



April 7, 2016

Dear Young Living Members:

I want to follow up with you and provide the current key information we have regarding our Cinnamon Bark essential oil. You are welcome to share this with your downlines.

- Neither Young Living nor the independent labs that we sent samples in question to have found markers for synthetics in our Cinnamon Bark essential oil. I have confidence in our procedures and in the expertise of our analysts.
- A certain level of natural variation is expected in our oils (which come from plants), and science isn't perfect, so it's possible that natural variations can be misidentified as synthetics. No standards exist for testing natural products, so analysts build up libraries of comparative data based on previous tests. Because Young Living is the oldest and largest essential oil company, we have the most extensive reference library of data—which we use to compare against samples during testing. It requires a great deal of skill and experience to interpret complex results from testing natural products, and our R&D team is certainly the most experienced in the industry, with over 180 years of total experience in analytical analyses.
- Young Living's R&D team routinely employs the following tests as part of our quality assurance: color, flavor, odor, refractive index, optical rotation, specific gravity, heavy metals, Fourier Transform Infrared Spectroscopy, gas chromatography, and micro. Each of these tests is performed on the raw material and then repeated on the final product to ensure that our oils meet the Young Living "gold standard." We employ Gas Chromatography Mass Spectrometry (GCMS) to separate and analyze an essential oil's components and validate quality, as well as to identify trace amounts of unknown substances.
- Our GCMS protocol follows a very meticulous process that requires the use of solvent blanks before and after each sample analysis to ensure that the instrument is not contaminated for each analysis. We adhere to strict protocols for calibration, tuning, and maintenance of the GCMS equipment. Each sample is tested in triplicate.

Here is more detail on the Cinnamon Bark essential oil lots in question:

- In our lab, Young Living investigated lot #15B10032 (the one initially questioned on Facebook), and the oil conformed to all of our specifications for natural Cinnamon Bark oil in each of our tests.
- We also sent this lot to an expert lab in France for GCMS testing, and it confirmed our findings.

Additionally, Young Living sent lot #15B10032 to Chemtech-Ford, an independent professional analytical testing lab accredited by the National Environmental Laboratory Accreditation Program (NELAP) with over 50 years of experience in testing natural substances. This lab concluded that there were no markers of synthetic compounds



Furthermore, this lab concluded that 2-propenylphenol is not a suitable marker of synthetic compounds. Chemtech-Ford's report is available here:

https://static.youngliving.com/en-US/PDFS/chemtech-ford_laboratories_cinnamon_bark_report.pdf

Since there is no uniform industry standard for testing essential oils, testing time lengths vary from lab to lab. Chemtech-Ford performed ion extraction, which will elucidate any co-eluting compounds in their chromatogram, regardless of run time.

Chemtech-Ford did report the presence of orthomethoxy cinnamaldehyde. However, this is reported in scientific literature to be present in both *Cinnamomum verum* (Ceylon Cinnamon) and *Cinnamomum cassia* (Chinese Cinnamon), so it is not a suitable marker for cassia. More details are available here:

https://static.youngliving.com/en-US/PDFS/royal_society_of_chemistry_2015.pdf

Chemtech-Ford, like most commercial labs, tests samples that contain petroleum by-products. These samples are often tested according to standard Environmental Protection Agency (EPA) methods. In the case of Young Living's lot of Cinnamon Bark essential oil, Chemtech-Ford used EPA method 8270C for semi-volatiles, which is a common method for petroleum by-products. The lab may have misidentified the presence of a petroleum compound because it is common in its reference library or because of cross-contamination. No other lab or testing has identified this compound.

A few additional points of clarification on the testing process: The Chemtech-Ford lab report shows a selected ion monitoring scan for phenylpentadienal isomers. The Chemtech-Ford report has been questioned because it mentions 1-Ethylbuta-1,3-dienyl benzene as a tentative match from their library. Review of the complete report shows that the mass spectrum of 1-Ethylbuta-1,3-dienyl benzene clearly does NOT match the mass spectrum of corresponding peak in the spectrum, so it is clearly not 1-Ethylbuta-1,3-dienyl benzene.

A lab uses its library as a reference to compare against a testing sample. For Young Living's lot of Cinnamon Bark essential oil, Chemtech-Ford searched its library for the presence of 1-Ethylbuta-1,3-dienyl benzene (a phenylpentadienal isomer). As indicated by the sample's mass spectrum, Chemtech-Ford did not find this in the sample.

This report also labels on peak as 1,2,4,5-tetramethylbenzene. Chemtech-Ford explained that this label was produced from its library and is only a tentative identification. The chemistry of natural products is very complex, and this is likely to be a natural component, since none of the other labs reported its presence. We will continue to investigate the nature of this compound.

- A lab at the University of Georgia used Carbon-14 testing to also investigate lot #15B10032. The report was not shared with us, so we are unable to provide any technical review at this time. What we can tell you is that Carbon-14 testing measures the ratio of carbon isotopes in samples. We also know that isotope ratios vary with geography (https://en.wikipedia.org/wiki/Isotope_analysis), and **we have not seen definitive synthetic markers in any of our other tests.**



- An analyst in New Jersey claimed to have detected coumarin, which this analyst said indicates the presence of *Cinnamomum cassia* (Chinese Cinnamon). Actually, coumarin is a marker for both *Cinnamomum cassia* (Chinese Cinnamon) and *Cinnamomum verum* (Ceylon Cinnamon). Scientific articles published in peer-reviewed journals confirm that it is not possible to infer that the presence of coumarin can differentiate between these two cinnamon oils. Additionally, a higher coumarin level can actually indicate the presence of *Cinnamomum verum* (Ceylon Cinnamon). This article discusses the matter further: https://static.youngliving.com/en-US/PDFS/coumarin_in_ceylon_cinnamon.pdf

This analyst also claimed that the plinol found in the sample cannot be found in nature. His statement is incorrect—plinol is found in nature. This article, published in the prestigious *Journal of Chromatography*, discusses the topic: https://static.youngliving.com/en-US/PDFS/journal_of_chromatography_natural_plinol.pdf

- A member sent lot #16121203 of Young Living's Cinnamon Bark essential oil to a lab in Canada for testing. This lab claimed that the product was adulterated with synthetic cinnamaldehyde because of the presence of phenylpentadienal isomers. Young Living performed extensive tests, using GCMS on three separate samples from the lot in triplicate, and a much more specific ion extraction to "zero in" on the phenylpentadienal isomer cited in the Canadian lab report. **No markers for synthetic cinnamaldehyde were found.**

In conclusion, extensive testing confirms there are **no** markers of synthetic compounds.

Young Living remains committed to ensuring the natural purity of our oils through extensive testing as an important part of our Seed to Seal process.

Sincerely,

Dr. Mike Buch
VP of R&D & Product Management