BIBIOGRAPHY

PACSI, FREDDIE D. APRIL 2012. The Effect of Raw Oyster Mushroom (*Pleurotusostreatus*) on the Carcass Yield and Quality of Broilers. Benguet State University, La Trinidad, Benguet

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ABSTRACT

The study was conducted at the Benguet State University Meat Laboratory, Balili, La Trinidad, Benguet to determine the effect of raw mushroom on the carcass yield and quality of broilers.

A total of 12 cobb broilers were randomly selected from four treatments. Each bird represents one replicate making a total of 3 replicates per treatment.

The result of the study shows that there are no significant differences among the treatments in terms of slaughter weight, dressed weight, dressing percentage and bone percentage. However, in terms of lean percentage, fat percentage and skin percentage there are highly significant, significant and highly significant differences respectively. Among the treatments Treatment 3 which is commercial feeds + 150 grams of oyster mushroom gives the best result.

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INTRODUCTION

Poultry production started since man learns to domesticate wild birds. During ancient times the people are purely hunters and gatherers. People need to hunt to acquire poultry meat, but as the time goes by they learned to domesticate them. They mainly raised birds for personal consumption to secure supply of meat when time and weather is a hindrance for hunting.

Today, poultry production is one of the most promising enterprises when it comes to animal industry. One main reason is that poultry meat is not a culturally restricted food; another is that vegetarians also consume eggs which are product of poultry.

Consumers today are becoming health conscious especially when it comes to food; they are strict in selecting meat as part of their diet. Most of them want high quality meat at affordable price. People who has high cholesterol level or who has high blood pressure preferred to eat poultry meat because of the ease of fat separation compared to other meat type. In the case of broiler production, researches nowadays are aiming to formulate rations that will produce high quality of meat which will meet the taste of consumers.

Oyster mushroom has been found to natural contain a statin drug known as lovastin (brand name: Mevacor, Altoprev) a drug used to lower cholesterol. Tests have shown that oyster mushroom contains up to 2.8% lovastin on a dry weight basis. Animal research has shown that oyster mushroom consumption lowers cholesterol level (Anonymous, 2011).

This study is a continuation of a concluded growth study which is consisted of 1 45 day breeding trial.

This study was conducted to find out the effect of dried non marketable Oyster mushroom on the carcass yield and quality of broiler chicken. The result of this study can

serve as a guide in using raw non-marketable oyster mushroom as a feed supplement to broilers.

This study generally aimed to determine the effect of non-marketable oyster mushroom on the carcass yield and quality of broiler.

Specifically, it aimed to:

1. determine the effect of raw oyster mushroom on the dressing percentage of Broiler under La Trinidad, Benguet condition.

2. determine the percentage of the lean, the bone, the skin, and the abdominal fat of the carcass produced from broilers that will be supplemented with raw mushroom; and

3. determine the level of raw mushroom that will give the best quality of broiler carcass.

The study was conducted at the Benguet State University Meat Laboratory at Balili, La Trinidad, Benguet on December 2011.

REVIEW OF LITERATURE

Poultry are domesticated birds that are bred specially to provide meat and eggs for Human consumption. Broilers are breed mainly for meat production. These birds are specifically bred from the Light Sussex cross for rapid weight gain, white flesh, long body and great breast meat development (Wilson, 1998).

Improvement of broiler carcass quality by usual selection techniques was studied during eight generation in synthetic line of fast growing chickens. Foundation stocks were obtain by crossing several commercial and experimental lines and were then maintained without selection pressure as a random control line. The so called quality line were obtain from this control line to give birds with low abdominal fat percentage, high breast meat yield and body weight as high as possible. Lowering abdominal fat content was more difficult to obtain than improving breast yield because of negative correlation existing between those two characteristics. Nevertheless good results were achieved, in eight generation of selection, birds from selected line were 8% heavier than control, abdominal fat percentage was 21% lower and pectoral muscle percentage was 11% higher. Higher breast angles were obtained in selected birds that means a better carcass confirmation (Richard *et al.*, 2011).

