

# The Ag *forum*

by JONES-HAMILTON CO.

## Poultry Litter Treatment (PLT®) Effects on Broiler Farm Fuel Costs and Bird Performance



### PLT® Field Trial Summary

JHF-10-95

The purpose of this trial was to determine the effects of PLT® on broiler farm fuel costs and bird performance related to PLT®'s ability to eliminate ammonia and acidify litter.

Four, 4-house farms were used for this trial. Two farms were located on Delmarva and the other two farms were located in South Carolina. This trial was conducted during the winter with outside temperatures at bird placement at 20°F on Delmarva and 50°F in South Carolina. Two houses on each farm had litter treated with PLT® at a rate of 50 lbs. of PLT® per 1,000 sq. ft. of floor space just prior to bird placement. The other two houses had untreated litter and served as controls. Atmospheric ammonia and litter pH were determined before and after PLT® application and ammonia levels were recorded throughout the grow-out. Fuel readings were recorded daily and bird weights were determined at the processing plant at the end of the grow-out.

Litter pH was significantly reduced in the treated houses with an average drop for the four farms from 8.25 down to 1.83. Ammonia was also significantly reduced throughout the entire grow-out and resulted in fuel cost savings per house averaging \$1,202.88.

Total bird weights were significantly improved in the treated houses with an average advantage in the two treated houses of 7,278 pounds. At an average cost of 30.5 cents per pound that is a revenue generation of \$2,224.52 per two houses. With the litter acidification, litter was safely reused for several flocks with an average cost savings of \$1,612.50.

**JH** JONES-HAMILTON CO.  
Agricultural Division



## Final Report

Project Number: JHF-10-95  
Project Title: Poultry Litter Treatment (PLT®) Effect on Broiler Farm Fuel Costs and Bird Performance  
Location: Major Poultry Integrator (Broiler Farms) in Maryland and South Carolina  
Duration: November 1995 to December 1995  
Trial Design by: Blake Gibson and Dr. Mac Terzich  
Final Report by: Dr. Mac Terzich, January 1996

## Objective

Determine the effects of PLT® on fuel costs and bird performance on broiler farm.

## Protocol

Four, 4 house farms with built-up litter were chosen for this trial. Two of the farms were located in Maryland with outside temperatures at the time of PLT® application at 20 degrees; the other 2 farms were located in South Carolina with outside temperatures at PLT® application of 50 degrees. On each farm, litter in 2 of the houses (houses 1 and 3) was treated with PLT® at 50 lbs. /1,000 sq. ft. Litter in the other 2 houses (houses 2 and 4) was untreated and these houses served as the controls. Data was collected before and immediately after PLT® treatment, through the grow-out (Farm B data for first 3 weeks, brooding period only), and totaled at the end of the grow-out to allow comparisons of ammonia levels, fuel usage, and costs.

## Results

### Farm A

Outside Temp at PLT® application: 50 degrees  
Inside temp at application: 90 degrees  
Ventilation Type: Tunnel  
Heating Type: Forced air  
Litter Age: 7 Flocks

### Farm A - LITTER PH

	House 1 Treated	House 2 Control	House 3 Treated	House 4 Control
Before PLT® Treatment	7.8	7.7	7.8	7.7
After PLT® Treatment	1.5	7.7	1.5	7.7

### Farm A - TOTAL BIRD WEIGHT AT PROCESSING BY HOUSE

House	Total Weight (lbs.)
1 - PLT® Treated	106,176
2 - Control	105,284
3 - PLT® Treated	106,548
4 - Control	102,432

### Farm A - TOTAL BIRD WEIGHT

PLT® Treated Houses	212,724
Control Houses	207,716
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PLT® Advantage (2-house avg.)	5,008 lbs.

### Farm A - FUEL COSTS BY HOUSE

House	Cubic ft. Fuel Used	Fuel Cost
1 - PLT®	318	\$843.91
2 - Control	516	\$1,369.36
3 - PLT®	308	\$817.37
4 - Control	499	\$1,324.25

### Farm A - TOTAL FUEL COST

PLT® Treated Houses	\$1,661.28
Control Houses	\$2,693.61
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PLT® Advantage	\$1,032.33
PLT® Product Cost \$200 (\$100/hse., half hse. brooding)	
Total Fuel Cost Advantage PLT®	\$832.33

## Farm A - FUEL USAGE (CUBIC FT.) AND COSTS DURING BROODING PERIOD

	House 1 PLT®	House 2 Control	House 3 PLT®	House 4 Control
Week 1	93 / \$247	163 / \$432	96 / \$255	159 / \$422
Week 2	89 / \$157	125 / \$332	78 / \$207	99 / \$263
Week 3	92 / \$244	157 / \$417	103 / \$273	160 / \$425
Brood Total	247 / \$648	445 / \$1,181	277 / \$735	418 / \$1,110

### PLT® Advantage (avg. all houses)

**412 cubic ft. less fuel, reduced cost by \$908**

Brooding fuel cost savings minus PLT® cost (\$100/house divided by 3 weeks) **\$822.29**

**Half house brooding**

Figures 1 through 4 present data on ammonia levels during grow-out, fuel usage, ammonia levels compared with fuel usage, and fan time compared to fuel usage.

### Farm B

Outside Temp at PLT® application: 50 degrees

Inside temp at application: 95 degrees

Ventilation Type: Curtain, Power ventilation with side wall fans

Heating Type: Forced air

Litter Age: 2 Flocks

### Farm B - LITTER PH

	House 1 Treated	House 2 Control	House 3 Treated	House 4 Control
Before PLT® Treatment	7.5	7.6	7.4	7.5
After PLT® Treatment	1.4	7.6	1.6	7.5

## Farm B - TOTAL BIRD WEIGHT AT PROCESSING BY HOUSE

House	Total Weight (lbs.)
1 - PLT® Treated	112,600
2 - Control	112,640
3 - PLT® Treated	116,960
4 - Control	115,580

## Farm B - TOTAL BIRD WEIGHT

PLT® Treated Houses	229,560
Control Houses	228,220
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PLT® Advantage (2-house avg.)	1,340 lbs.

## Farm B - FUEL USAGE (CUBIC FT.) AND COSTS DURING BROODING PERIOD

	House 1 PLT®	House 2 Control	House 3 PLT®	House 4 Control
Week 1	76 / \$201	125 / \$332	84 / \$223	143 / \$379
Week 2	131 / \$348	110 / \$292	120 / \$318	134 / \$356
Week 3	100 / \$265	107 / \$284	76 / \$201	79 / \$361
Brood Total	307 / \$814	342 / \$908	280 / \$742	356 / \$1,096

### PLT® Advantage (avg. all houses)

**111 cubic ft. less fuel, reduced cost by \$448**

Brooding fuel cost savings minus PLT® cost (\$100/house divided by 3 weeks) **\$362.29**

**Half house brooding**

Figures 5 through 8 present data for the first 21 days of grow-out for farm B including ammonia levels, fuel usage, fuel usage compared to ammonia levels and fan times compared to fuel usage.

**Farm C**

Outside Temp at PLT® application: 22 degrees

Inside temp at application: 87 degrees

Ventilation Type: Tunnel

Heating Type: Forced air

Litter Age: 8 Flocks

**Farm C - LITTER PH**

	House 1 Treated	House 2 Control	House 3 Treated	House 4 Control
Before PLT® Treatment	8.6	8.0	9.1	8.5
After PLT® Treatment	2.1	8.0	2.2	8.5

**FARM C - TOTAL BIRD WEIGHT AT PROCESSING BY HOUSE**

House	Total Weight (lbs.)
1 - PLT® Treated	125,021
2 - Control	119,876
3 - PLT® Treated	129,945
4 - Control	121,283

**FARM C - TOTAL BIRD WEIGHT**

PLT® Treated Houses	254,966
Control Houses	241,159
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PLT® Advantage (2-house avg.)	13,807 lbs.

