

Andrew Bunker, (Speaker #2)  
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## Questions

**1. What are the requirements to be an organic vegetable oil?**

The oilseed or fruit must be grown on an organic certified farm and processed per accepted methods and additives by an organic certified refinery which is certified by an organic certifying agency such as QAI, Quality Assurance International.

**2. What makes lecithin so viscous?**

The lecithin is obtained from the degumming of the crude oil. After the water and phosphoric acid treatment, the gums are formed and precipitated. After vacuum drying and bleaching, the product is 50% phospholipids and 50% oil with the characteristic viscosity. The lecithin can be further solvent-extracted to remove all the oil which is then a solid.

**3. I've heard the term of partial deodorization. What is this and why would it be used?**

In a partial or 'brush' deodorization, the temperatures and deodorization times are lower (than standard) yielding higher free fatty acids, darker colors and flavor. Typically oils are deodorized to low % FFAs and a bland taste.

Partial deodorization is used to retain certain characteristics such as red color in palm oil and a light cocoa flavor in cocoa butter.

**4. What is the best way to prevent or slow down oxidation of finished canola on vegetable oil (consumer viewpoint)?**

From a consumer standpoint, store the bottle in a cool, dark environment as heat and light can accelerate oxidation.

**5. Is oil bleaching typically a batch or continuous process? If it depends, what are the advantages/disadvantages of the different approaches?**

Oil bleaching is typically a continuous process handling a larger volume of oil and is thus more efficient than a batch process. Also clay dosing levels can be adjusted in process versus using a set amount in a batch process.

**6. Is there any beneficial use for FFAs removed in deodorization?**

Typically the FFAs are collected in a tank and sold as animal feed. If the FFAs can be kept separate per oil type (lauric C12, palmitic C16 or stearic C18) they can be used in specialty products in the food or chemical industry.

**7. How likely is the definition of partial hydrogenation to change with the FDA's final rule, partial hydrogenation = > 4 IV?**

Very unlikely to change once a final rule.

**8. Have coating manufacturers made progress in removing PHOs from compound coatings?**

The majority of coating manufacturers have removed PHOs from compound coatings to comply with the trans labeling on the nutrition facts panel. There is still a small volume of PHO compound coating (non-lauric from palm, soy oils) that is used in coatings that are a very small percentage of a complete confection thus eliminating the need for declaring as the TFA level falls below the 0.5 gms per SS.

**9. What proactive measures are being taken now in the palm oil industry to eliminate 3-MCPDs?**

Many palm oil refiners are now producing a low 3 MCPD product which, at this time, is used mainly in baby formula. There are several factors which can lead to increased 3 MCPDs in oil including how long the fruit is held before processing and the temperatures at which it is deodorized. Palm refiners control the handling of the fruit and the processing parameters to avoid producing 3 MCPDs. This reduces the yield from the fruit so it is still considered a premium product. Eventually, the process will become more standardized and we will see more low 3 MCPD oil enter the market.

**10. Do you think blends using PH oils will also be banned even if the total blend has an IV less than 4?**

It's my understanding that if PHOs are banned they would not be allowed in blends regardless of the IV of the blended oil. FDA may allow the use of some PHOs per Food Additive Petition at low levels for very specific use. The details of this restricted use of PHO will be forthcoming from the FDA within this year.

**11. Is the enzymatic interesterified process considered "natural?"**

By whom? If you are speaking strictly scientifically, enzymes are naturally occurring and the lack of specific enzymes in your system will lead to all kinds of illness and potentially death. That being said, most activists in the food world would answer the question with an emphatic "No." The FDA has been pushed for years to set a standard for the term "natural" but has not yet acted. Here is the answer the FDA gives on their website when asked the meaning of the term "natural": "From a food science perspective, it is difficult to define a food product that is 'natural' because the food has probably been processed and is no longer the product of the earth. That said, FDA has not developed a definition for use of the term natural or its derivatives. However, the agency has not objected to the use of the term if the food does not contain added color, artificial flavors, or synthetic substances." Using this as the definition, enzymatic interesterification is considered a natural process but I would recommend caution when making this claim because many people do not agree.

**12. Are any enzymes used in the vegetable oil manufacturing process genetically modified?**

There are different enzymes used to process oil, some are GMO and others are not.

**13. How is hexane extraction viewed from a natural standpoint?**

Natural is not a term defined by the FDA so it means different things to different people when it comes to labeling food. It is safe to say that people focused on natural or organic foods look at

solvents used in food processing as not being natural.

**14. How much hexane remains in the finished oil after hexane extraction? Isn't hexane bad for me?**

Yes, hexane is very bad for you. Fortunately, there is no hexane present in a fully refined oil (see answer to 21 below). Think of it this way, lye (sodium hydroxide) is used in the production of soap. Get it in your eyes and you could go blind or ingest it would land you in a hospital but nobody seriously thinks soap is a dangerous product. The same is true of solvent extraction; it is sometimes used in the processing of oil but is not present in the end product.

**15. What causes heavy metals to impact process? Specifically, why is phosphorous content important to the refining process? Do you have to check each batch for phosphorous content or do you estimate?**

Phosphorus levels as low as 2ppm in oil can prevent the hydrogenation reaction from occurring by deactivating the catalyst, nickel. The phosphorus is checked on the refined oil with a typical spec of 3 ppm max phosphorus. Bleaching the oil will reduce the phosphorus content.

