns with the consumption of neosugar go beyond whether it confers benefits to health. It may actually cause gastrointestinal symptoms such as bloating and diarrhea, especially at high doses.

In 1987, researchers at the University of Minnesota found that subjects given neosugar supplements reported abdominal pain, eructation, flatulence and bloating. Subjects given plain sugar as a control did not report these symptoms. The researchers stated that the complaints were of minimal severity, with the exception of flatulence, which was severe.¹⁶⁹

French researchers at the Saint-Lazare Hospital in Paris evaluated the response to neosugar in 14 healthy volunteers. At less than 30 grams per day, the volunteers complained of excessive flatulence. Diarrhea was observed at higher doses (50 grams per day).¹⁷⁰

When the European Commission’s Scientific Committee for Food (SCF) reviewed the scientific literature on fructooligosaccharides in 1988, it came to the following conclusion:

Although the Committee had no concern about exposure through the consumption of normal items in the diet in which fructooligosaccharides occur natu-

rally, it noted that even from single, typical portion sizes of foods to which Actilight [a fructooligosaccharide] had been added, intakes approached those at which gastrointestinal effects in humans had been reported.

Furthermore, in feeding studies with experimental animals numerous effects had been seen, in some cases at all dose levels.¹⁷¹

After the rejection by the European Commission’s SCF, a manufacturer of neosugar resubmitted a request in 1995 to allow its addition to foods. In 1997, the SCF concluded that “although laxative effects may be observed at high intakes (more than 30g/day), a consumption of the order of 20 grams a day of fructooligosaccharides is unlikely to cause more undesirable laxative symptoms than isomalt, lactitol, maltitol, mannitol, sorbitol and xylitol,” and decided to allow it.¹⁷²

However, subsequent studies bring into question whether 20 grams a day is harmless for everyone. A 2000 study by researchers at the Department of Medical Gastroenterology at Copenhagen Hospital in Denmark found that patients with irritable bowel syndrome (IBS) reported that their symptoms worsened when they started taking fructooligosaccharide supplements (20 grams per day). Seven of the patients given fructooligosaccharide supplements reported abdominal pain, compared with only one patient in the control group.¹⁷³

GAMING THE ORGANIC SYSTEM

As it turns out, the executives and lobbyists of \$12 billion food giant Dean Foods, which owned the Horizon brand at the time, played an instrumental role in pushing for the approval of fructooligosaccharides (FOS) in organics. Horizon is now controlled by Dean's spin-off, WhiteWave Foods.

When the National Organic Standards Board (NOSB) reviewed the petition for neosugar in 2007, the word "neosugar" did not appear on the petition; it was referred to exclusively as "short-chain fructooligosaccharides." The initial subcommittee voted 1 in favor and 4 against approving the use of neosugar in organics in March 2007.

The committee recognized that "the substance is used for a value-added quality and is not essential for [the] final product." Their primary concern, however, was with the French study showing flatulence and diarrhea in humans given neosugar, which had been pointed out to NOSB members in a technical review.¹⁷⁴

When this decision became public, Dean Foods' lobbyists promptly got to work to ensure the full NOSB would approve the petition at its meeting the following month, in April 2007.

At the meeting, Dean Foods Vice President Kelly Shea and several executives with GTC Nutrition, the manufacturer of Nutraflora® neosugar, convinced enough NOSB members to vote in favor of the petition. Although it did not add neosugar to its products, Organic Valley's representative at the meeting also urged the board to approve its use.

Shea argued that fructooligosaccharides "are fully consistent with organic principles and organic values." There was no discussion of the pesticides used

to grow conventional sugar beets and sugar cane used as the starting material for neosugar. Growers of sugar beets even treat seed with neonicotinoid pesticides, which are toxic to honeybees and implicated in the declining populations of these important pollinators.¹⁷⁵ Honeybees are integral to the health of our food system, responsible for pollinating one in three mouthfuls of food.

And while there was much boasting about neosugar's beneficial effects on human health, the corporate executives never mentioned the studies showing flatulence and other negative effects from consuming neosugar.