### Farm C - FUEL COSTS BY HOUSE

House	Cubic ft. Fuel Used	Fuel Cost
1 - PLT®	298	\$789.70
2 - Control	541	\$1,433.65
3 - PLT®	332	\$879.80
4 - Control	521	\$1,380.65

### Farm C - TOTAL FUEL COST

PLT® Treated Houses	\$1,669.50
Control Houses	\$2,814.30
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PLT® Advantage	\$1,144.80
PLT® Product Cost \$160 (\$100/hse., half hse. brooding)	
Total Fuel Cost Advantage PLT®	\$984.80

### Farm C - FUEL USAGE (CUBIC FT.) AND COSTS DURING BROODING PERIOD

	House 1 PLT®	House 2 Control	House 3 PLT®	House 4 Control
Week 1	81 / \$215	144 / \$382	96 / \$255	159 / \$422
Week 2	71 / \$188	153 / \$405	78 / \$207	99 / \$263
Week 3	84 / \$223	165 / \$437	103 / \$273	160 / \$425
Brood Total	236 / \$626	462 / \$1,224	277 / \$735	418 / \$1,110

#### PLT® Advantage (avg. all houses)

**367 cubic ft. less fuel, reduced cost by \$973**

Brooding fuel cost savings minus PLT® cost (\$100/house divided by 3 weeks) **\$904.43**

**Third house brooding**

Figures 9 through 12 present data for farm C including ammonia levels during the grow-out, fuel usage, ammonia levels compared to fuel usage, and fan times compared to fuel usage.

### Farm D

Outside Temp at PLT® application: 19 degrees

Inside temp at application: 87 degrees

Ventilation Type: Curtain, power ventilation, side wall fans

Heating Type: Gas brooders

Litter Age: 13 Flocks

### Farm D - LITTER PH

	House 1 Treated	House 2 Control	House 3 Treated	House 4 Control
Before PLT® Treatment	9.2	9.1	8.6	8.7
After PLT® Treatment	2.4	9.1	1.9	8.7

### Farm D - TOTAL BIRD WEIGHT AT PROCESSING BY HOUSE

House	Total Weight (lbs.)
1 - PLT® Treated	132,045
2 - Control	128,023
3 - PLT® Treated	134,912
4 - Control	129,978

### Farm D - TOTAL BIRD WEIGHT

PLT® Treated Houses	266,957
Control Houses	258,001
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PLT® Advantage (2-house avg.)	8,956 lbs.



## Farm D - FUEL COSTS BY HOUSE

House	Cubic ft. Fuel Used	Fuel Cost
1 - PLT®	240	\$636.00
2 - Control	523	\$1,385.95
3 - PLT®	262	\$694.30
4 - Control	489	\$1,295.85

## Farm D - TOTAL FUEL COST

PLT® Treated Houses	\$1,330.30
Control Houses	\$2,681.80
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PLT® Advantage	\$1,351.50
PLT® Product Cost \$160 (\$80/hse., third hse. brooding)	
Total Fuel Cost Advantage PLT®	\$1,191.50

## Farm D - FUEL USAGE (CUBIC FT.) AND COSTS DURING BROODING PERIOD

	House 1 PLT®	House 2 Control	House 3 PLT®	House 4 Control
Week 1	64 / \$170	124 / \$329	57 / \$151	109 / \$289
Week 2	75 / \$199	192 / \$509	78 / \$207	139 / \$368
Week 3	83 / \$220	155 / \$411	89 / \$236	148 / \$392
Brood Total	190 / \$589	471 / \$1,248	190 / \$594	396 / \$1,049

### PLT® Advantage (avg. all houses)

**487 cubic ft. less fuel, reduced cost by \$1,114**

Brooding fuel cost savings minus PLT® cost (\$80/house divided by 3 weeks) **\$1,045.43**

**Third house brooding**

Figures 13 through 16 present data for farm D including ammonia levels during the grow-out, fuel usage, ammonia levels compared to fuel usage, and fan times compared to fuel usage.

## Discussion

### Litter pH:

**Litter pH was significantly reduced** in all PLT® treated houses on all 4 farms. Litter pH was reduced from an average of **8.25 down to an average of 1.83** in the treated houses.

### Total Bird Weight:

Bird weight was increased in the PLT® treated houses compared to the controls on all 4 farms. **Weight improvement** compared to untreated control houses ranged from 1,340 pounds to 13,807 pounds, **averaging 7,278 pounds per farm** improvement in PLT® treated houses (2 of 4 houses per farm).

Bird weight improvement in PLT® treated houses is in addition to fuel savings and results in significant cost savings compared to untreated houses. With an average cost per pound of meat production at 30.5 cents, the following savings were gained by increased weights in the PLT® treated houses on each farm:

<b>Farm A</b>	<b>\$1,527.44</b>
<b>Farm B</b>	<b>\$ 408.75</b>
<b>Farm C</b>	<b>\$4,230.35</b>
<b>Farm D</b>	<b>\$2,731.58</b>

**Average revenue generation from weight gain for the 4 farm trial is \$2,224.52 per farm (\$1112.26/house).**

### Fuel Costs:

**Fuel costs in all PLT® treated houses on all farms were significantly lower** than fuel costs in untreated houses. PLT® eliminated ammonia in the treated houses allowing reduced fan times and less loss of heat resulting in reduced fuel costs. Fuel costs for the **entire 7 week grow-out** were reduced in the PLT® treated houses by an **average of \$1,202.88 per farm**. (\$1,002.88 per farm with PLT® cost subtracted) compared to untreated houses on the same farm.

Fuel costs during the **brooding period** were reduced in the PLT® treated houses by an **average of \$783.61 per farm** compared to untreated houses on the same farm. Varying housing, equipment, and management styles produced a range of fuel savings during the brooding period from \$362.29 to \$1,045.43 (all figures represent costs and savings minus PLT® cost).

Fuel savings from PLT® use more than offset PLT® cost. Fuel savings were also combined with improved weight gain in birds from PLT® treated houses resulting in further savings.

### Ammonia Control:

**PLT® treated houses had significantly lower ammonia levels** than untreated houses on all 4 farms. Lowered ammonia levels through the brooding period allowed for reduced fan times, less heat loss, and significant fuel savings.

### Litter Cost Savings:

**Litter cost savings were significant on all 4 farms** in the PLT® treated houses. PLT® lowered the litter pH dramatically and prevented ammonia levels from rising and causing stress to chicks. PLT® allows the reuse of litter and provides a less stressful environment for brooding.

Litter use is a controversial environmental issue. Materials used as poultry house litter may be used for other applications and the poultry industry's use of these materials is often viewed by environmental groups and some communities as unnecessary and wasteful. New litter costs are rising in most areas of the United States and litter availability is declining rapidly. Disposal and further application of used litter is also viewed as an environmental concern. The spreading of used litter on fields is not always accepted in some communities. These conditions have caused many poultry integrators to reuse litter for several flocks or several years.

On the **South Carolina farms**, new litter cost is \$800 for the whole house and \$400 for the brood chamber (half house brooding). Used litter disposal costs are \$700 per house. **Total litter costs per house are \$1,500.** These costs are saved with PLT®. On the **Maryland farms** the new litter cost is \$1,515 for the whole house and \$305 for the brood chamber (third house brooding). Litter disposal costs are \$210 per house. **Total cost savings per house for litter reuse are \$1,725.** These savings by using PLT® are added to fuel savings and added bird weight profits and the **average litter cost savings for the four farms was \$1,612.50 per house.**

