

Comparative Growth Results of Cycloptics 315W Ceramic Metal Halide Lighting And 600W MH and 1000W HPS to Grow Sour Diesel MMJ Indoors

The following are the results of a licensed grower in Denver, CO that purchased thirty-five (35) 315W CMH All-Bright™ fixtures manufactured by Cycloptics to grow Sour Diesel MMJ in an 18' x 18' x 9' indoor grow room. The All-Bright™ fixtures were mounted to the ceiling of the room in fixed positions and did not require being raised or lowered. The purpose of the test was to compare All-Bright™ effectiveness to the lighting regime traditionally used by the grower. This system consisted of a combination of eight 54W T5HO fluorescents and four 600W metal halide lamps for the vegetative phase and sixteen 1000W high pressure sodium fixtures for flowering. The All-Bright™ reflectors used the Philips 315W Green Power CMH lamp producing 1.90 PPF/W; rated for use in the open reflectors with a rated life of up to 30,000 hours at 90% lumen maintenance. The comparative growth performance metrics were:

- Average ounces of DW (dry weight) mass per plant after trimming
- Total grow days from the start of the vegetative phase through flowering
- Total combined kWh for the lighting and inline fans per harvested DW pound
- Percentage of Total Active Assayable Cannabinoids
- Payback period for the incremental cost of installing All-Bright™ lighting system

The Sour Diesel plants were grown hydroponically using 3ft x 3ft trays that were 15" off the floor. The plants were transferred into the grow room with All-Bright™ lighting after being cloned in Grodan 2"x2" cubes under eight 54W T5 HO fluorescent tubes for 14 days with 18 hour lighting. Prior to being moved under the All-Bright™ lighting the plants were transferred into 6"x6" Grodan cubes.

The full grow cycle for the plants using All-Bright™ lighting lasted 73 days. The lighting regime was 13 hours On 11 hours Off. To optimize the average intensity and uniformity of the All-Bright™ light landing diffusely on all areas of the plants the walls and ceiling were lined with 94% reflective diffuse white Orca grow film, and the concrete floor was painted with white epoxy paint. The temperature was maintained at 85°F during the day and 75°F at night. Humidity was controlled at 65% day and night without any carbon dioxide enhancement.

At the end of 73 days the plants grown under All-Bright™ were harvested at an average height of 35" and dried for 7 days prior to trimming. The comparative growth performance results are:

	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH	Cycloptics Impact
Avg DW Ounces/Plant	4.4 oz.	5.7 oz.	30% Increase
Total Veg Days	60 Days	73 Total Days	36% Faster Growth
Total Flower Days	60 Days		
Total kWh Per Harvested Pound	682 kWh	386 kWh	43% Reduction
Total Assayable Active Cannabinoids		28.3%	
Cycloptics 315W CMH Payback	1.2 Months		

Lighting Electricity Cost

T5HO + 600W MH 1000W HPS	Nbr Lamps	Lamp Watts	Ballast Watts	System Watts	Hrs/ Day	Days	Lighting kWh	Cost/ kWh	Cost/ Crop
Veg-54W T5	4 x 2	54	15	123	18	30	266	\$0.10	\$27
Veg-600W MH	4	600	65	665	18	30	1,436	\$0.10	\$144
Flower-1000W HPS	16	1000	100	1100	12	60	12,672	\$0.10	\$1,267
Total kWh							14,374		
Total Electricity Cost of T5 + 600W + 1000W Lighting									\$1,437

Cycloptics 315W CMH	Nbr Lamps	Lamp Watts	Ballast Watts	System Watts	Hrs/ Day	Days	Lighting kWh	Cost/ kWh	Cost/ Crop
Veg-MH	35	315	16	331	13	73	10,994	\$0.10	\$1,099
Flower-HPS	35	315	16	331	13				
Total All-Bright 315W Lighting kWh							10,994		
Total Electricity Cost of All-Bright™ Lighting									\$1,099

Inline Fans Electricity Cost

600W + 1000W Inline Fans	Days	Nbr Fans	W/ Fan	Hrs/ Day	kWh	Cost/ kWh	Cost/ Crop
Veg	60	0	0	0	0	\$0.10	\$0.00
Flower	60	3	220	12	634	\$0.10	\$63.36
Total kWh					634		
Electricity Cost for 600W and 1000W Inline Fans							\$63.36

Cycloptics 315W CMH	Days	Nbr Fans	W/ Fan	Hrs/ Day	kWh	Cost/ kWh	Cost/ Crop
Veg	73	0	0	0	0	\$0.00	\$0.00
Flower		0	0	0	0	\$0.00	\$0.00
Electricity Cost for Cycloptics Inline Fans							\$0.00

Total Electricity Cost for Lighting and Inline Fans Per Harvested Crop

Total Electricity Cost for Lighting and Inline Fans Per Crop	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH
T5HO Veg kWh	266	10,994
600W MH Veg kWh	1,436	
1000W HPS Flower kWh	12,672	
Inline Fans kWh	634	0
Total kWh	15,008	10,994
Cost/kWh	\$0.10	\$0.10
Total Electricity Cost for Lighting and Inline Fans Per Crop	\$1,501	\$1,099