One dissenting NOSB member, Bea James, pointed out after the pre-

sentation by one of the GTC Nutrition executives: "You didn't mention anything about the possible side effects of FOS, and I know that some people do have a negative reaction in their digestion." James also stated, "I think that the side effects of a poor diet are not necessarily the responsibility of organic agriculture or products."

But in the end, 10 NOSB members voted to approve neosugar for use in organics, with only three dissenting votes (two board members were absent).

The final NOSB recommendation stated: "It was agreed that certain agricultural materials might be essential for creating a product that meets consumer expectations of taste or texture or nutritional value. A number of commenters cited fructooligosaccharide as an essential ingredient in the organic consumer products they make for this reason."

Horizon's Fat Free and Cream on Top yogurt brands identify fructooligosaccharide on their ingredients labels as "Fructan."



HOW SYNTHETIC AND NON-ORGANIC INGREDIENTS ARE APPROVED FOR USE IN ORGANICS

The organic standards prohibit the vast majority of synthetic processing aids and ingredients that are allowed in conventional foods. In order for a non-organic or synthetic ingredient to be approved for use in organic foods, the National Organic Standards Board (NOSB), a 15-member citizen panel of organic stakeholders, must approve the substance by a two-thirds vote.

The NOSB is required by law to allow only ingredients that are essential for organic production, and to consider potential negative environmental and human health impacts of the ingredient. Any ingredient that is not “essential” or that has potential harmful effects should be prohibited. Unfortunately, however, the NOSB is not immune from the influences of corporate lobbying power.

To learn more, read *Organic Watergate*, The Cornucopia Institute’s white paper on the collusion between agribusiness and the USDA, available for download at www.cornucopia.org.

Inulin

Inulin, also a prebiotic, is made from vegetables that are natural inulin sources, such as chicory root.

It can be produced organically, from organic vegetables and using organic-approved processing methods. Organic Valley and Yami Organic add organic inulin to some of their products.

YOGURT BRANDS CONTAINING INULIN

BRAND	PRODUCT	ORGANIC STATUS
Yakult	Lowfat	Conventional
Kirkland	Lowfat	Conventional
Dannon	Activia Light	Conventional
The Greek Gods	Nonfat Greek	Conventional
Darigold	Lowfat	Conventional
Yami	Organic	Organic

Nanoparticles

In May 2014, the Project on Emerging Nanotechnologies (PEN) reported that there are over 1,600 products on the market that contain nanoparticles listing Dannon Greek Plain Yogurt as one of them. This brand reportedly contains nanoparticles of titanium dioxide, used to make the product whiter. Due to its high refractive index, titanium dioxide is also present in paints, plastics, paper, toothpaste, cosmetics, and, more recently, skim milk to enhance whiteness.

The potential health effects of exposure to titanium dioxide nanoparticles are concerning. Inhaling titanium dioxide nanoparticles results in stress induction and mitochondrial damage in glial cells.¹⁷⁶ Lung exposure to titanium dioxide also triggers systemic immune responses including lymph node deposits, spleen congestion, and cell signaling.¹⁷⁷ Research on dietary ingestion of titanium dioxide is scant, although it is already in our food.

The U.S. Food and Drug Administration (FDA) lacks statutory authority to regulate nanoparticles. Because nanoparticles are considered a “manufacturing aid,” they are not required to be listed on ingredient labels.¹⁷⁸

A major cause for concern is that nanoparticles are likely to be significantly more bio-reactive due to their size. Research into their potential use as chemotherapeutic drugs has already proven their ability to interact with cells. Scientists engaged in nanoparticle research admit that they likely interact with cells in unknown ways and may pose a potential threat to consumers.¹⁷⁹

There is no sound justification for why consumers should unknowingly be eating titanium dioxide nanoparticles added to food purely for cosmetic purposes, given the potential risk of the technology.

Flavors

Artificial and natural flavors are chemicals made in a laboratory—essentially “perfume” for food. Yogurt without strawberries, or with a very small amount of strawberries, can be made to smell and taste like strawberry yogurt with the addition of artificial or natural flavors. It is no surprise that most yogurt, including organic yogurt, contains added flavors.