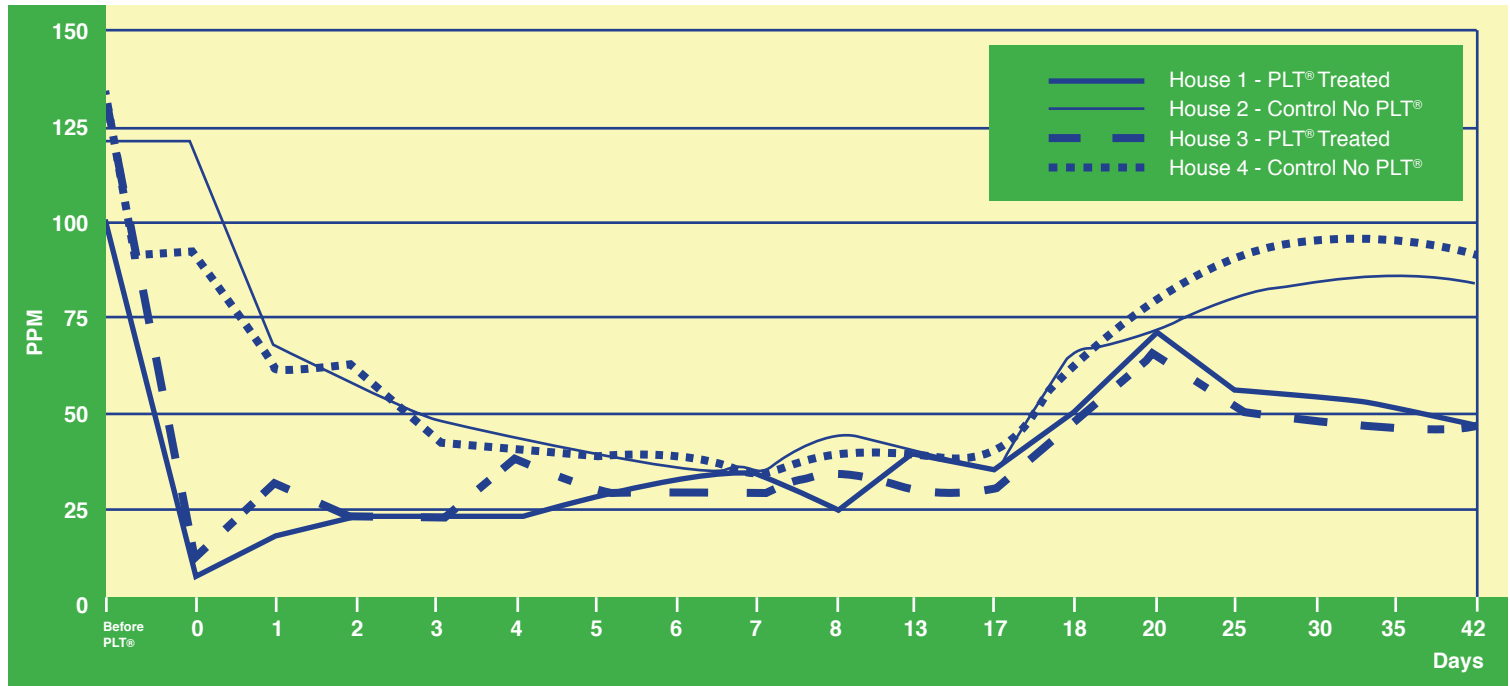
### Conclusion

Poultry Litter Treatment (PLT®) effectively lowers poultry house litter pH and ammonia levels. These benefits allow for reduced fan times, significantly lowered fuel costs, and improved bird weight resulting in significant cost savings and improved profits. Profits gained by PLT® usage are significant when considering, increased bird weight, reduced ammonia and fuel usage, and elimination of litter costs.