Lighting and Inline Fans Electricity Cost Per Harvested Pound

Cost of Lighting & Inline Fans Electricity Per Pound	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH
Average Dry Weight Ounces Per Plant	4.4	5.7
Plants (Sixteen 4x4 trays X 5 plants/tray) Per Crop	80	80
Harvested Pounds Per Crop	22.0	28.5
Total kWh-Lighting	14,374	10,994
Total kWh-Inline Fans	634	0
Total kWh - Lighting and Inline Fans Only	15,008	10,994
kWh/Lb.	682	386
Lighting/Inline Fans Electricity Cost/Harvest	\$1,501	\$1,099
Lighting and Inline Fan Electricity Cost Per Harvested Pound	\$68.22	\$38.58

Annualized Relamping Cost Comparison

Annualized Relamping Cost	600W MH	1000W HPS	1000W MH and HPS Annualized Relamping Cost	Cycloptics 315W CMH Annualized Relamping Cost	Cycloptics 315W CMH Annualized Relamping Savings
Stage	Veg	Flower		Veg & Flower	
Hrs/Day	18	12		13	
Days	30	60		73	
Total Hours/Crop	540	720		949	
Crops/Year	2.9	2.9		4.5	
Total Hours/Year	1,540	2,053		4,276	
Hours/Replace *	7,200	4,320		30,000	
Lamps/Year	0.21	0.48		0.14	
Cost/Lamp	\$100.00	\$70.00		\$100.00	
Lamp Cost/Year	\$21.39	\$33.27		\$14.25	
Total Fixtures	4	16		35	
Relamp Cost/Year	\$86	\$532	\$618	\$499	\$119
* Based upon EYE Lighting MH and HPS Hortilux lamp data, and Elite Agro rated life using CeramaTek ballast					
Annualized relamping cost for the eight T5HO lamps used during first 30 days of Veg not included					

Net Income Comparison Per Crop and Year

Net Income Per Per Crop and Year Comparison	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH
Total Veg Days	60	73
Total Flower Days	60	
Total Turnaround Days for Room	8	8
Total Veg and Flower Days Per Crop	128	81
Crops per Year	2.9	4.5
Number of Plants (16 4x4 trays X 5 plants/tray) Per Crop	80	80
Avg Pounds Per Harvest	22.0	28.5
Wholesale Price/Lb.	\$2,300	\$2,300
Average Net Income Per Crop	\$31,680	\$50,864
Total Pounds Per Year	62.7	128.4
Average Annual Revenue	\$144,289	\$295,380
Lighting and Inline Fans Electricity Cost/Year	-\$4,280	-\$4,954
Relamping Cost Per Year	-\$618	-\$499
Annual Net Income	\$139,392	\$289,927

Incremental Investment for All-Bright™ 315W CMH Lighting

Upfront Investment	T5 HO Veg Room	600W MH Veg Room	1000W HPS Flower Room	Cycloptics 315W CMH
Light Fixtures-Qty	1	4	16	35
Cost/Reflector	\$150.00	\$200.00	\$200.00	
Cost/Ballast		\$200.00	\$200.00	
Cost/Lamp	8 @ \$7.00	\$100.00	\$70.00	
Total Cost/Fixture	\$206.00	\$504.00	\$486.00	\$638.00
Total Light Fixtures Cost	\$206.00	\$2,016	\$7,776	\$22,330
Inline Fans-Qty		0	3	
Cost/Fan		\$275.00	\$275.00	
Total Inline Fans Cost		\$0.00	\$825.00	
Power Boxes Installed		1	2	
Cost/Power Box		\$500.00	\$500.00	
Total		\$500.00	\$1,000.00	
Electrician-Installation		\$0	\$0	\$4,500
Investment	\$206.00	\$2,516	\$9,601	
Total T5, 600W, 1000W Investment		\$12,117		
Total All-Bright™ 315W Investment				\$26,830
Incremental Investment in All-Bright™ Lighting				\$14,713

Payback on Incremental Investment in Cycloptics 315W All-Bright™ CMH Lighting

Payback on Incremental Investment in Cycloptics 315W CMH Lighting	T5 + 600W MH 1000W HPS	All-Bright™ 315W CMH	Cycloptics Incremental Investment	Cycloptics 5-Year Net Profit Impact	Cycloptics Investment Payback
Equipment Investment	-\$12,117	-\$27,250	\$15,133		
Annual Gross Profit	\$139,392	\$289,927			
Year 1 Net Profit After Investment	\$127,275	\$262,677		\$135,402	1.2
Year 2 Gross Profit	\$139,392	\$289,927		\$285,937	Months
Year 3 Gross Profit	\$139,392	\$289,927		\$436,472	
Year 4 Gross Profit	\$139,392	\$289,927		\$587,006	
Year 5 Gross Profit	\$139,392	\$289,927		\$737,541	

