



Synthetic versus Nonsynthetic and Agricultural versus Nonagricultural: Where We've Been, Where We Are and Where We're Going

By Sheila Linderman

"Agricultural" and "nonsynthetic"—these are two of the basic defining terms of organic. However, determining what these words really mean to the industry and what materials fit into which category has been stirring a good deal of passionate discussion since the beginning days of the National Organic Program (NOP).

[Back to Table of Contents](#)

To be certified organic, a material must be agricultural. Any nonagricultural materials that are allowed to be used in organic must be on the National List of Allowed Substances, which then divides these ingredients into two categories, synthetic and nonsynthetic. Sounds easy enough, but there are several materials that fall between these categories, challenging the definitions of agricultural, nonagricultural, synthetic and nonsynthetic. This requires us to take another look at what these terms really should encompass.

The Materials Working Group (MWG) of the National Organic Standards Board (NOSB) has been trying to sort these terms out for a while now, but has not come to a definite conclusion.

And now, with changes to the EU organic standard that conflict with NOP's definitions, these ambiguous terms may cause even more controversy—making it challenging to export to Europe and ultimately creating an international food fight.

But rather than fight, let's try to really figure out the issues behind this confusion and what steps need to be taken to protect the integrity of organic, spur organic innovation and ensure ease of global export. There are four primary materials that illustrate the issues behind this confusion—flavors, soy lecithin, glycerin and yeast.

Flavors: Caught Between Definitions

Flavors are one of the most complicated ingredients to categorize and hence the best example to illustrate the issue at hand.

When the crafters of the regulations (i.e., the NOP) were trying to cover as many areas as they could think of, they did not imagine that processed foods—foods we don't simply grow—would be the key to the organic industry's success. Given that flavors generally came in liquid or powder forms, and given the very narrow view of what was agricultural (soil-based for plants, pasture-based for livestock), flavors were seen as nonagricultural. However, the crafters wanted what little organic processed food there was to taste good. So, they chose to put flavors on the National List as an allowed nonsynthetic material, noting in the commentary that the Food and Drug Administration (FDA) definition of "natural flavors" could generally be followed. However, there are some major flaws with this.

Agricultural or nonagricultural? One of the biggest contradictions is that although they are included on the List as nonagricultural, most flavors are actually made from agricultural ingredients—and thus are able to be certified organic. A few diligent, knowledgeable flavor houses, including Moore Ingredients (now part of A.M. Todd) and Natural Flavors, worked with their respective certifiers to prove this. They also showed that compounded flavors could be made through an allowed process without synthetics (by using distillation). Because of this, today hundreds of certified organic flavors exist.

Take, for example, citral—a natural aroma chemical used in many flavors. It does not sound like something one might grow, but can be produced by distilling lemongrass or Litsea cubeba essential oil. These essential oils are unquestionably agricultural, and distillation is an allowed process. Therefore, citral technically should be able to be certified organic. Even natural aroma chemicals with scary-sounding chemical names, such as cis-3-hexenol, are allowable. In this case, Japanese mint (*Mentha arvensis*) is steam-distilled (allowed), then redistilled into fractions (allowed). In order for a natural aroma chemical to be allowed in a certified organic flavor, the processor must provide proof to the certifier that the starting material and the processes are all allowed under the NOP.

But despite these developments, the MWG is still mulling over many questions surrounding this issue. Are all aroma chemicals agricultural, or are some too far from the original plant material? If they are agricultural, do they have to be certified in order to be used in an organic flavor?

A few years ago, due to the Harvey lawsuit, the courts decided that in order for a nonorganic agricultural material to be used in organic products, that material had to be listed on 205.606. This ruling also dictated that if an organic version of a material is commercially available it must be used (aka, "organic preference"). At that time, some in the organic industry felt that flavors should be moved from 205.605 to 205.606. They understood that as long as flavors were on 205.605, processors would not have to use organic flavors even when available. This would do nothing to help increase organic acreage or provide incentive for further organic flavor development.

At around the same time, flavors were coming up for sunset review and the many weighed in, stating that with so many certified organic flavors commercially available, they should be sunsetted off 205.605. Even the Flavor and Extract Manufacturing Association (FEMA), a century-old trade organization that represents some fairly huge global companies, presented a decision tree showing that flavors could be agricultural. Because of the confusion surrounding the definition of "agricultural," however, flavors retained their spot on the List.

