Scout Scientific LLC
1800 N Greene St, Suite G
Greenville, NC 27834

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Analytical Report

Client:	Lone Star Mushrooms
Samples:	See list below.
Requested Test:	Qualitative HPLC Analysis and Beta-Glucan Testing
Methods:	HPLC Analysis performed by an in-house developed method. Beta-Glucan testing used the β-Glucan Assay Kit (Yeast and Mushroom), PN K-YBGL, and 08/2023 procedure from Megazyme with specialized sample preparation for tinctures.
Date of Analysis:	February 2025
Report Date:	February 28, 2025
Results:	See Discussion below.

Samples

The following samples were received on January 29, 2025. The Lone Star Mushroom (LSM) numbers were assigned by Scout Scientific for tracking.

LSM-01, other brand: name and lot removed
LSM-02, other brand: name and lot removed
LSM-03, other brand: name and lot removed
LSM-04, other brand: name and lot removed
LSM-05, other brand: name and lot removed
LSM-06, other brand: name and lot removed
LSM-07, other brand: name and lot removed
LSM-07, other brand: name and lot removed
LSM-08, Lone Star Mushroom, Lot 011425_75_1, 60 mL, 2 bottles
LSM-09, Lone Star Mushroom, Lot 011425_75_2, 60 mL, 2 bottles
LSM-10, Lone Star Mushroom, Lot 011425_95_1, 60 mL, 2 bottles

Samples LSM-01 to 03 are powders. The remaining samples are all tinctures. Samples LSM-04 and 07 contain glycerin, while LSM-05, 06, 08, 09, and 10 all contain EtOH.