Dr. David Kessler, former head of the Food and Drug

Administration, commented on our food supply: “We’re eating fat on fat on sugar on fat with flavor. And much of what we’re eating with these flavors, you have to ask yourself, is this really food?”

Commenting specifically on the artificial and natural flavors that can be found in most processed foods, including yogurt, Kessler said: “We’re living in a food carnival... these flavors are so stimulating, they hijack our brain.”¹⁸⁰

Nature’s Flavors, a flavor manufacturer, explains their methods on their website: “The trick to making a product taste good is to give the customer only enough flavor to tease their taste buds. You never want to completely satisfy their tastes.”¹⁸¹

Morley Safer of CBS’s *60 Minutes* interviewed employees at the largest flavoring company in the world, Givaudun, in the fall of 2011. The Swiss company employs 9,000 people in 45 countries. Here Safer gained some insight into the flavor industry and how the process of making flavors works. Jim Hassler, a Givaudun employee, said: “You don’t want it [the flavor] to linger, because you’re not gonna eat more of it if it lingers.”

It should be noted that at one time, a representative of a similar industrial flavoring manufacturer was appointed by the USDA Secretary to sit on the National Organic Standards Board, which sets national policy governing organic food production in the U.S.

Flavors, in some ways, are added to food to create an impression that we are eating something that we’re not—in other words, to trick the brain. Yogurt with a picture of a strawberry and the word “strawberry” on the label does not necessarily contain any strawberries; the flavors trick the body into believing a nutritious strawberry is being eaten.

But are flavors also added to help companies sell more of their products—to “hook” consumers? Another Givaudun employee reiterated the point made by Hassler: The company aims to create a flavor “they’ll go back for again and again.” That’s when Safer said: “You’re trying to create something else, which is called addiction.” To which the Givaudun flavorist responded: “Exactly.”

Fruit-Flavored Yogurt Without Fruit

Nutrition experts advise people to eat plenty of fruits and vegetables for good health. The Centers for Disease Control and Prevention writes: “A diet that includes a colorful va-



Even some “all-natural” yogurt products marketed as fruit-flavored contain no actual fruit.

riety of fruits and vegetables helps people stay healthy and can help reduce their risk for many chronic diseases.”¹⁸²

Many yogurt containers feature pictures of fruit, but consumers should be aware that some “fruit-flavored” yogurt products contain no fruit at all. It is especially troubling that this practice seems most prevalent in yogurt products by major brands, Yoplait and Dannon, marketed specifically to children. Dannon’s Danino and Danimals products, both targeted to children, contain no fruit. Yoplait’s yogurt products for children, including Go-Gurt, Kids Lowfat and Kids Trix, feature a picture of fruit on the container but contain no actual fruit.

The Greek Gods brand, owned by the Hain Celestial Group, has a “honey and strawberry” flavor that contains no strawberries. Their website states, misleadingly: “Greek Gods Honey Strawberry Yogurt is made with fresh pasteurized milk and cream and is sweetened with Honey and natural Strawberry to create a sweet creamy delicacy with a rich taste.” The “natural Strawberry” that the Hain Celestial Group refers to is natural strawberry *flavor*, not actual strawberries.

Artificial Flavors

Artificial flavors are synthetic—a secret cocktail consisting of any of the 2,500 chemically defined flavoring substances that are considered safe for use in food by the Food and Drug Administration. These substances, the basis for artificial flavors, include chemicals with names like isopropyl benzoate, 4-propenylveratrole, 3-hydroxy-2-methyl-4H-pyran-4-one, 2-isopropyl-5-methylcyclohexanol and α -methylbenzyl propionate. These materials are prohibited in organics.

YOGURT BRANDS CONTAINING ARTIFICIAL FLAVORS

BRAND	PRODUCT
Muller	Corner
Yoplait	Light Thick 'n Creamy
Yoplait	Go-Gurt
Great Value (Walmart)	Light Nonfat
LaLa	Smoothie
LaLa	Light
Yakult	Probiotic Drink
El Mexicano	Drinkable Yogurt
Chuck E. Cheese	Squeeze

Natural Flavors

Natural flavors are derived from natural substances. But this doesn't mean they are derived from the foods where they naturally occur.