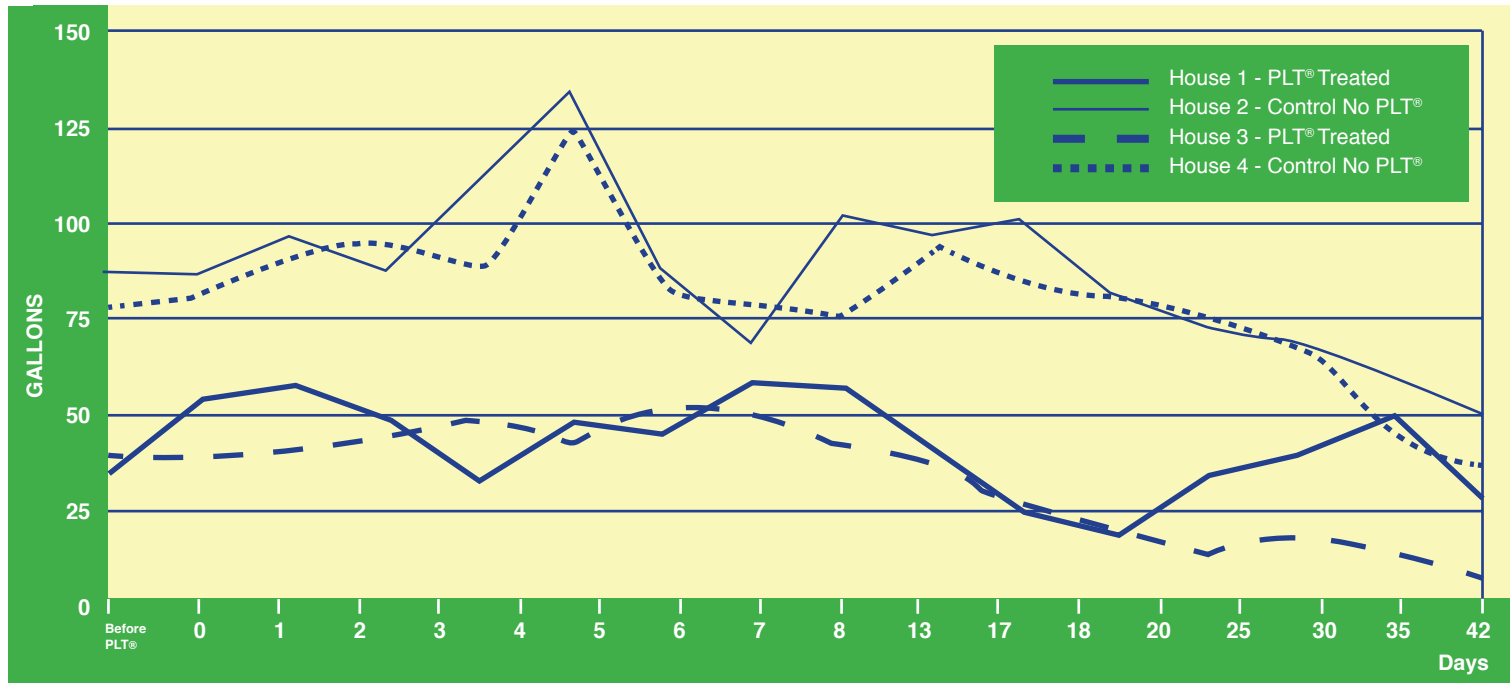


## Farm A

### Ammonia (ppm) Levels During Grow-Out

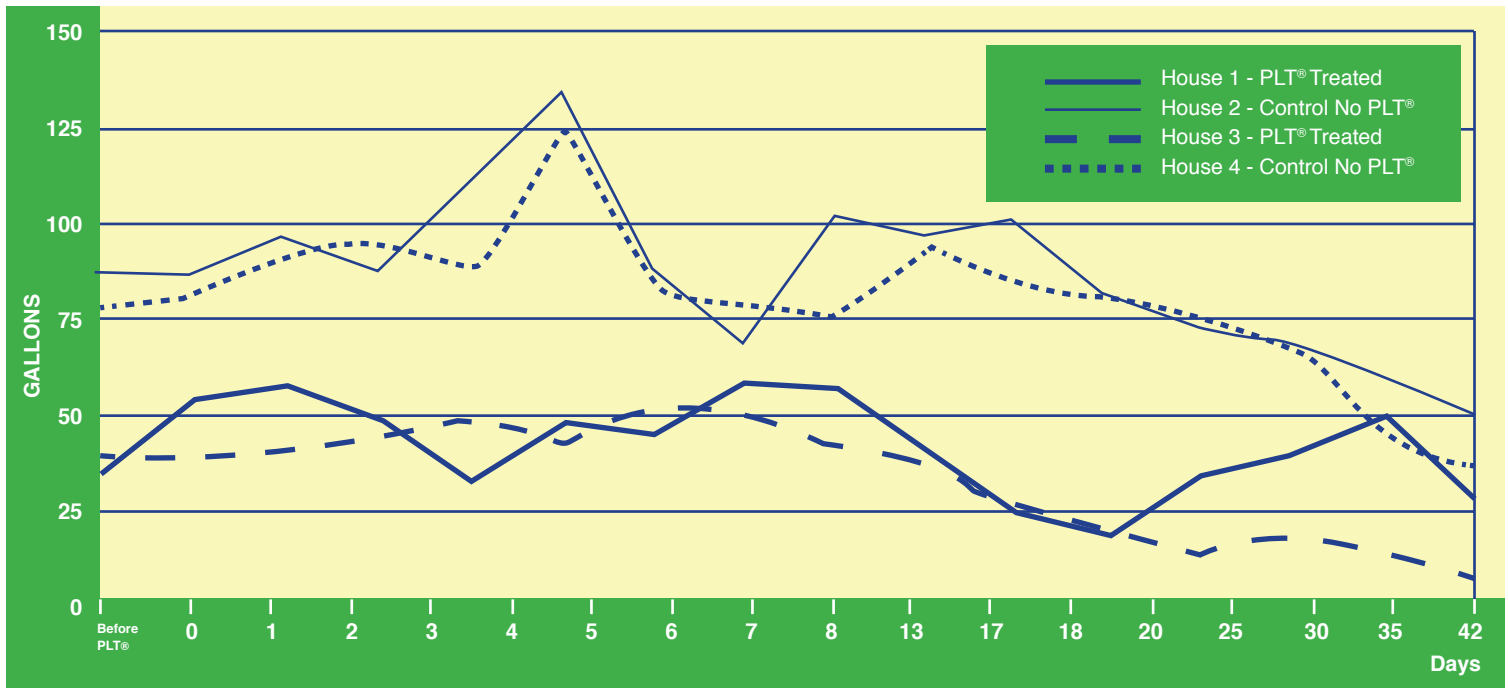


### Fuel Usage (gal.) During Grow-Out (Cubic foot formula: ft<sup>3</sup> x 100 x 1.66/36.28 = gals. used)

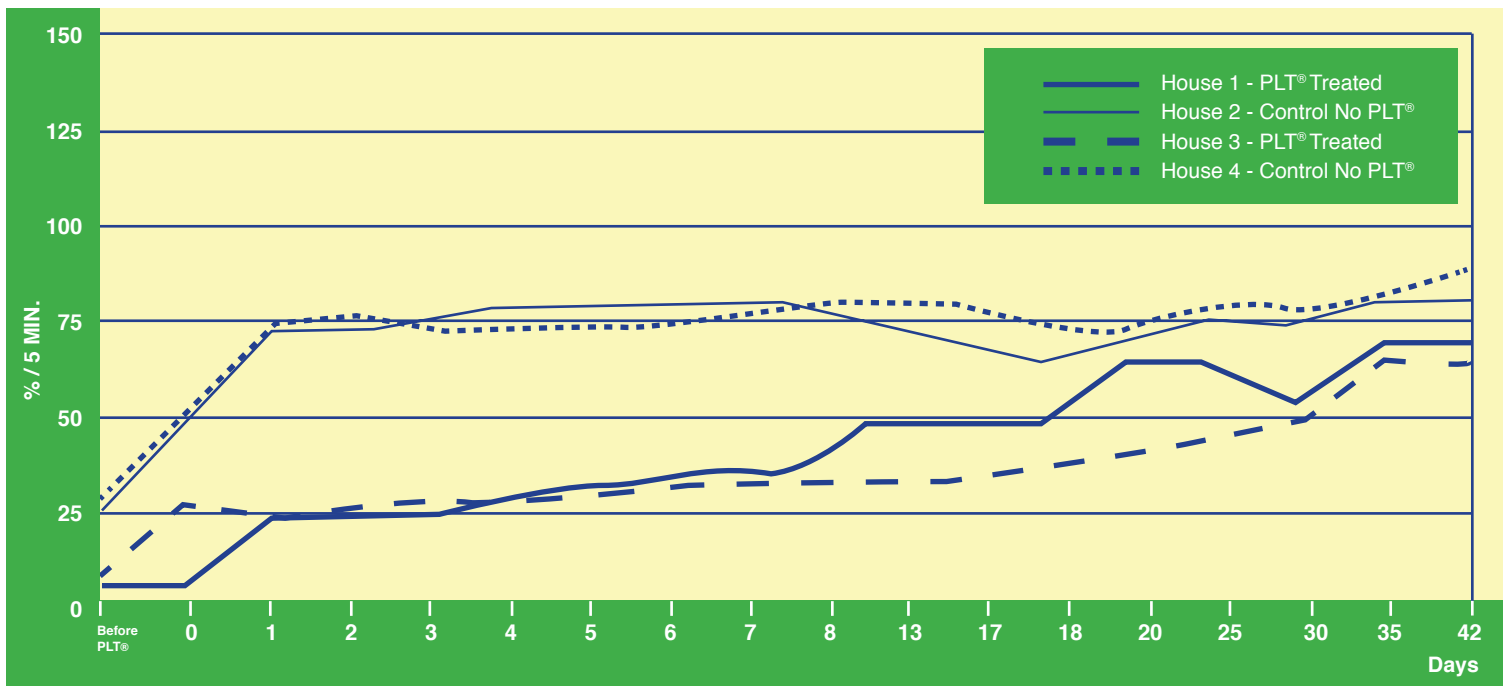


## FAN TIME COMPARED TO FUEL USAGE

Fuel Usage (gal.) During Grow-Out  
 (Cubic foot formula:  $\text{ft}^3 \times 100 \times 1.66/36.28 = \text{gals. used}$ )