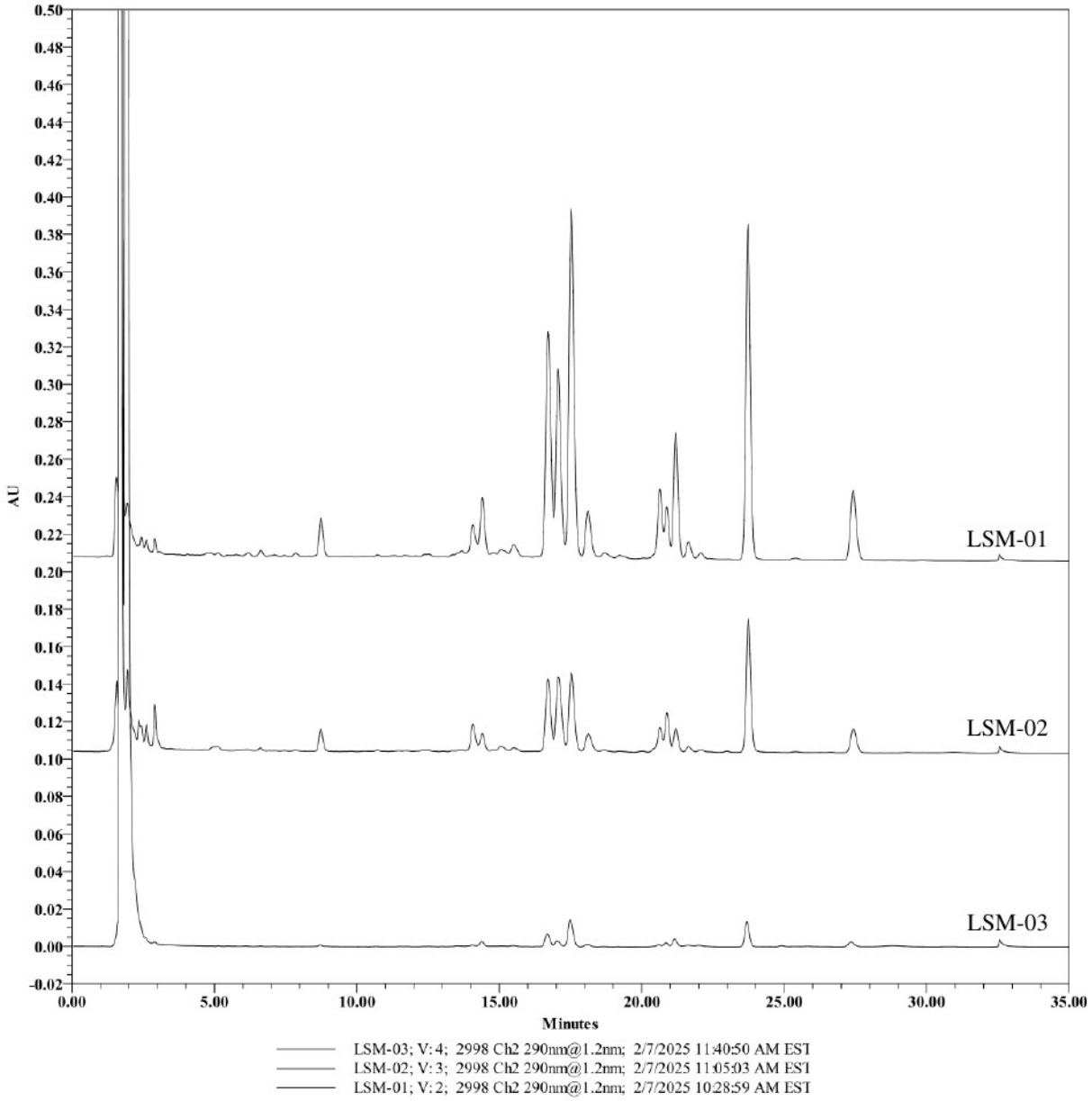
Qualitative HPLC Analysis

Dry powder and tincture samples were prepared differently to make them ready for qualitative HPLC analysis. In the following chromatographic overlays, the powders and tinctures are separately compared. The peaks represent terpene compounds known to be in Lion's Mane mushroom. Generally, when compared to each other, the larger the peak the higher the concentration.

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Figure 1. HPLC Overlay of Powder Samples



