LightLab 3 Repeatability and Reproducibility Study

LightLab 3 Cannabis Analyzer repeatability and reproducibility were calculated using ASTM E691 standard calculations[1]. Four LightLabs, calibrated at four different times, were used to analyze four different samples that contain varying levels of cannabinoids. A full report of this data summary is available, contact Orange Photonics, Inc. to request the full report.

LightLab repeatability and Reproducibility were compared to AOAC International standard method performance requirements (SMPR®s) for flower and concentrates: AOAC SMPR® 2017.001[2] and AOAC SMPR® 2017.002[3]. The RSD_r and RSD_R values for AOAC requirements were compared with LightLab values. LightLab was shown to exceed AOAC requirements and is on par or better than laboratory performance. LightLab represents a truly lab-grade analysis option for cannabinoid analysis.

Sample Type	Example Result	± Absolute Repeatability	± Absolute Reproducibility	RSD_r Repeatability	RSD_r AOAC Limit	RSD_R Reproducibility	RSD_R AOAC Limit
Plant Material	20%	0.7%	0.9%	1.8%	≤4%	2.3%	≤5%
Concentrate	80%	2.1%	2.8%	1.3%	≤2%	1.8%	≤3%
Hemp Compliance	0.75%	0.07%	0.08%	4.6%	<5%	5.5%	<7%
Tincture	3%	0.19%	0.23%	3.2%	n/a	3.8%	n/a
Young Plant	3%	0.14%	0.17%	2.3%	≤4%	2.9%	≤5%

Repeatability: The expected variation in results from run-to-run on a *single* LightLab.

Reproducibility: The expected variation in results between *multiple* LightLabs running the same sample.

RSD_r: Relative standard deviation of *repeatability*. This number shows the amount of scatter around the results of a single LightLab relative to the concentration. A larger number means more scatter than a smaller number. Since it is relative, smaller concentrations will generally have higher RSD_r simply because the result is smaller.

RSD_r: Relative standard deviation of *reproducibility.* This number shows the amount of scatter around the results of different LightLabs running the same sample relative to the concentration.

± Absolute Repeatability: This is a determination the range of values expected when running the same sample on a single LightLab. For example, the Plant Material with a concentration of 20% cannabinoids will read within 19.3%-20.7% on a single LightLab since it has an absolute repeatability of 0.7%. This is based on a 95% confidence interval or 2x standard deviation.

± Absolute Reproducibility: This is a determination of the range of values expected when running the same sample on multiple LightLabs. For example, the Plant Material with a concentration of 20% cannabinoids will read within 19.1%-20.9% on multiple LightLabs since it has an absolute repeatability of 0.9%. This is based on a 95% confidence interval or 2x standard deviation.

[1] ASTM Standard E691, 1999, "Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method", ASTM International, West Conshohocken, PA, 1999, www.astm.org.
[2] AOAC International. (2017). Standard Method Performance Requirements (SMPRs) for Quantitation of Cannabinoids in Dried Plant Materials (AOAC SMPR® 2017.002).
[3] AOAC International. (2017). Standard Method Performance Requirements (SMPRs) for Quantitation of Cannabinoids in Cannabis Concentrates (AOAC SMPR® 2017.001).

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