Organic natural flavor is derived from a certified organic natural source. But again, that source does not necessarily have anything to do with what the name of the food implies.

While the organic standards allow the addition of natural flavors in organic foods, flavors in organic foods are held to stricter standards than those in conventional foods. The natural flavors in organic foods are prohibited from being processed with synthetic, petroleum-based solvents such as propane and hexane, which are commonly used to produce "natural flavors" for use in conventional foods.¹⁸⁴

Natural flavors in organic foods also cannot contain any synthetic carrier systems or artificial preservatives.¹⁸⁵ A non-organic yogurt could claim to be "all-natural" but contain natural flavors with synthetic carriers and preservatives, such as polysorbate 80, BHT, BHA, triacetin and propylene glycol.¹⁸⁶

Since these are subingredients in the natural flavor powder, the FDA does not require that they be included in the ingredients list, even though they appear in the final product.

The following yogurt brands *do not* contain natural fla-



Natural flavors are derived from natural substances. But this doesn't mean they are derived from the foods where they naturally occur. Natural strawberry flavor, for example, is not derived from strawberries, but from tree bark or castoreum, a secretion of the North American beaver's anal gland.¹⁸³

vors, but rather rely on flavors from "real food" rather than synthesized additives:

YOGURT BRANDS CONTAINING ONLY REAL FLAVORS

BRAND	ORGANIC STATUS
Butterworks Farm	Organic
Cedar Summit Farm	Organic
Hawthorne Valley	Organic
Nancy's	Organic
Straus	Organic
Noosa	Conventional
Saint Benoit	Organic
Siggi's	Conventional
Seven Stars	Organic
Trader's Point Creamery	Organic
Maple Hill Creamery	Organic

Malic Acid

Malic acid is added to many yogurt products to change the taste. It enhances certain flavors, like fruit, while masking less-desirable flavors, like whey. Malic acid in conventional foods is likely DL-malic acid, which is a synthetic substance made from petroleum-based chemicals including butane and benzene.¹⁸⁷ Organic standards allow only L-malic acid, which is made without the use of petrochemicals.

YOGURT BRANDS CONTAINING MALIC ACID

BRAND	PRODUCT
Dannon	Oikos
Dannon	Activia Light
Dannon	Danimals Coolision
Ralph's	Carbmaster
Great Value	Light Nonfat
Hiland	Light

Section V: Cost Comparison of Conventional vs. Organic Brands

Consumers often equate “organic” with “more expensive.” After all, organic yogurt is produced with organic milk, which costs more to produce because federal organic standards prohibit cost-cutting practices such as confining dairy cows in crowded feedlots, using antibiotics and growth hormones, and feeding the cows subsidized, pesticide-treated, GMO corn and soybean rations. These practices, prohibited in organics, are standard on conventional farms that produce milk for non-organic yogurt. Since organic dairy products are more expensive to produce, this is often reflected in marketplace prices for organic yogurt.



When consumers pay more for organic yogurt, they are getting something in return: healthier food. The extra cost also supports organic farmers who subscribe to a more humane animal husbandry management model and who are more responsible stewards of the land.

But organic does *not* always mean more expensive. In fact, Cornucopia staff members compared yogurt prices in different markets across the U.S. As with breakfast cereal prices (see our report *Cereal Crimes*, at www.cornucopia.org), we found many instances of lower prices for organic yogurt compared with brand-name conventional yogurt.

In a Boston, Massachusetts, suburb, Whole Foods Market sold the following organic yogurt brands for less than \$5 per 32 ounces at the time of our site visit in 2013: Seven Stars, Nancy's, Stonyfield, Butterworks Farm, Green Valley Organic and Organic Valley.

In a conventional supermarket in the same town, the following conventional yogurt brands sold for more than \$5 per 32 ounces: Chobani, Yoplait Greek 100, Dannon Activia, Muller, Fage, Dannon Danimals, Yoplait Go-Gurt and Dannon Light 'n Fit Greek. Some of these are Greek yogurt products and therefore contain more protein and reflect a higher cost for milk in the product (unless whey protein concentrate or MPCs are used). Yet many of these Greek yogurts are completely devoid of the healthy fats that are essential for good health and found in many of the less-expensive organic yogurt products.