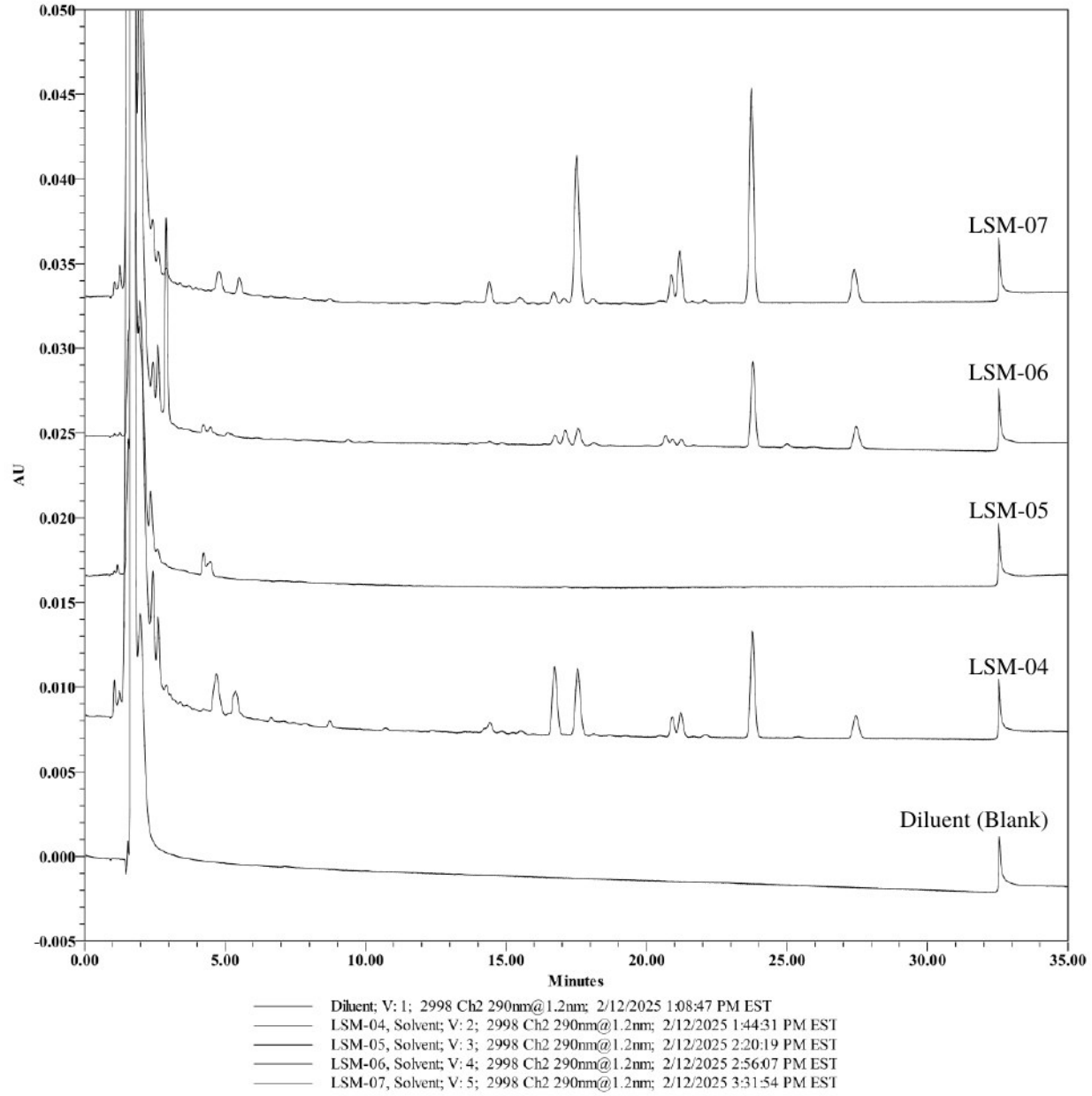
Discussion

Comparing the extractions of the three powder products, there are difference amounts observed for each.

