

HOP CERTIFICATE OF ANALYSIS



ADVANCED ANALYTICAL RESEARCH

Customer : Hidden Valley Hops - Justin Gloede

Sample ID: 3 Variety: Nugget US
(Pre-Harvest)

Certifying Officer: Zach Lilla - Lab Manager

Date : 8/16/2019

| Method | | | | |
|---------|--|---------------------|-------|-----------------|
| Hops-4C | Moisture Analysis | % Moisture | 81.5 | |
| | | % Dry Matter | 18.5 | |
| Hops-6A | Alpha & Beta Acids by SPEC | % Alpha | NT | (as is) |
| | | %Beta | NT | (as is) |
| | | a/b ratio | NT | |
| Hops-12 | Hop Storage Index | HSI | 0.213 | |
| Hops-13 | Total Essential Oil | mL/100g | NT | (as is) |
| Hops-14 | Alpha & Beta Acids by HPLC | Cohumulone | 36.0 | (% of Total AA) |
| | ICE-3 | Total % Alpha Acids | 2.03 | (as is) |
| | | Colupulone | 62.2 | (% of Total BA) |
| | | Total % Beta Acids | 1.54 | (as is) |
| | | a/b ratio | 1.32 | |
| Hops-17 | Hop Essential Oil by GC-FID as a % of total oil | B-Pinene | NT | |
| | | Myrcene | NT | |
| | | Linalool | NT | |
| | | Caryophyllene | NT | |
| | | Farnesene | NT | |
| | | Humulene | NT | |
| | | Geraniol | NT | |

NT=NOT TESTED

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Note: Target ranges are only a general guideline, they may differ based on regional differences.

Note: With fresh wet hops, due to variations in handling, values corrected for moisture are no indication of a dried post processed A/B or oil content.

| Nugget US | Typical Ranges |
|------------|----------------|
| % Alpha | 13.5 - 16% |
| % Beta | 4.4 - 5.5% |
| Cohumulone | 22 - 26% |
| Total Oil | 1 - 3 mL/100g |

Calculations (Brewing Values @ 10% moisture)

| | SPEC | HPLC |
|------------|------|---------|
| % Alpha | NT | 9.88 |
| % Beta | NT | 7.49 |
| Cohumulone | | 36.0 |
| Total Oil | NT | mL/100g |

Signed: _____

Zachary Lilla - Lab Manager