But in some cases, similar-sized containers of conventional “regular” yogurt were priced higher than organic varieties.

A 32-ounce container of Stonyfield Organic yogurt in a Walmart store in rural Minnesota cost less than a similar-sized container of Dannon Oikos Greek, Dannon Light 'n Fit, The Greek Gods, Chobani and Fage.

And in a Boston-area natural food retailer, a conventional yogurt brand, Chobani, was priced higher than five organic yogurt brands (see table on next page).

COST OF CHOBANI VS. ORGANIC BRANDS

BRAND	ORGANIC STATUS	PRICE PER 32 OZ.
Seven Stars	Organic	\$3.99
Stonyfield	Organic	\$3.99
Butterworks Farm	Organic	\$4.49
Nancy's	Organic	\$3.99
Chobani	Conventional	\$6.29

In addition to researching prices in stores, Cornucopia staff also analyzed wholesale prices.¹⁸⁸ These prices show that many organic farmstead dairies' yogurt products,

in a large container rather than in single-serve containers, are priced lower than numerous conventional yogurt products (mostly Greek-style yogurt).

WHOLESALE COST COMPARISONS OF PLAIN YOGURT BRANDS

BRAND	PRODUCT	ORGANIC STATUS	CONTAINER SIZE IN OZ.	PRICE PER OZ.
Brown Cow	Lowfat Plain	Conventional	32	9.59¢
Cascade Fresh	Fat-Free Plain	Conventional	32	9.59¢
Brown Cow	Cream on Top	Conventional	32	9.62¢
Seven Stars	Plain	Organic	32	11.31¢
Wallaby	Lowfat Plain	Organic	32	11.56¢
Stonyfield	Nonfat, Lowfat and Whole-Milk Plain	Organic	32	11.75¢
Horizon	Plain Fat-Free or Whole Milk	Organic	32	12.01¢
Nancy's	Whole-Milk Plain	Organic	64	12.01¢
Hawthorne Valley	Plain	Organic	32	12.87¢
Nancy's	Fat-Free, Lowfat or Whole-Milk Plain	Organic	32	13.09¢
Butterworks	Plain Nonfat or Whole Milk	Organic	32	14.18¢
Erivan	Plain	Conventional	16	14.37¢
Maple Hill Creamery	Plain Whole Milk	Organic	32	15.41¢
The Greek Gods	Fat-Free and Whole Milk – Greek	Conventional	24	15.71¢
Total Fage	0% Plain – Greek	Conventional	35.3	18.41¢
Chobani	Plain Fat-Free – Greek	Conventional	32	18.62¢
Nancy's	Greek Nonfat Plain – Greek	Organic	24	23.86¢
Stonyfield	Fat-Free Plain – Greek	Organic	32	25.10¢

WHOLESALE COST COMPARISONS OF FRUIT-FLAVORED YOGURT BRANDS

BRAND	PRODUCT	ORGANIC STATUS	CONTAINER SIZE IN OZ.	PRICE PER OZ.
Brown Cow	Cream Top Blueberry	Conventional	32	9.62¢
Cascade Fresh	Fat-Free Blueberry	Conventional	32	10.91¢
Siggi's Skyr	Nonfat Drinkable Fruit	Conventional	32	10.93¢
Stonyfield	Blueberry Lowfat	Organic	32	11.75¢
Organic Valley	Drinkable yogurt, Berry	Organic	32	12.44¢
Brown Cow	Cream Top fruit	Conventional	6	14.71¢
Cascade Fresh	Fat-Free fruit	Conventional	6	14.97¢
Stonyfield	Nonfat or Lowfat fruit	Organic	6	16.30¢
Green Valley Organics	Plain	Organic	24	16.58¢
Wallaby	Lowfat or Nonfat fruit	Organic	6	17.50¢
Trader's Point Creamery	Pourable	Organic	32	18.77¢
Maple Hill Creamery	Fruit 100% grass fed	Organic	6	20.35¢
Liberte	Fruit and Greek fruit	Conventional	6	20.83¢
Chobani	Nonfat or Lowfat fruit	Conventional	6	22.03¢
Green Valley Organics	Lactose-Free fruit	Organic	6	24.12¢
Chobani	Nonfat or Lowfat fruit	Conventional	6	22.03¢
The Greek Gods	Greek fruit-flavored	Conventional	6	22.58¢
Noosa	Traditional Fruit	Conventional	8	28.89¢
Siggi's Skyr	2% or nonfat fruit	Conventional	5.3	35.43¢