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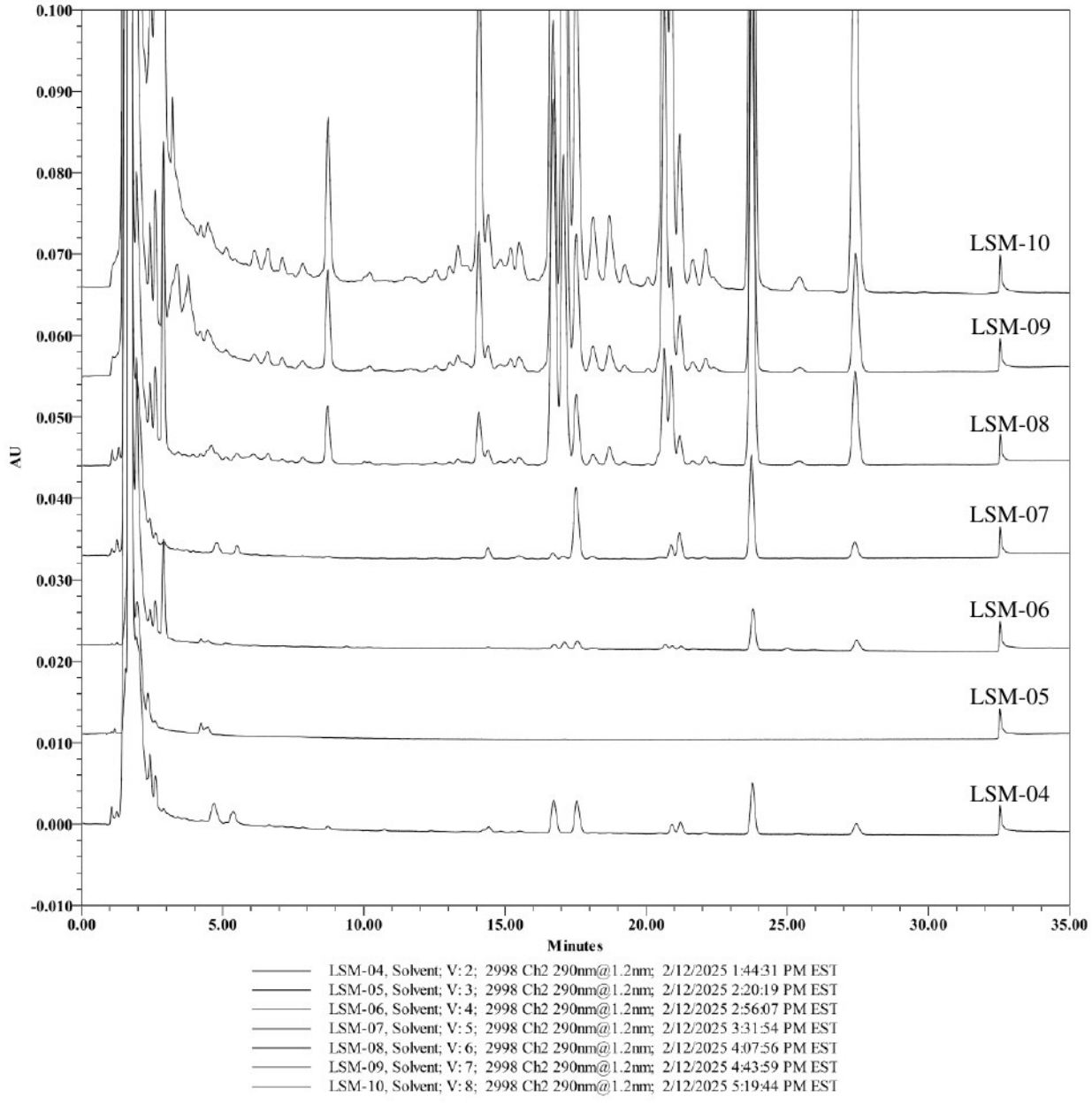
Figure 2. HPLC Expanded Scale Overlay of Other Vendor Tincture Samples