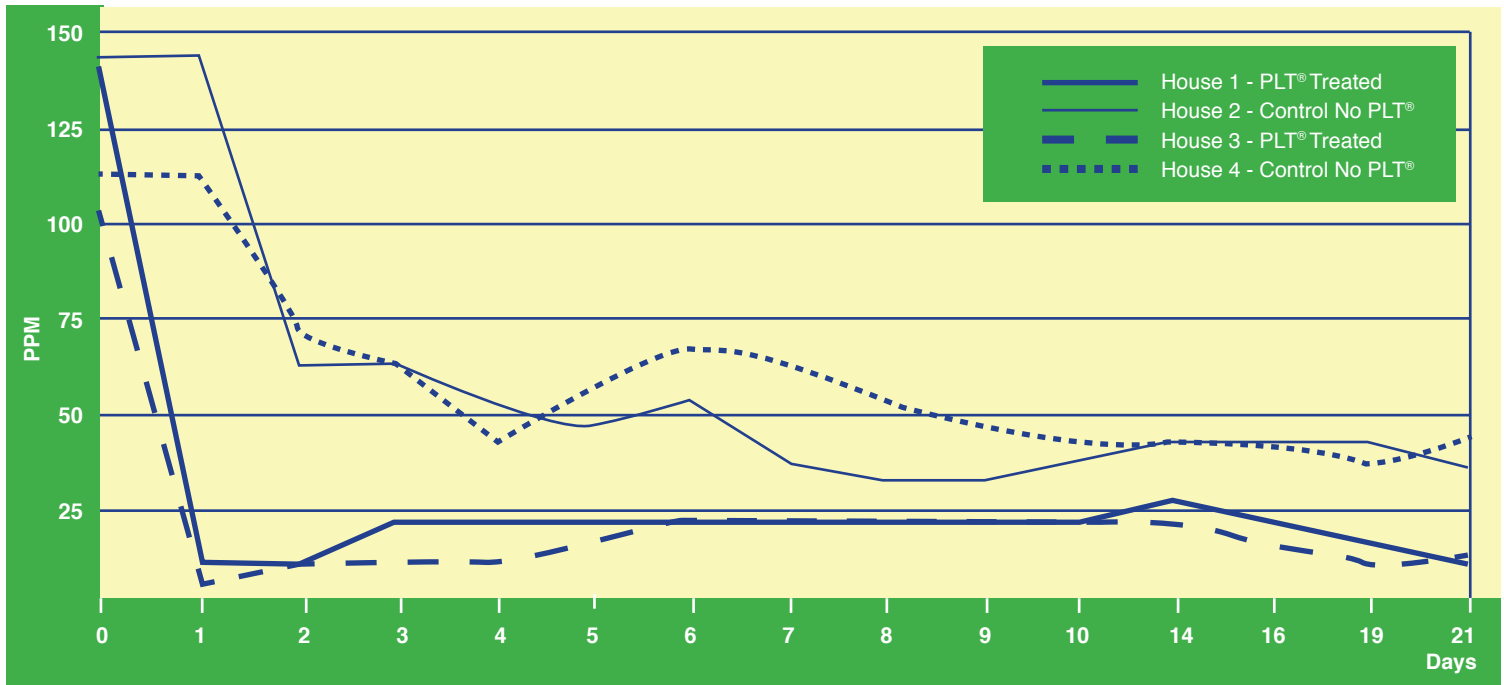


## Fan Time (%/5min.) During Grow-out

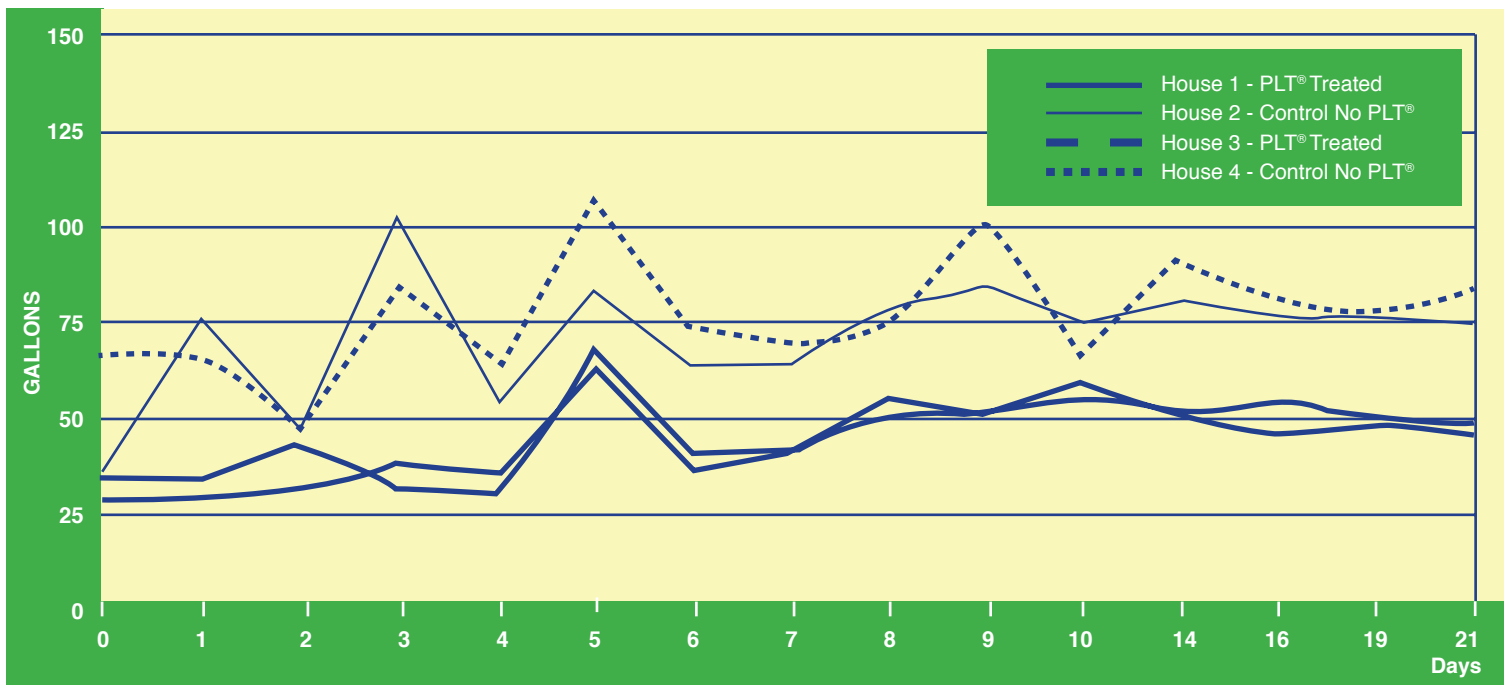


## Farm B

### Ammonia (ppm) Levels During First 21 Days

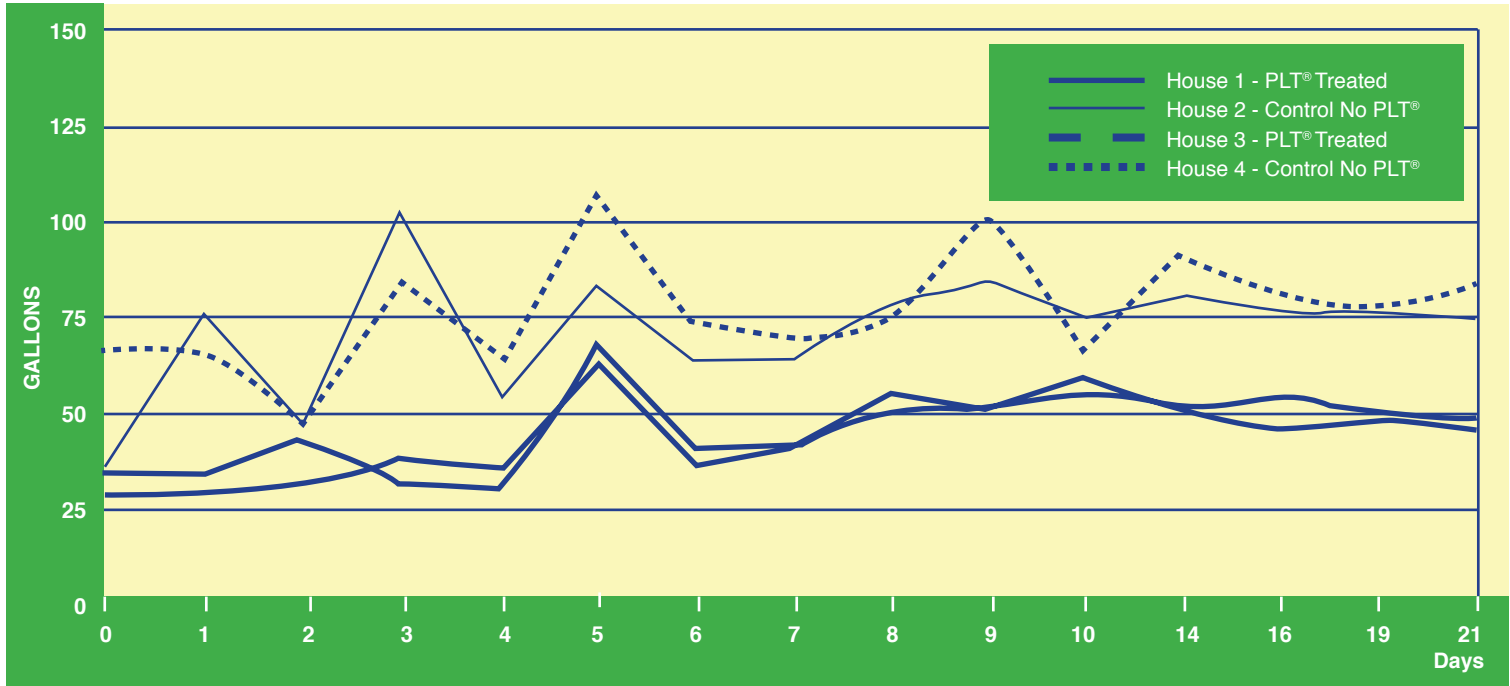


### Fuel Usage (gals.) During First 21 Days

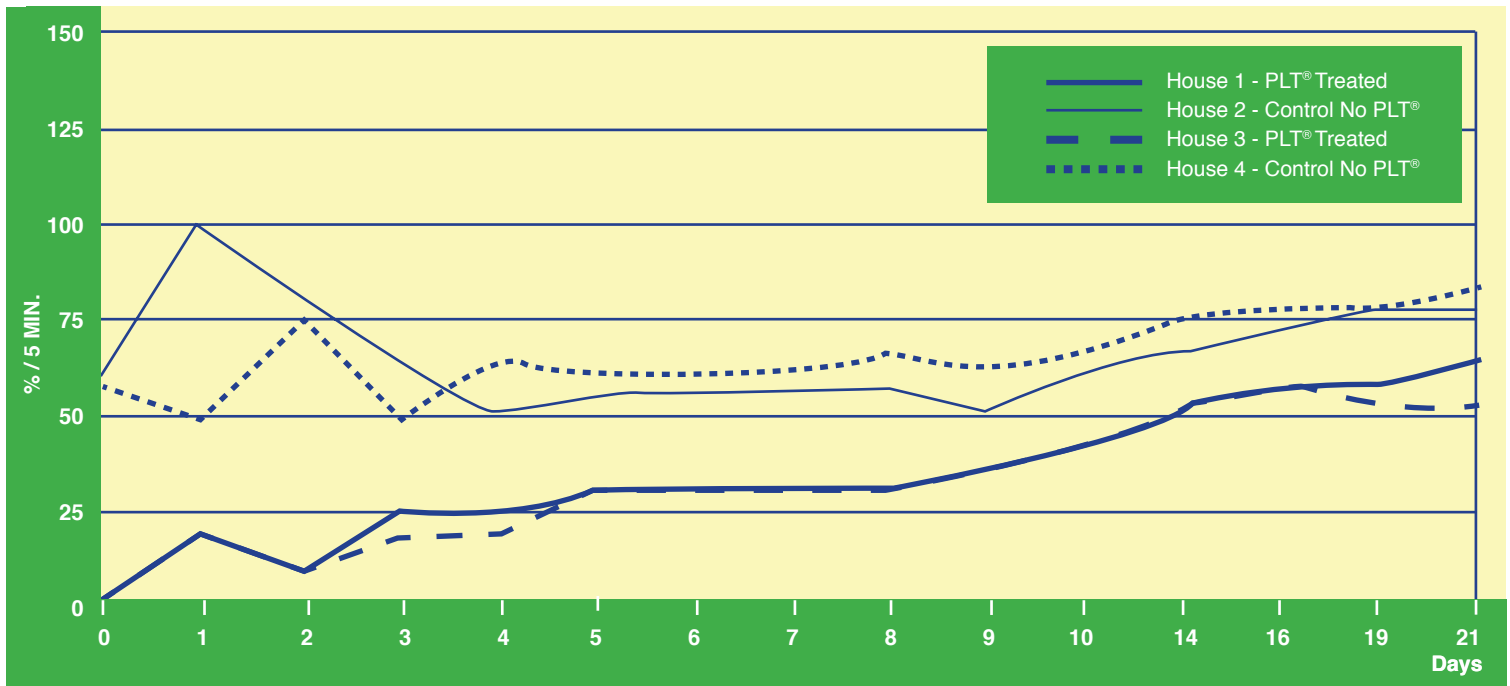