As Cornucopia's *Cereal Crimes* report demonstrated with cereal prices, many conventional products are more expensive than their organic counterparts. In the case of yogurt, consumers looking for a healthy option should skip the Greek-style choices unless they are organic. Traditional-style organic yogurt is, in many instances, much less expensive than conventional Greek-style yogurt.

Why do Chobani, Fage Total and other conventional Greek yogurt makers charge such a price premium for

yogurt made from conventional milk produced on conventional farms where the cows are confined and given feed rations containing genetically engineered and pesticide-treated grains? Greek yogurt requires more milk to produce than regular yogurt, which explains the higher prices for Greek yogurt. But the nutritional superiority of organic pasture-raised cows' milk yogurt is worth the extra price—especially when it is less expensive than Greek yogurt with conventional dairy ingredients, like Chobani and Fage.

Conclusion

Real yogurt *is* a health food—but not when produced with milk from confined cows fed GMO grain rather than grazing on pasture, and not when the milk and cultures are mixed with a plethora of artificial ingredients that have been shown to be detrimental to human health—and sometimes loaded with more sugar than some popular candy bars.



Yogurt brands with other labels, such as the “Live and Active Cultures” seal, do not provide any benefits that cannot be acquired from organic yogurt. Cornucopia’s tests showed that many organic yogurts without the Live and Active Cultures seal actually contained higher levels of live and active cultures than yogurt with the seal. And some products with the Live and Active Cultures seal contained lower levels than promised.

New types of yogurt, like “Greek” yogurt, do not provide the health benefits of organic whole-milk yogurt. Our tests revealed that organic whole-milk yogurt contained much higher levels of beneficial fats. Cedar Summit Farm, a grass-based organic dairy in Minnesota, produces yogurt with nearly 20 times as much of the healthy fat CLA as Chobani. Tests also showed that the omega-6 to omega-3 ratio in organic pasture-raised yogurt is more favorable than the ratio found in conventional yogurt brands.

The Cornucopia Institute urges consumers and wholesale buyers to consult the Yogurt Buyer’s Guide (available at www.cornucopia.org under the Scorecards tab). This tool will help you make informed purchasing decisions that support the companies and dairies that are committed to organic agriculture and that protect people’s health by avoiding additives such as artificial sweeteners, carrageenan and artificial colors.

Appendix: The Yogurt Market

Yogurt is big business. Globally, consumers spend \$73 billion per year on yogurt.¹⁸⁹ In the U.S., where individuals consume an average of 13 pounds of yogurt each year, yogurt is growing fast, at 7% annually, and is among the top five foods for sales growth. The U.S. market for yogurt is estimated to be worth \$6 billion.¹⁹⁰

No wonder that publicly traded food corporations, which have a legal obligation to return profit to their shareholders, see an opportunity for growth and profit in yogurt. Even corporations like PepsiCo, a multibillion-dollar manufacturer of processed foods and sugary beverages, have entered the market.

Which corporations are behind the brands in the yogurt aisle? This retail space used to be dominated by two corporate food giants: General Mills and Groupe Danone. With the explosion of Greek yogurt in recent years, Chobani, which remains independently owned, has become a market leader. By some estimates, Chobani now accounts for 25% of yogurt sales.