Discussion

When prepared similarly to the other tinctures, sample LSM-05 does not appear to contain any Lion's Mane terpene compounds.

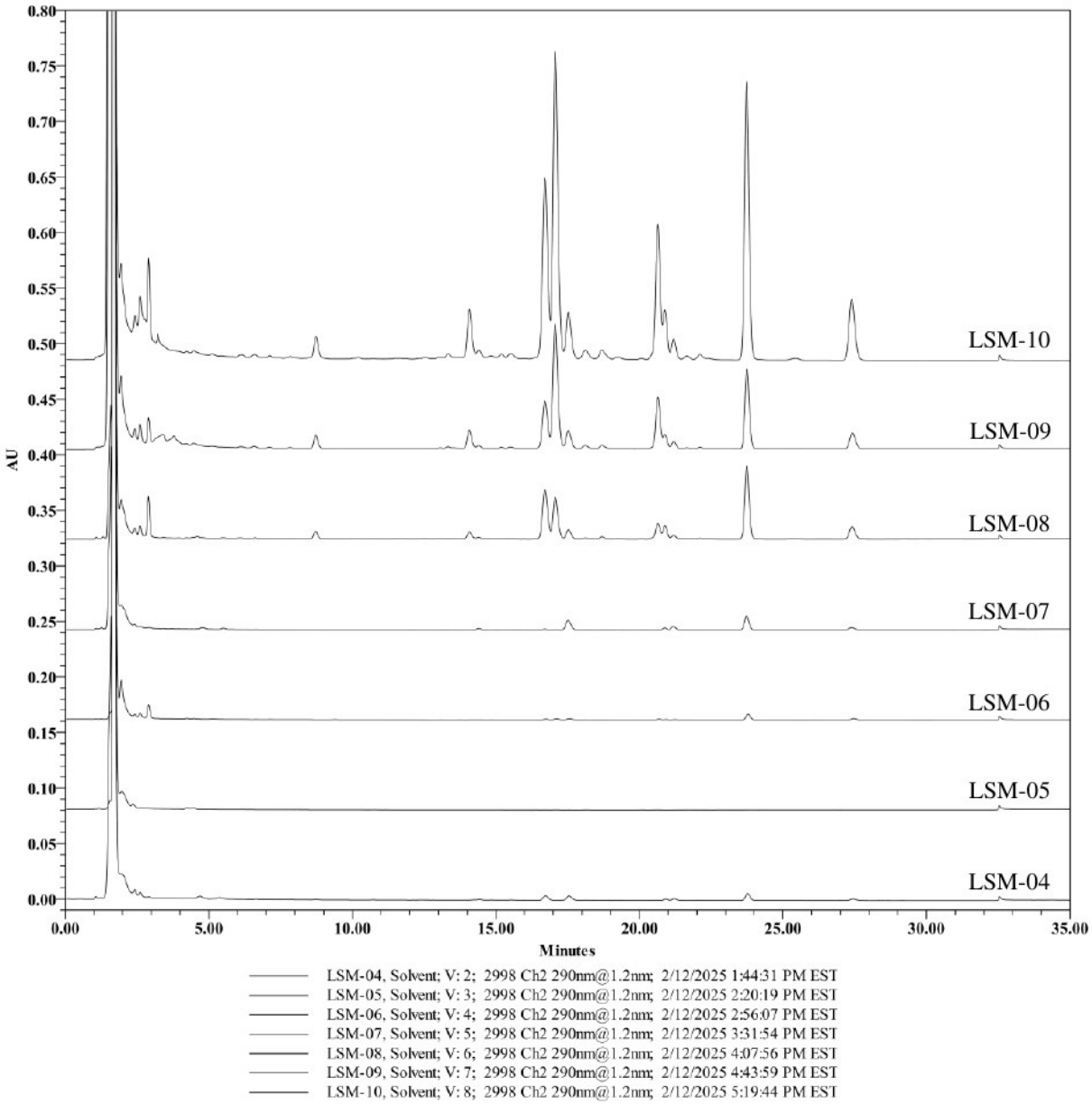
Figure 3. HPLC Expanded Scale Overlay of All Tincture Samples



Discussion

Samples LSM-04 to 07 on the same expanded scale as LSM-08 to 10, showing the differences in terpene concentration. See Figure 4 for a full-scale overlay, showing how much more concentrated the client samples are than the other vendor samples that were investigated.

Figure 4. HPLC Full Scale Overlay of All Tincture Samples



Discussion

From this overlay the Lone Star Mushroom tinctures are shown to have a much higher terpene content, with LSM-10 exhibiting the most.

Beta-Glucan Testing

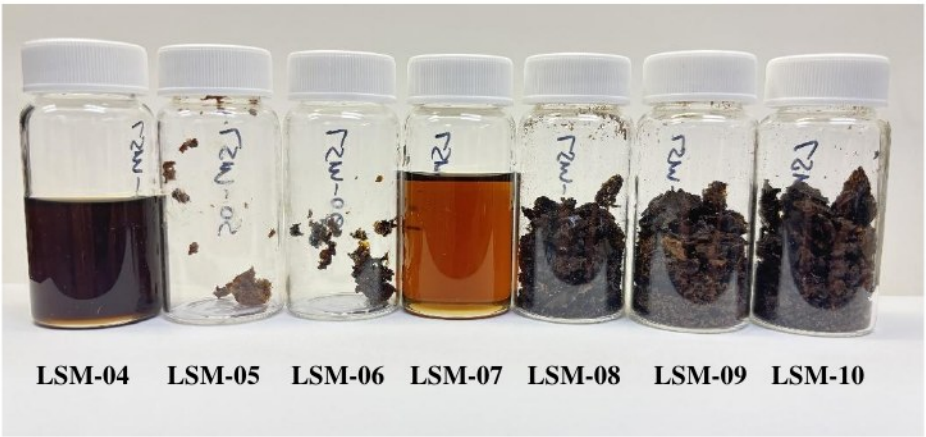
The tincture samples required additional preparation for Beta-Glucan testing. In that process an exact volume was transferred to a container and the water removed from the sample. The remaining residue was collected and measured to determine the sample concentration, also known as Total Solids in solution. This information can be used in conjunction with the Beta-Glucan result.