The bottom line is this: as long as flavors remain on 205.605(a), nonorganic versions can be used as long as they are nonsynthetic. However, if sunsetted or moved to section 205.606, any flavors used in products labeled "organic" will have to be certified organic, unless they

are not commercially available as organic.

As for their components, the natural aroma chemicals, it remains to be seen whether they qualify as agricultural. This is where the elusive definition of a "nonagricultural substance" will come in. At what point, if any, does something stop being agricultural? Currently, it is defined as: *A substance that is not a product of agriculture, such as a mineral or a bacterial culture that is used as an ingredient in an agricultural product. For the purposes of this part, a nonagricultural ingredient also includes any substance, such as gums, citric acid or pectin, that is extracted from, isolated from, or a fraction of an agricultural product so that the identity of the agricultural product is unrecognizable in the extract, isolate or fraction.*

According to Gwendolyn Wyard, co-facilitator of the MWG and processing program technical specialist for Oregon Tilth, "The concept that an ingredient, product, or substance is no longer agricultural once it has been processed into an extract, isolate, or fraction is nearly impossible to evaluate, and is not consistent with many of the agricultural products currently on the market."

Wyard pointed out that most processing activities render the finished products as unrecognizable from their original raw materials. "Substances that are clearly recognized as agricultural products, such as maltodextrin, cornstarch, rice syrup and vegetable protein, could all be classified as nonagricultural according to this definition," she said. "Without further specification of the terms 'identity' and 'unrecognizable,' evaluation of a substance is difficult at best."

Furthermore, the example of pectin and gums as nonagricultural substances is confusing, because both of these substances are also listed as agricultural ingredients in §205.606.

Any aroma chemicals that do qualify as agricultural will either have to be certified individually, or listed individually on 205.606. Regarding those natural aroma chemicals that do not qualify as agricultural (i.e., those that are deemed "nonagricultural"), the flavor industry may want to consider a petition to put them, as a group, on 205.605(a) as nonsynthetics. This listing would have to be accompanied by a specific annotation, defining the allowed sources and processes for the aroma chemicals. FEMA, which now has an organic task force studying the agricultural/nonagricultural issue, should be able to guide that industry through the petitioning process.

In the interim, the companies that choose to use organic ingredients when they don't have to should be commended. The number of companies opting to use organic flavors gives the certified flavor houses their raison d'être. These end-users go beyond the regs and answer to their own philosophies about organic ingredients. Undoubtedly, those philosophies include using the maximum, not the minimum number of available organic ingredients.

Synthetic or nonsynthetic? This question of what qualifies as synthetic is somewhat easier to answer. The NOP defines a synthetic as a substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources, except that such term shall not apply to substances created by naturally occurring biological processes. As an example from the flavor theme, ethyl acetate, which is a natural aroma chemical, can be manufactured by combining sugar cane-based ethanol (certifiable, therefore allowed), with glacial acetic acid (a nonsynthetic aroma chemical). This causes a reaction called esterification, which results in the formation of a new molecule—ethyl acetate. By current definition of nonsynthetic flavors, this aroma chemical should not be allowed unless it is extracted directly.

But what about compounded flavors? Are they not a new molecule, and as such not allowable as ingredients in finished products? Actually, no; compounded flavors are compounds. That is, they are conglomerations of molecules that react through taste and smell in such a way that they are perceived as a certain flavor. The flavorist artfully combines these molecules, which remain distinct, to reproduce the flavor that occurs in nature.

Soy Lecithin: Soon to Be Removed from the Allowed Synthetics List?

One of the most recent positive developments regarding synthetics revolves around soy lecithin, a very important ingredient used for emulsification. When the List was made, the idea of organic soy lecithin was unimaginable because of conventional lecithin's synthetic processing method. Thus, currently nonorganic bleached lecithin is on the List under allowed synthetics.

However, organic lecithin has been developed and the manufacturer recently petitioned to have the nonorganic, synthetic version removed from the List. This is the first time that a petition has been received for removal of a material based on commercial availability of an organic version. There is also a petition to remove unbleached lecithin from 205.606, citing the prevalence of genetically modified soy used to make unbleached lecithin, and the fact that the GMOs are undetectable in the finished product. At the very least, an annotation requiring non-GMO verification would seem to be in order (if unbleached lecithin is not removed). A recommendation on these petitions is not expected until the Spring 2009 NOSB meeting.

As with flavors, there are commendable companies, such as Lake Champlain Chocolates and Dagoba, who are already using organic versions of this product even though bleached lecithin remains on 205.605(b). If the NOSB approves the recommendation this spring as expected, everyone else will have to follow in their footsteps. The EU already requires that certified organic soy lecithin be used (except in certain milk products), so this will make export easier in the long run.

