

HOP QUALITY REPORT CERTIFICATE OF ANALYSIS



To: Wisconsin Hop Exchange

Sample ID: 23SNT1024-01LH

Variety: Santiam

Product: T-90 Pellet

Date : 12/13/2023

Certifying Officer: Zach Lilla - Lab Manager
 TTB Certified Chemist - Member AOAC - ASBC - BJCP

| Method | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|--|---|--|--------|---------|----------|----|----|---------|----|----|----------|----|----|---------------|----|----|-----------|----|----|----------|----|----|----------|----|----|
| Hops-4C | Moisture Analysis | % Moisture 8.8 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | % Dry Matter 91.2 | | | | | | | | | | | | | | | | | | | | | | | | |
| AAR | Xanthohumol by HPLC | NT mg/g | | | | | | | | | | | | | | | | | | | | | | | | |
| Hops-12 | Hop Storage Index | HSI 0.307 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hops-13 | Essential Oil by Steam Distillation | mL/100g 1.59 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hops-14 | Alpha and Beta Acids by HPLC | Cohumulone 22.9 (% of Total AA) | | | | | | | | | | | | | | | | | | | | | | | | |
| ICE-3 | | % Alpha Acids 5.69 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Colupulone 36.6 (% of Total BA) | | | | | | | | | | | | | | | | | | | | | | | | |
| | | % Beta Acids 6.59 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | a/b ratio 0.86 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hops-17 | Hop Essential Oil by GC-FID (as is) | <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">% area</th> <th style="text-align: center;">mg/100g</th> </tr> </thead> <tbody> <tr><td>B-Pinene</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> <tr><td>Myrcene</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> <tr><td>Linalool</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> <tr><td>Caryophyllene</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> <tr><td>Farnesene</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> <tr><td>Humulene</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> <tr><td>Geraniol</td><td style="text-align: center;">NT</td><td style="text-align: center;">NT</td></tr> </tbody> </table> | | % area | mg/100g | B-Pinene | NT | NT | Myrcene | NT | NT | Linalool | NT | NT | Caryophyllene | NT | NT | Farnesene | NT | NT | Humulene | NT | NT | Geraniol | NT | NT |
| | % area | mg/100g | | | | | | | | | | | | | | | | | | | | | | | | |
| B-Pinene | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |
| Myrcene | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |
| Linalool | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |
| Caryophyllene | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |
| Farnesene | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |
| Humulene | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |
| Geraniol | NT | NT | | | | | | | | | | | | | | | | | | | | | | | | |

NT=NOT TESTED

Signed:

Zachary Lilla - Lab Manager - TTB Certified Chemist
 AAR LAB - ADVANCED ANALYTICAL RESEARCH
 2517 Advance Rd Ste. A Madison WI 53718



AROMA QUALITY (AQ)

HOP QUALITY REPORT



Customer : Wisconsin Hop Exchange

Sample ID: 23SNT1024-01LH

Variety: Santiam

Product: T-90 Pellet

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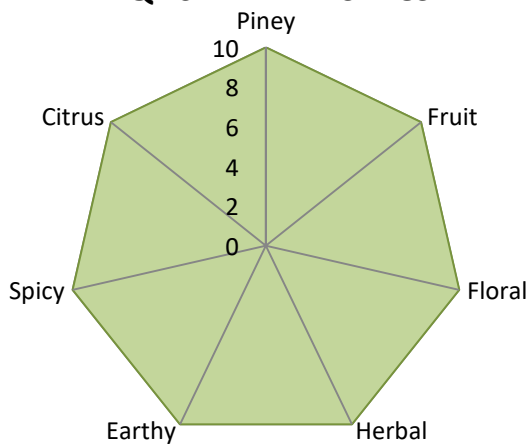
Certifying Officer: Zach Lilla - Lab Manager
TTB Certified Chemist - Member AOAC - ASBC - BJCP

| | | Typical Range | |
|---|------|-----------------|-------------------------------------|
| % Moisture | 8.8 | 8 - 12 % | <input checked="" type="checkbox"/> |
| HOP QUALITY (adjusted to 10% moisture) | | | |
| Total Oil ml/100g | 1.57 | 1.0 - 2.2 mL | <input checked="" type="checkbox"/> |
| cohumulone | 22.9 | 22 - 24% | <input checked="" type="checkbox"/> |
| Alpha Acids | 5.61 | 6.0 - 8.5% | <input type="checkbox"/> |
| Beta Acids | 6.50 | 7.0 - 8.0% | <input type="checkbox"/> |
| Myrcene | NT | 15.00 - 25.00 % | <input type="checkbox"/> |

AROMA QUALITY (AQ)

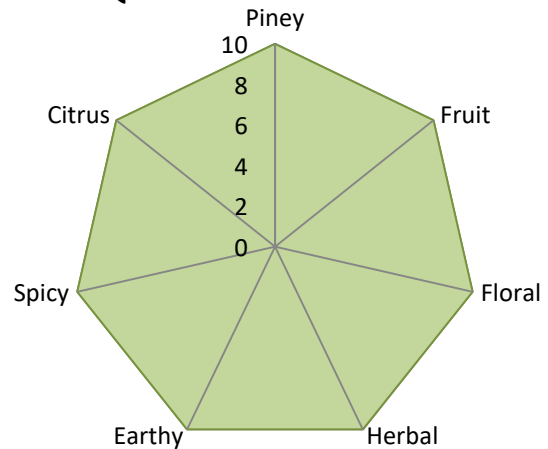
| | | % Area | mg/mL of Hop Oil | | | mg/100g of Hops (@10%H2O) | | |
|---------------|----|-----------------|------------------|-----------|----|---------------------------|--|--|
| B-Pinene | NT | 0.10 - 0.50 % | NT | 1 - 5 | NT | 1 - 11 | | |
| Myrcene | NT | 15.00 - 25.00 % | NT | 150 - 250 | NT | 150 - 550 | | |
| Linalool | NT | 0.70 - 1.30 % | NT | 7 - 13 | NT | 7 - 28.6 | | |
| Caryophyllene | NT | 6.00 - 9.00 % | NT | 60 - 90 | NT | 60 - 198 | | |
| Farnesene | NT | 14.00 - 18.00 % | NT | 140 - 180 | NT | 140 - 396 | | |
| Humulene | NT | 20.00 - 30.00 % | NT | 200 - 300 | NT | 200 - 660 | | |
| Geraniol | NT | 0.01 - 0.40 % | NT | 0.1 - 4 | NT | 0.1 - 8.8 | | |

AQ vs VARIETY SPECS



Aroma Intensity= 100

AQ vs ALL HOP VARIETIES



Aroma Intensity= 100

Signed: _____

Zachary Lilla - Lab Manager - TTB Certified Chemist

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