One of the main reasons poultry has enjoyed an increasing trend of consumption is because of its nutritional value, low fat content, and unsaturated fat type. Further more, because it is mainly associated with the skin, most poultry fat can be easily removed by removing the skin. In contrast, a greater proportion of fats in red meats are founded dispersed throughout the lean making it harder to remove. Cholesterol is also lower in poultry due to the ease of fat separation if desired (Pond, 2000).

Abdominal and subcutaneous fats are regarded as the main source of waste in slaughter houses. The objective of the current study was to estimate genetic parameters for fat deposition in the3 different parts of the body and their relationship with other carcass traits of the meat type chicken. Heritability estimates for abdominal fat percentage as a measure of subcutaneous fat, and intramuscular fat percentage were 0.71, 0.24, and 0.08 respectively (Zerehdaran *et al.,* 2004).

The following factors are considered in judging dressed market poultry on the basis of quality of an individual carcass (Clark and Shepherd, 1955):

1. Confirmation
2. Fleshing
3. Fat covering
4. Freedom from pinfeathers
5. Freedom from cuts, tear, disjoints, and broken bones
6. Freedom from discoloration of the skin, flesh blemishes and bruises
7. Freedom from freezer burns

Oyster mushroom (*Pleurotus ostreatus*) is a fleshy, gilled mushroom growing in shelf-like fashion on wood, sawdust, or straw that is good food and promising medicinal value. Protein quality is nearly equal to animal derived protein. Low fat content is mostly of good unsaturated kind. It has all the mineral salt required by the human body, such as calcium, phosphorus and iron, in twice amounts contained in pork, beef and chicken meat. It has the highest content of vitamin B_1 and B_2. It has 5 to10 times richer in niacin than any other vegetable. This mushroom shows the activity against cancer and high cholesterol. It is rich in folic acid which can prevent and cure anemia. Oyster mushroom has been used to

relax muscle and to resist leakage of blood vessels. According to country line mushroom (2003) the following nutrients are found on 100 grams of fresh oyster mushroom.

Nutrients	Nutrient Value
Calories	38 kcal
Protein	15%-25%
Fat	2.2 g
Vitamin B1 (Thiamine)	0.56 mg
Vitamin B2 (Riboflavin)	0.55 mg
Vitamin B3 (Niacin)	12.2 mg
Fiber	2.8 g
Carbohydrate	6.5 g
Phosphorus	140 mg
Calcium	28 mg
Iron	1.7 mg

MATERIALS AND METHOD

Materials

The different materials used are 12 heads of 45 day-old broiler chicken, knives, containers, weighing scales, cooking pot, record books and writing pen.

Birds fed with raw mushroom were used in this study. Three healthy birds were taken from each of the four treatments of the previous study of to serve as samples for carcass evaluation. Each bird represented one replicate, making a total of three replications per treatment. The treatments administered to the birds are as follows:

T_0- Commercial feeds only

T_1- Commercial feeds + 50 grams raw mushroom

T_2- Commercial feeds + 100 grams raw mushroom

T_3- Commercial feeds + 150 grams raw mushroom

Carcass Yield Evaluation

Prior to slaughtering, the birds were confined in cages and fasted for eight hours but provided with abundant water. The live weight of the fasted birds was taken individually and was recorded as the slaughter weight. Upon plucking, the dressed weight was recorded with the head, feet and entrails separated from the body.

Carcass Quality Evaluation

Carcass quality was measured through leanness, low fat content, and with minimal bone percentage. The lean, bone, skin and the fat portions were separated from the carcass and then weighed individually. The individual weights were recorded then expressed into percentage of the slaughter weight to eliminate differences due to the body weights at slaughter.

The following parameters were gathered from the study:

1. Slaughter weight (kg). This was the weight of fasted broiler prior to slaughter.

2. Dressed weight (kg). This was the actual weight of the slaughtered bird after plucking with the head, feet, and entrails removed from the body.