Sample Concentration (Total Solids)

Sample	Dry Sample (g)	Conc. (mg/mL)
LSM-04	NA	NA
LSM-05	0.2374	9.5
LSM-06	0.3715	14.9
LSM-07	NA	NA
LSM-08	3.5258	141.0
LSM-09	3.7411	149.6
LSM-10	3.5910	143.6

Samples LSM-04 and 07 remained liquids (due to glycerin), therefore no sample concentration could be calculated (NA).

Picture



Tincture Samples After Water Removal and Collection

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Beta-Glucan Results

Sample	Sample Form	Total Glucan, %	Alpha Glucan, %	Beta Glucan, %
LSM-01	Powder	40.0	3.5	36.5
LSM-02	Powder	42.2	20.9	21.3
LSM-03	Powder	67.9	15.0	52.9
LSM-04	Tincture	NA	NA	NA
LSM-05	Tincture	8.9	8.0	0.9
LSM-06	Tincture	13.2	9.1	4.1
LSM-07	Tincture	NA	NA	NA
LSM-08	Tincture	10.8	4.1	6.7
LSM-09	Tincture	9.5	3.4	6.1
LSM-10	Tincture	10.6	3.7	6.9
Control	Powder	52.7	0.8	51.9

Normalized Tincture Concentration

Sample	Beta-Glucan, %	Conc. (mg/mL)	Amount Beta-Glucan (mg/mL)
LSM-05	0.9	9.5	0.1
LSM-06	4.1	14.9	0.6
LSM-08	6.7	141.0	9.5
LSM-09	6.1	149.6	9.1
LSM-10	6.9	143.6	9.9

(Beta-Glucan, % / 100) * Conc. (mg/mL) = Amount Beta-Glucan

Discussion

Our experience tells us that typically Lion's Mane powders should give a Beta-Glucan value around 42-43%. Only one of these samples came close to that range, LSM-01. The bottle label for this product lists Beta-Glucan content as 30%, perhaps intended to be listed as ≥ 30%, in which case our result is well in-line. Sample LSM-02 contained a similar Total Glucan value to LSM-01, but the Beta-Glucan value was lower due to the increased level of Alpha-Glucan. This may be an indication of starch filler or other growing effects that made this value higher than traditionally observed. Sample LSM-03 indicates a high Beta-Glucan content, however this is due to the unusually high Total Glucan value. This is either an error in the testing of the sample or suggests that the sample may be adulterated with a substance(s) that could artificially inflate the Total Glucan value, like D-Glucose. We would need to investigate this further and have some thoughts as to how to proceed.

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Discussion Continued

The tincture samples yield some interesting results as well. The LSM-05 sample, which exhibited no peaks in the HPLC Analysis, shows little Beta-Glucan content. LSM-06 produced a respectful 4.1% test result, but when normalized for sample concentration as a tincture, the amount was still quite low at 0.6 mg/mL.

The samples from the client yielded the highest Beta-Glucan content observed in any tinctures tested so far to date. They were all in the 9 to 10 mg/mL range, meaning that if the recommended tincture dose is 1 mL, the customer would receive 10 mg Beta-Glucan. This amount is less than the ≥ 300 mg Beta-Glucan content of a powder product like LSM-01 (30% of 1000 mg daily dose). However, the tincture is already in a solubilized form, perhaps making it readily available to the customer versus the powder form.

Conclusion

The client submitted samples for Qualitative HPLC Analysis and Beta-Glucan Testing. The tinctures containing glycerin were not able to be tested for Beta-Glucan content.

Suggestion

During preparation of the HPLC samples a centrifuge was used to remove undissolved solids from the product. It was noted that for samples LSM-08 to 10 the solution became clearer, much more visually appealing as a tincture solution. It might be beneficial to explore this as an option to produce these products, either as the final step or performed separately after the aqueous and ethanol extraction. There are continuous centrifugal manufacturing techniques and machinery that could be utilized.