Growth Performance Comparison

	T5 + 600W MH 1000W HPS	315W CMH All-Bright™	All-Bright™ Impact
Avg DW Ounces Per Plant	4.4 oz.	5.7 oz.	30% Increase
Total Veg Days (T5 + 600W MH)	60 Days	73	36%
Total Flower Days (1000W HPS)	60 Days	Total Days	Faster
Total kWh Per Pound Harvested	682 kWh	386 kWh	43% Reduction
Total Active Assayable Cannabinoids		28.3%	
Cycloptics 315W All-Bright™ Investment Payback	1.2 Months For 80 Plant Crop		



Test Date
7/25/2013

Expires
9/23/2013

Sour Diesel
Sample Type: Flower

TestID 100300

The below test is reported in percentage by weight, milligrams per gram, or milligrams per final consumable weight. THC-A is not decarboxylated (not active) and shall not be reported in the total active cannabinoids. THC-A is converted to active THC in the calculated active column using the formula (THC-A x .877 = THC). Total assayable cannabinoids simply represents the sum of the cannabinoids detected in the sample. If THC-A is not detected in the sample, the calculated active and total active will remain the same. Edible results may be lower than expected; this is due to circumstances outside of CannLabs control, such as cannabinoid material adhering to the manufacturers' packaging. This report and all information herein shall not be reproduced, except in its entirety, without the expressed consent of CannLabs. This report is for informational purposes only and should not be used to diagnose, treat or prevent any medical related symptoms. Due to many factors outside of CannLabs control, results may vary. Results are only for the samples supplied to CannLabs.
The statements and results herein have not been approved or endorsed by the FDA.

Chemical Report

Cannabinoid Assay

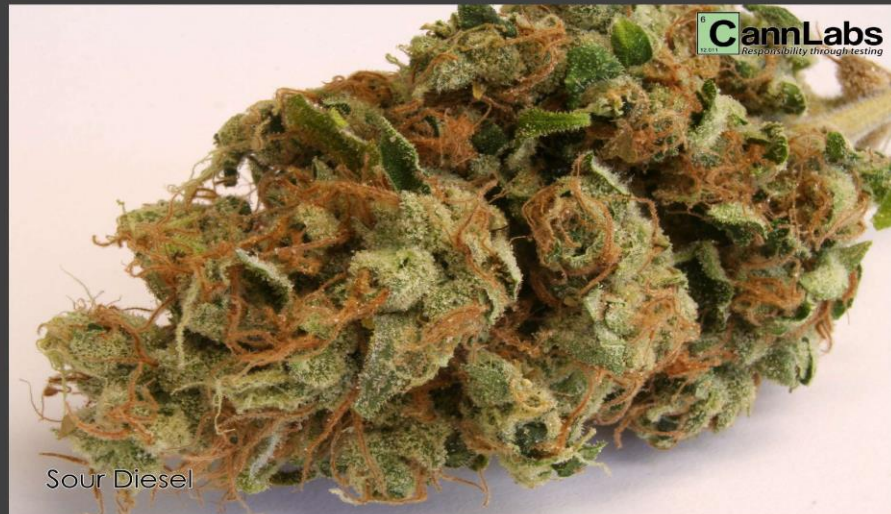
Assayable Cannabinoids		Active Cannabinoids	Total Active Assayable Cannabinoids
CBD-A	<0.01 %	Max CBD	
		0.00 %	
CBD	<0.01 %	Max THC	
THC-A	32.04 %	28.28 %	
THC	0.18 %	CBN	28.28 %
		0.00 %	
CBN	<0.01 %		

Physical Exam

Visual Inspection Assay

	Yes	NO	Severity 1-10
Mold	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Powdery Mildew	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Insects	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Misc.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

NOTES



Sour Diesel

Pictures of Greenbeams 315W CMH MMJ Grow in 18ft x 18ft Room in Denver, CO



**Day 0
4/27/13**



**Day 0
4/27/13 - Avg Height 12"**



**Grow Day 1
4/28/13**



**Grow Day 1
4/28/13 - Avg Height 13"**



**Grow Day 3
4/30/13**



**Grow Day 3
4/30/13 - Avg Height 14"**



Grow Day 16
5/13/13 – Avg Height 16"



Grow Day 33
5/30/13



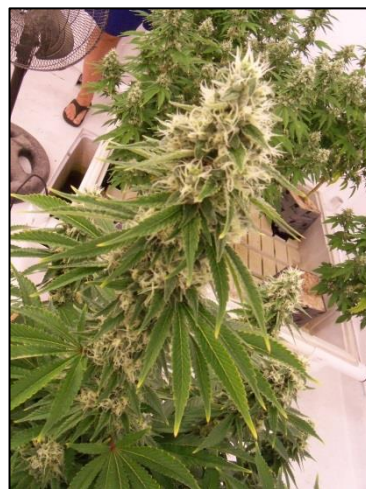
Grow Day 33
5/30/13 - Avg Height 27"



Grow Day 42
6/8/13



Grow Day 56
6/22/13 – Avg Height 33"



Grow Day 56
6/22/13



Grow Day 73
7/9/13



Grow Day 73
7/9/13

cycloptics®

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