Glycerin: The Road from Synthetic to Agricultural

Most of the 42 synthetics that appear on 205.605(b) are elemental (mined substances, or chemical recreations of such) to begin with. A few, including lecithin and the alginates, are agricultural to begin with, then chemically altered. This description could be applied to glycerin, which has traditionally been made by the hydrolysis of fats or oils. Hydrolysis is defined as the *decomposition of a compound with water, such as the dissociation of a dissolved salt or the catalytic conversion of starch to glucose*. Hydrolysis as a process always creates a new molecule, so anything that is subjected to hydrolysis would be a synthetic. For this reason glycerin, which is very useful as a carrier and completely harmless as a food ingredient, finds itself on 205.605(b), with only the annotation "produced by hydrolysis of fats and oils."

So, when Oregon Tilth certified one of its clients for glycerin production, there was a bit of an outcry, something to the effect that "you can't make an organic synthetic." What the outraged parties did not realize was that the manufacturer had devised a way to make glycerin by a biological—and therefore, allowed—process, starting with certified organic vegetable oil.

It would seem that the manufacturer should now petition to have glycerin removed from 205.605, since it can be made as organic. However, the glycerin from this particular process is only a byproduct, possibly from production of organic soaps or ethanol (biodiesel). Until

the manufacturer finds an outlet for these primary organic products, there will not be enough organic glycerin to qualify it as commercially viable.

Draco Natural Products, however, has found a way to process organic vegetables (that's whole vegetable mass, not just oils) into glycerin via a biological process, and to do so as a primary process. Once the glycerin is certified and commercially available as organic, it should be feasible to petition glycerin off 205.605, and onto 205.606. Thus, the organic version would have to be used whenever available. Given that the EU considers glycerin certifiable, having the NOP make this change will ease export that much more.

Yeast: A Huge Potential Problem with Export

Yeast may also cause complications for those who wish to export. The new EU regulations view yeast as agricultural, and thus certifiable. But the NOP has yet to see it the way our friends overseas do. In the United States, yeast still remains on the 205.605(a) list of nonagricultural materials. Because of this, processors are allowed to use nonorganic autolyzed, baker's, brewer's, nutritional and smoked (nonsynthetic smoke only) yeasts in certified organic foods even though organic certified versions are available.

Due to this fact, many processors may soon have a rude awakening when they go to export their product. Because the EU recognizes yeast as agricultural and certifiable, organic products made with conventional yeast will not be saleable in the EU as organic. This extends way beyond traditional yeasted products, such as breads and crackers, to dry soups, dips, and coated snack foods, which often contain autolyzed yeast for flavor and texture.

For nearly five years, Grace Marroquin, of Marroquin International Organic Commodity Services, has been trying to help the NOSB see yeast as livestock (seeing it as a plant was out of the question, because there is no soil involvement). Instead of growing it in a barn, it's grown in a vat (the NOP does not specify that livestock must be grown in a barn). It is fed organic substrate; it is harvested; it is culled. It "quacks like" agricultural. Furthermore, yeast is not all that different from mushrooms (grown from spores, etc), which are certifiable.

Also, the regulations mention nothing about sulfuric acid, which is traditionally used to purify conventional yeast strains. Without more annotations in the regulations, the certifiers cannot legitimately keep their clients from using commercial yeasts that are processed with sulfuric acid and other harsh chemicals.

Getting Down to What It's Really All About

With all the debate about definitions and what falls into what category, it's easy to get lost in semantics. However, the major question is: if an organic version is made available that works just as well as the nonorganic version, shouldn't processors have to use it—whether or not it perfectly fits into the definition of "agricultural"? We are bound by the word agricultural because it is part of OFPA. But, maybe we should think of all that we eat starting out as either mined (and not certifiable as organic) or grown (and potentially certifiable, if all prescribed conditions are met). If grown in soil, then farming practices must meet one set of standards in order for the product to be certified. If grown in some sort of container and given organic nutrients, then another set of standards must be met. The beauty is that those standards are already in place. Only rigidity seems to be standing in the way of seeing that grown food as agricultural. And the controversy continues.

Sheila Linderman is an organic product and certification consultant (www.sheilalinderman.com), with extensive international experience in the development and certification of organic flavors, baked goods and personal care products. She can be reached at sheila@sheilalinderman.com.

[home](#)

[magazine](#)

[subscribe](#)

[advertise](#)

[contact](#)