**16. You mentioned the difficulty of tracing palm kernel oil. In your opinion, how long will it take the industry to get this under control?**

It is not correct to think of it in terms of being "out of control." PKO is a commodity and the logistics surrounding it were refined and improved over the course of decades to make the processing and transportation as efficient as possible (i.e. sustainable). Some NGO's are now making traceability part of their sustainability program. The basic idea is if you can't trace it, you can't prove it is produced in an ethical way. This guilty until proven outlook on palm and palm kernel forces the industry in many cases to roll back the progress made in efficiently transporting the product from the plantation to the mills and refiners and eventually to market. The industry has already spent a lot of time and money rearranging and certifying production in order to comply with traceability schemes. There is already a significant volume available on the market and it will grow over the next few years. There will be points over the coming years where demand outstrips supply – we have already seen this happen in 2015. I believe over the next few years, we will see the market settle back to a balance where enough traceable oil will be available to supply the demand of the market.

**17. To what extent do bio-fuel uses affect the price of the palm/palm kernel oil we use?**

Good question! Almost every vegetable oil producing country has a biofuel program in place. Some governments portray the programs as efforts to save the environment (e.g. US and Europe) while other are more straightforward about saying they are put in place to prop up the price of the commodities their farmers produce (e.g. Indonesia). It is difficult to quantify how much of an effect all these programs have on prices. They add several percent to demand but, more importantly, they provide a link from the price of petroleum products to vegetable oil. This tends to put a floor under the price of vegetable oil – if the price of palm falls well below petroleum, it is immediately purchased in large quantities to be made into biodiesel.

**18. From your discussion of traceability, it is clear that PKO has issues. Is certified PKO available?**

Yes, it is definitely available now and the volumes are increasing on a daily basis. The issue is not so much the production of PKO; there is plenty sloshing around. The issues come when you start applying sustainability programs to the logistics chain – keeping the oil segregated throughout the supply chain or requiring traceability through mills and refiners is adding cost and creating supply shortages as the industry adjusts. Like any market, it will adjust over time to the new demands of consumers.

**19. For RBD tropical oils, is the processing value chain largely in the producing countries?**

It depends on where the oil is being shipped to. For example, the United States does not impose import duties on RBD oils so most of the processing is done in the origin countries. Europe, on the other hand, imposes higher duties on RBD oil than it does crude oil so most of the oil shipped there in crude form and then refined after arrival.

**20. Are 3-MCPD glycidyl esters presently on the California Prop 65 list?**

Yes, both '3-MCPD' and 'Glycidol' are on Prop 65 as cancer toxicity compounds. Glycidol has a MADL of 0.54 ug/day. No value listed for 3-MCPD. (MADL: maximum allowable dose level).

**21. When hexane is used for extraction, how do you ensure that all hexane is removed prior to consumption?**

In oil processing such as bleaching (105C) and then the much higher temperature of deodorization (220 to 250C), hexane with a boiling point of only 69C will not be present in a fully refined vegetable oil. Most processors conduct periodic testing on hexane levels to confirm this.

**22. With, US trans regulations, the partial hydro seems to be going away. Is this true of other areas of the world?**

Yes, I would agree with that as many countries if not ahead of the US in elimination of trans fat (sa EU), they will follow the lead of the US.

**23. For interesterification, it is normally random. How does "directed" IE work and what are its benefits?**

The interesterification type used depends on the application and desired melt characteristics. Interesterification can be random (chemical) to produce fats for number applications from cocoa butter substitutes to shortenings. The 1-3 specific interesterification (enzymatic) is used in the manufacture of cocoa butter equivalents and also for shortenings. Directed interesterification is a low temperature fat modification process where higher melting triglycerides are formed. The saturated fatty acids are fractionated from the liquid oil and the reaction continues with the fatty acids distributed in the liquid phase which is no longer random. Directed interesterification was developed in the late 1940s and used primarily for lard-based shortenings in the mid-1950s. This process is no longer used industrially.

**24. Has enzymatic IE now supplanted so-called “directed” IE?**

Although both are considered “non-random,” directed IE is a different type of IE versus the *sn*-1,3 specific enzymatic IE. See (23) above.

**25. How are IE-treated fats labeled on an ingredient statement?**

In the US, interesterification is not denoted and the oil is just listed. In Canada, the term modified is listed prior to the oil type.

**26. What is the state of “fair trade” certification in the palm oil supply chain?**

Over the 18 years I have been in the industry, I have only had a couple of requests for Fair Trade Palm. I know it exists in relatively small quantities but the volumes are tiny compared to conventional or even organic palm which is more common.

**27. I’m confused by labeling. Hydrogenation is catalytic chemistry, manmade, chemistry is changed – labeled, got it.**

**Intesterification is chemically or enzymatically rearranged – same “stuff,” different chemistry, so why not labeled?**

**Fractionation is just a temperature, filtered process.**

**Natural – I guess I can do this in my kitchen. And when you recombine you get the original back – exactly. But when I use just the PKS it is totally different chemically and all properties from the PK, so why is it not labeled?**

I am not certain why the FDA made the determination but perhaps they considered the degree of the process change. Hydrogenation can substantially change the physical properties and fatty acid composition. Intesterification will change the physical properties and triglyceride composition but not the fatty acid composition. Fractionation will change the physical properties with slight changes to the fatty acid composition.

**28. What are some anticipated emerging future sources of confectionery oils? Are they beyond current tree and seed sources?**

Solazyme is producing oils to a desired fatty acid composition and melt profile. I see new oils being available by this process. Question is 1) when will they become affordable and 2) will the consumers accept this new technology manufactured oil?

Based on Solazyme’s stock price, the answer to 1) is not soon enough! The cost of their product is based on the price of sugar which is used as a raw material. This makes their product competitive with some higher value added fats and oils already.

My personal opinion on 2) is yes, given the chance, most people will understand that oil squeezed out of algae is just as healthy and functional as oil squeezed out of seeds or fruit.