General Mills (Yoplait)

General Mills' most well-known yogurt brand is Yoplait, which it began marketing in the U.S. in 1977. However, General Mills owns other brands as well, including Liberte, which is especially popular in natural food stores and in Canada, and Mountain High.¹⁹¹

General Mills is one of the nation's corporate food giants, with \$10 billion in food and beverage sales in the U.S. in 2012 (with an additional \$4.2 billion in international sales). The Yoplait brand accounted for nearly 15% of the company's U.S. sales, or \$1.5 billion.¹⁹²

The fastest-growing yogurt products for General Mills are Yoplait Go-Gurt and Yoplait Greek varieties.¹⁹³

Groupe Danone (Dannon)

The French corporation Groupe Danone is likely the

world's leading yogurt manufacturer and marketer. The company posted nearly \$26 billion in sales in 2012. In the U.S., Groupe Danone markets yogurt under the Dannon brand. Oikos and Light & Fit Greek are its fastest-growing products, doubling their sales in 2012.¹⁹⁴ Danimals Smoothies sales are also growing rapidly.

Groupe Danone owns the Brown Cow yogurt brand and an 85% share in Stonyfield Farm, a leading organic yogurt brand.

Chobani

Chobani has taken the yogurt market by storm. Just five years after its first product hit stores shelves, the start-up yogurt company netted more than \$1 billion in sales. Chobani got its start in 2005 when Ulukaya bought a shuttered Kraft yogurt plant and decided to make traditional strained, or "Greek," yogurt. *Business Insider* called Chobani "one of the most explosive food start-ups to ever hit the market."

Chobani, Inc. remains an independent company, with its founder, Hamdi Ulukaya, as its president and CEO. Ulukaya was recently added to *Forbes'* list of billionaires. Chobani dominates the Greek yogurt market, with estimates as high as 52% of market share.¹⁹⁵

PepsiCo (Muller)

PepsiCo is a \$65 billion corporation best known for its Pepsi, 7Up, Gatorade, Mountain Dew and Lays chips brands, which each bring in over \$1 billion in annual revenue. But PepsiCo, a public corporation, follows the money and recognized the potential for growth and profit in

what it calls the “Good-for-You space” in the grocery industry: healthy foods, including yogurt.

In 2012, PepsiCo launched a joint venture with a German yogurt maker, Muller. PepsiCo told its investors: “We’re excited about the strong growth prospects of this category.” Muller is available in the Northeast and Mid-Atlantic but will likely soon be available nationwide.

Dean Foods

Dean Foods is a \$12 billion corporation that markets dairy brands around the nation. Yogurt brands include Alta Dena, Berkeley Farms and Meadow Gold.

WhiteWave Foods

WhiteWave Foods owns the Horizon brand and Silk, which makes a soy-based yogurt product. In 2013, WhiteWave was spun off as an investor-owned corporation by its former parent, Dean Foods, where it had acted as the dairy giant’s branded product division.

In addition to offerings in the organic and natural market sector, WhiteWave Foods sells a number of distinctly unhealthy products, including International Delight non-dairy coffee creamer. It retains the same CEO, much of its top management, and investors, from its former owner, Dean Foods.

Dean and WhiteWave have a history of strong-arm lobbying tactics and twisting published science in their efforts to secure USDA approval for the use of synthetic and non-organic ingredients in organic foods. WhiteWave Foods procures milk from a number of industrial dairies (each milking thousands of cows), for its Horizon organic product line, including yogurt. This dependence on “factory farms” is unusual in the organic dairy industry.

The Hain Celestial Group

The Hain Celestial Group is a corporation that markets dozens of “natural” and organic brands, with \$1.38 billion in sales in 2012. Hain Celestial became involved in selling yogurt in 2010 when it acquired The Greek Gods non-organic yogurt brand.

The Hain Celestial Group also owns the Health Valley brand, which offers yogurt smoothies, which are not organic. It also expanded its popular organic Earth’s Best brand for babies and children to include yogurt.

Private-Label/Store Brands

As the economy began to contract in 2008, we saw market share shifting from name-brand food, and dairy products in particular, to private-label brands owned by retailers or grocery distributors. Many are included in the Yogurt Buyer’s Guide. They should be judged, like name-brand products, by the ingredients and processes used to create their finished yogurt. However, when it comes to organic yogurt, private-labeled in organics might very well be an oxymoron. For consumers who want to understand how their food is created, where it comes from, and who stands behind it, private-label is, inherently, anonymous.