## FAN TIME COMPARED TO FUEL USAGE

### Fuel Usage (gal.) During First 21 Days

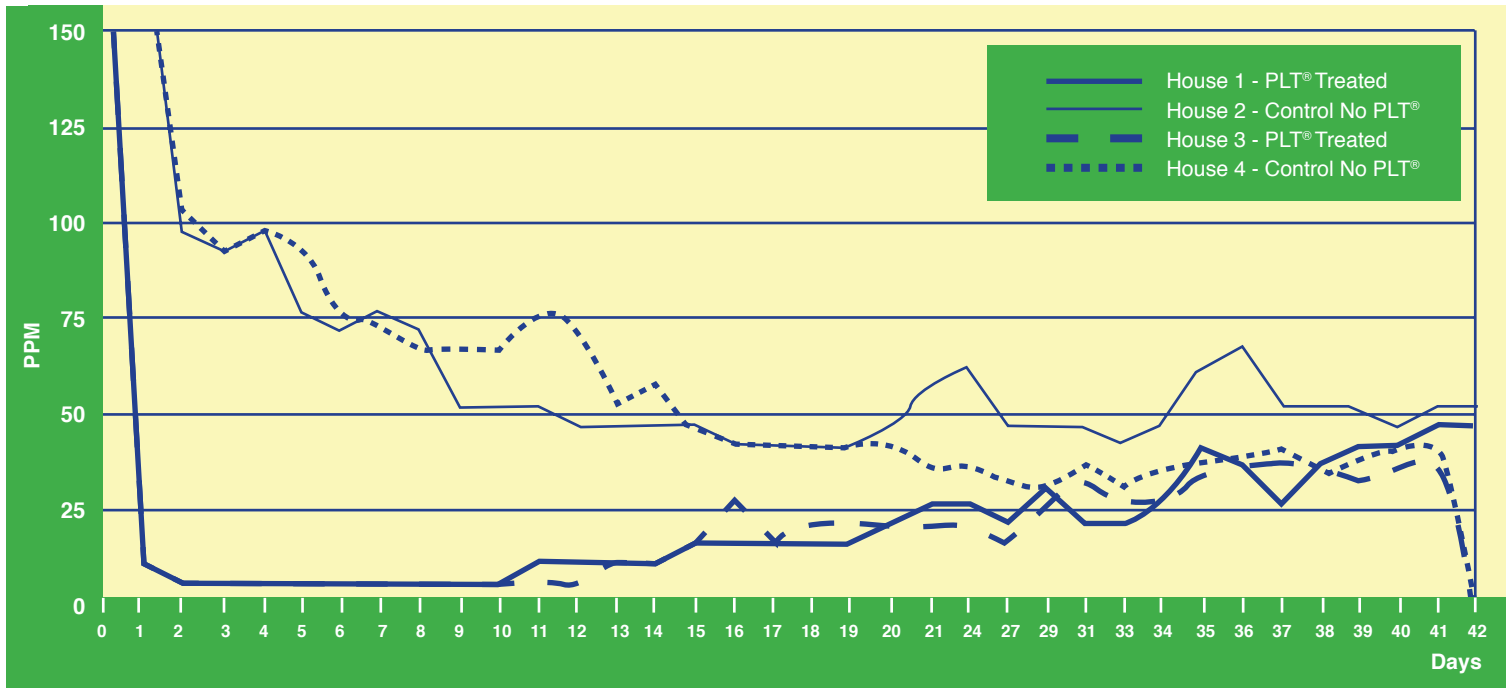


### Fan Time (%/5min.) During First 21 Days

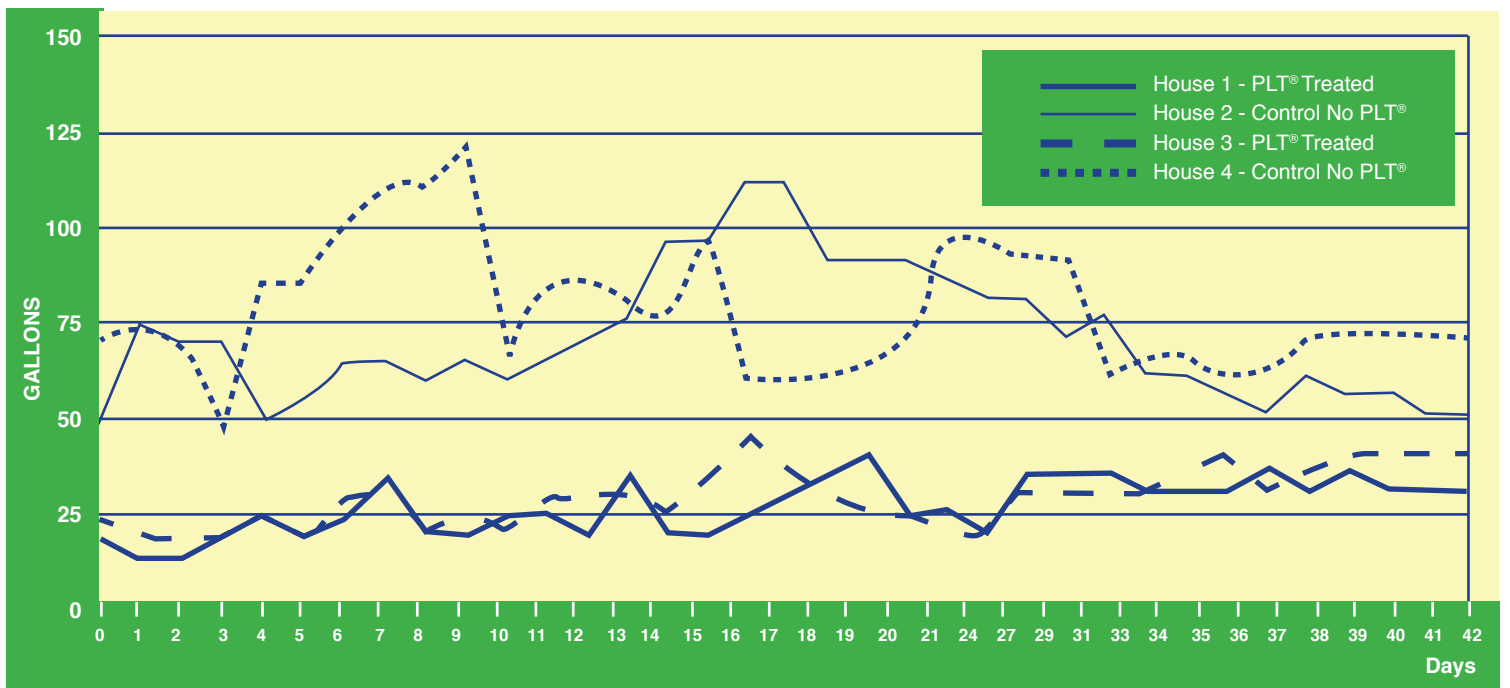


# Farm C

## Ammonia (ppm) Levels During Grow-out



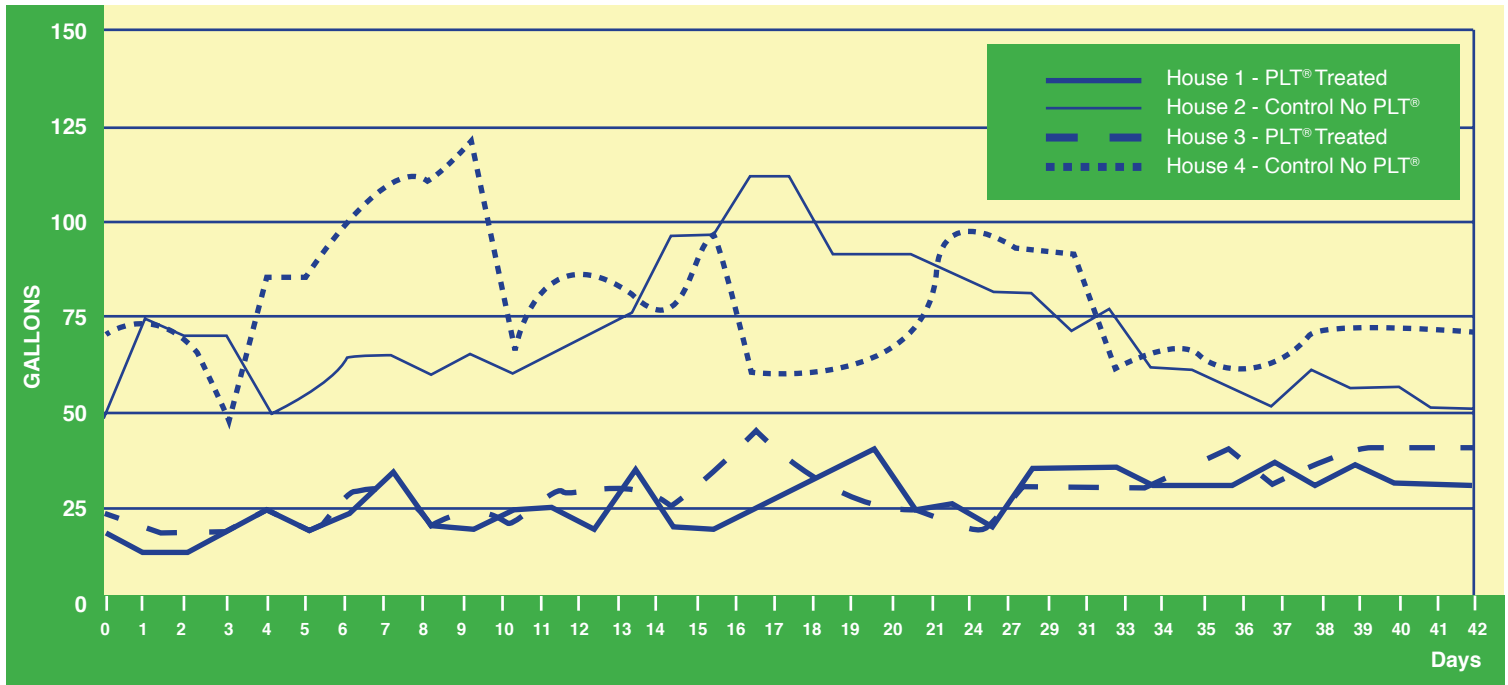
