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**YAKIMA CHIEF - HOPUNION LLC**  
**CERTIFICATE OF ANALYSIS**

**Supplier:** Yakima Chief-Hopunion, LLC  
 203 Division Street  
 Yakima, WA 98902

**Date of Issue:** 15-Nov-2017

**Product Name:** LupuLN2™ Powder

**Lot Number:** PL1-ZJUMOS0010  
**Variety:** Mosaic® Brand  
**Crop Year:** 2016

<u>Characteristic</u>	<u>Typical Analysis</u>	<u>Actual Analysis</u>
Alpha Acids:	2.5 - 17.5% (w/w) UV Spectro by ASBC HOPS - 6A	20.5%
Beta Acids:	3.0 - 9.0% (w/w) UV Spectro by ASBC HOPS - 6A	6.2%
Hop Storage Index	Varies by Variety and Time from Harvest Hop Storage Index by ASBC Hops - 12	0.240
Oil by Distillation:	Varies by Variety ASBC Hops - 13 (%v/w)	4.0%
Oil Profile by GC, EBC Analytica V 7.12:	<b>B-Pinene:</b> 0.9 % <b>Myrcene:</b> 66.2 % <b>Linalool:</b> 0.5 % <b>Caryophyllene:</b> 3.5 %	<b>Farnesene:</b> 0.1 % <b>Humulene:</b> 9.0 % <b>Geraniol:</b> 0.6 %

Lead:	< 1.0 ppm	passes test
Arsenic:	< 0.5 ppm	passes test
Cadmium:	< 0.03 ppm	passes test
<b>Total Heavy Metals:</b>	<b>&lt; 10 ppm (asPb)</b>	<b>passes test</b>

  
 Missy Raver  
 Quality Control Manager