Independent Companies or Co-ops

There are many independent companies and farmer cooperatives that sell yogurt, especially organic yogurt. These include Springfield Creamery (Nancy’s), CROPP (Organic Valley), Kalona Supernatural, Wallaby Organic, and Clover Stornetta (Clover Organic Farms).

Consumers looking to support independent companies or farmer cooperatives should use Cornucopia’s Yogurt Buyer’s Guide to identify such brands. You can find it on the website, www.cornucopia.org, under the Scorecards tab.

Direct from the Organic Farm

Many cooperative grocers and independent natural foods retailers also sell regional brands of yogurt that are produced on the farm. Examples include Butterworks Farm (Vermont), Seven Stars (Pennsylvania), Hawthorne Valley Farm (New York), Maple Hill Creamery (New York), Straus Family Creamery (California), and Cedar Summit Farm (Minnesota). All of these farm-based brands have a wide regional distribution and most are more dedicated to grass-fed management of their cows.

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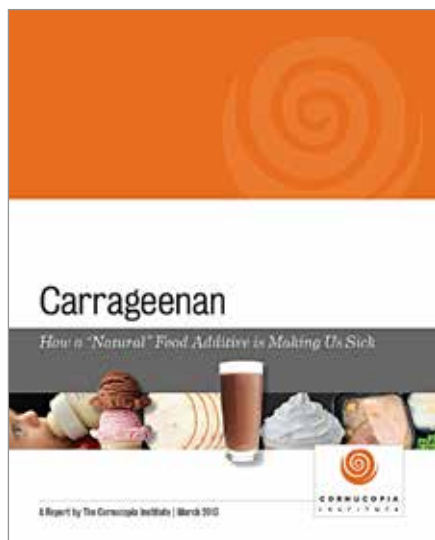
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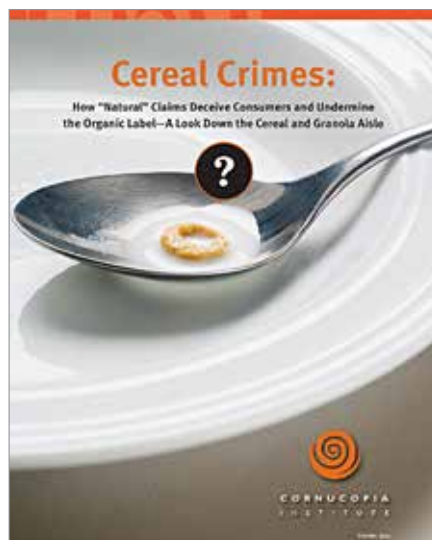
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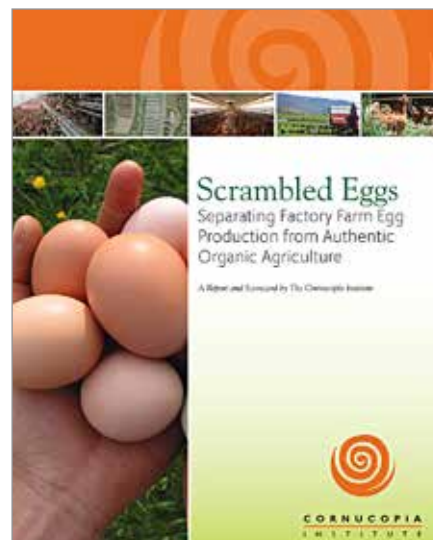
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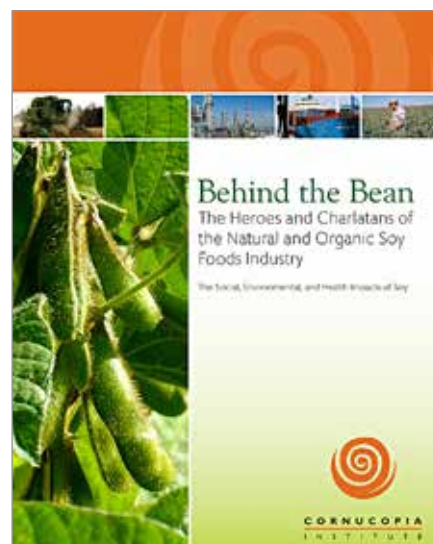
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