## Fuel Usage (gals.) During Grow-out



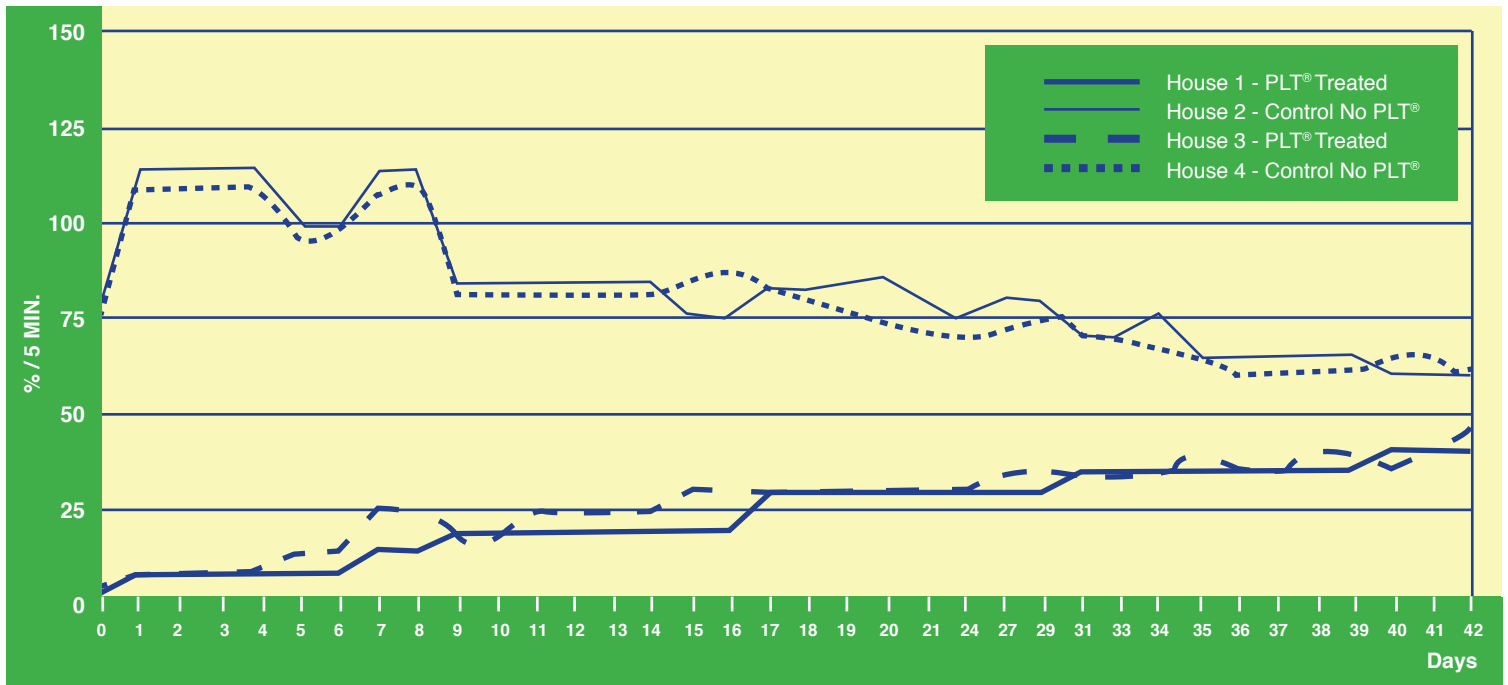


## FAN TIME COMPARED TO FUEL USAGE

### Fuel Usage (gal.) During Grow-out

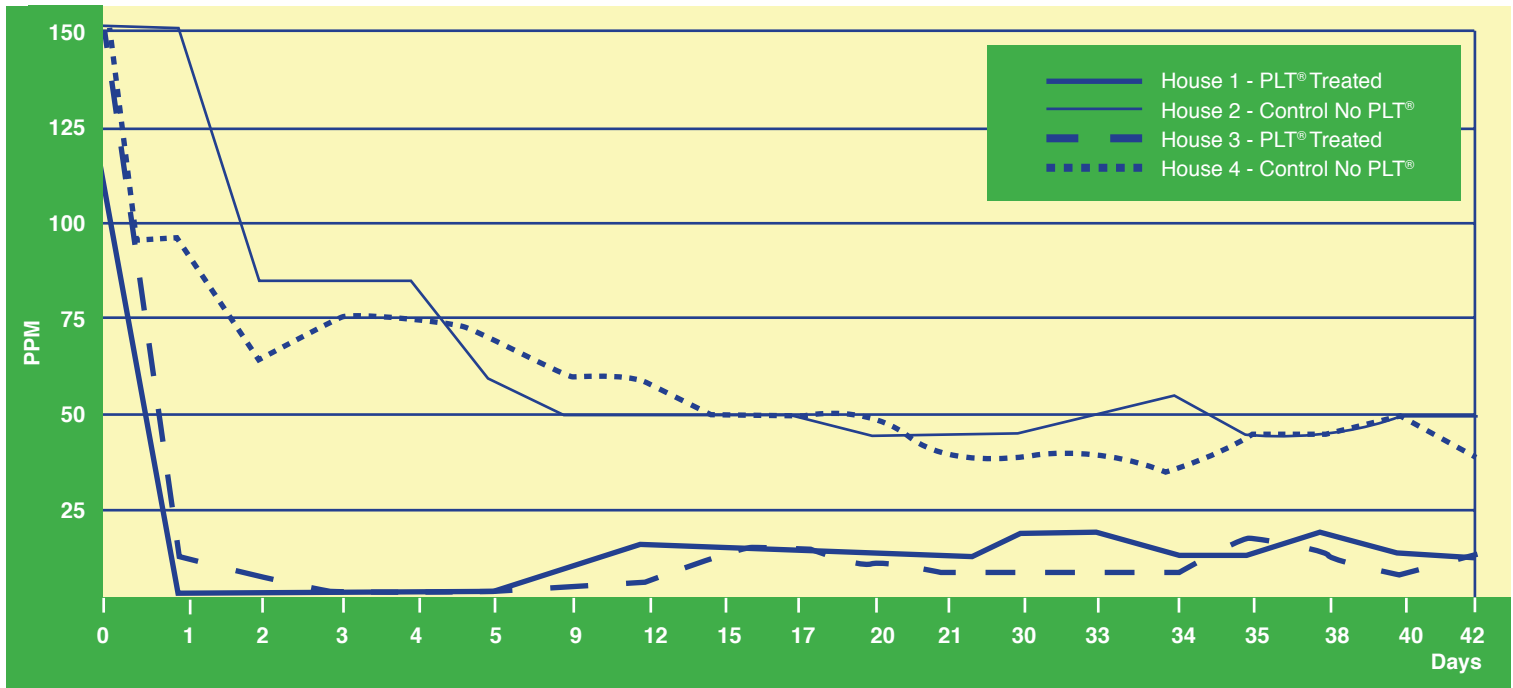


### Fan Time (0/5min.) During Grow-out

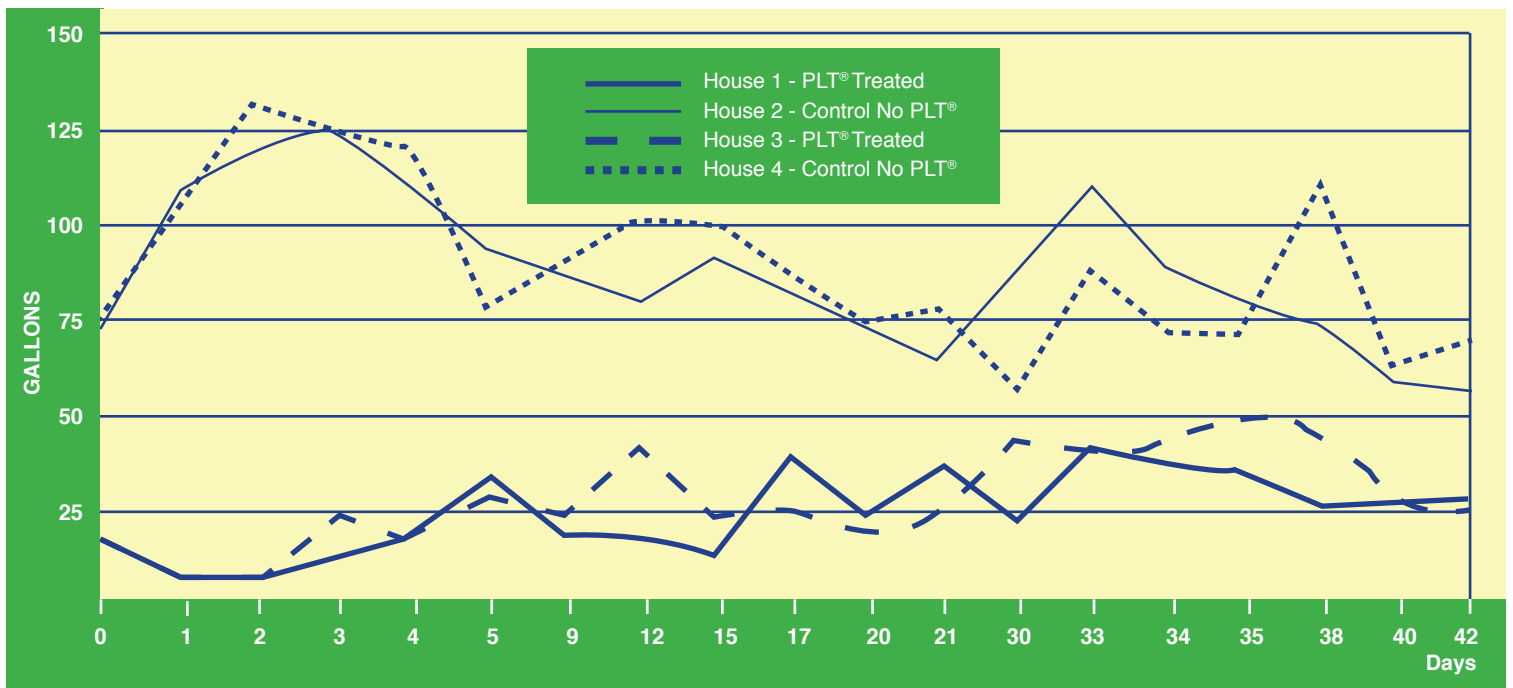


# Farm D

## Ammonia (ppm) Levels During Grow-out

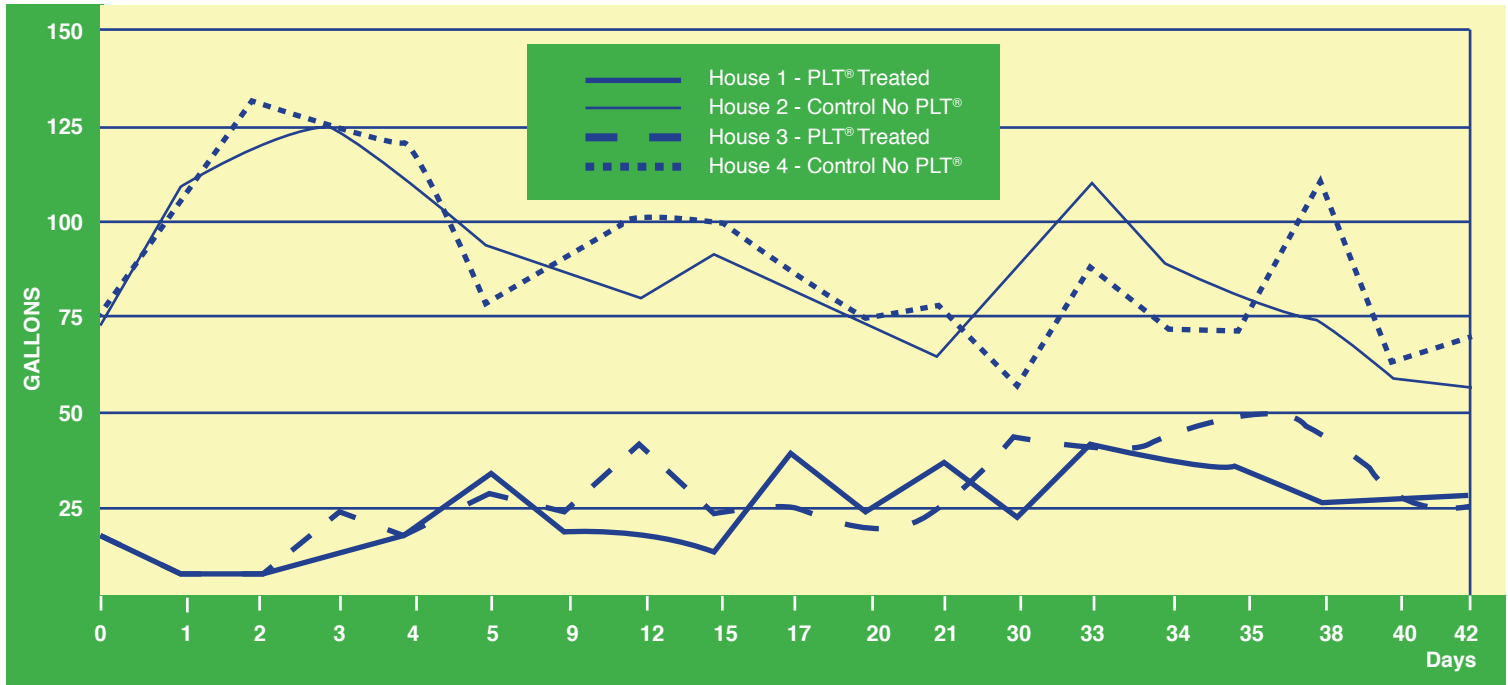


## Fuel Usage (gals.) During Grow-out



## FAN TIME COMPARED TO FUEL USAGE

### Fuel Usage (gal.) During Grow-out



### Fan Time (%/5min.) During Grow-out