3. Dressing percentage. This was obtained by dividing the dressed weight over the slaughter weight then multiplying it by 100.

4. Percentage of the lean. This was obtained by dividing the weight of the lean over the dressed weight then multiplying it by 100.

5. Percentage of the bone. This was obtained by dividing the weight of the bones over the dressed weight then multiplying it by 100.

6. Percentage of the skin. This was obtained by dividing the weight of the skin over the dressed weight then multiplying it by 100.

7. Percentage of the fat. This was obtained by dividing the weight of the fat over the dressed weight then multiplying it by 100.

Data Analysis

Data were analyzed using the analysis of variance for Completely Randomized Design and treatment means using Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Slaughter Weight

Table 1 shows the recorded result of slaughter weight. It can be perceived from the table that the uniformity of the sample birds was considered prior to slaughter as confirmed by non-significant differences in statistical analysis. This result is expected because birds with more or less were similar weights consciously selected.

Dressed Weight

Table 2 shows that dressed weight goes with slaughter weight. Although numerical differences can be seen, statistical analysis revealed that the parameter was more or less the same for all treatments.

Table 1. Slaughter weight of the birds

TREATMENT	SLAUGHTER WEIGHT (kg)
Commercial feeds	1.616[a]
Commercial feeds + 50 g raw mushroom	1.533[a]
Commercial feeds + 100 g raw mushroom	1.466[a]
Commercial feeds + 150 g raw mushroom	1.416[a]

Table 2. Dressed weight of the birds

TREATMENT	DRESSED WEIGHT (kg)
Commercial feeds	1.23[a]
Commercial feeds + 50 g raw mushroom	1.10[a]
Commercial feeds + 100 g raw mushroom	1.05[a]
Commercial feeds + 150 g raw mushroom	1.00[a]

Dressing Percentage

Table 3 shows the computed dressing percentage of the sample birds. There is no significant difference on its statistical analysis. The controlled treatment had an average dressing percentage of 76.33% while the birds fed commercial feeds + 50 grams raw mushroom has 71.86% followed by commercial feeds + 100 grams raw mushroom which is 71.56 and lastly commercial feeds + 150 grams raw mushroom with 70.56 average.

Lean Percentage

Table 4 shows the percentage of lean among the treatments. Based on the raw data gathered, commercial feeds + 150 grams raw mushroom gave the best result averaging 66.84%, followed by commercial feeds + 100 grams raw mushroom which is 65.55 then pure commercial feeds with 63.49% and lastly pure commercial feeds + 50 grams raw mushroom with 63.44%. Despite analogous lean weights, significant variation was observed in the lean:dressed weight ratio. The result proves that oyster mushroom contains quality protein that makes the experimental animals leaner.

Table 3. Dressing percentage of the birds

TREATMENT	DRESSING PERCENTAGE (%)
Commercial feeds	76.34[a]
Commercial feeds + 50 grams raw mushroom	71.86[a]
Commercial feeds + 100 grams raw mushroom	71.57[a]
Commercial feeds + 150 grams raw mushroom	70.56[a]

*Means with the same letter superscripts are not significantly different at 5% level of significance by DMRT

Bone Percentage

Table 5 shows the computed bone percentage. Statistics show that there are no significant differences among the treatments. The data reveals that in terms of weight, the bones of smaller animals are lighter but when expressed as a percentage of dressed weight, all birds yielded a proportion of 18% bone.

Table 4. Lean percentage

TREATMENT	DRESSED WEIGHT	LEAN WEIGHT	LEAN PERCENTAGE
Commercial feeds	1.233	0.783	63.50[c]
Commercial feeds + 50g raw mushroom	1.100	0.698	63.45[c]
Commercial feeds + 100g raw mushroom	1.050	0.688	65.54[b]
Commercial feeds + 150g raw mushroom	1.00	0.668	66.84[a]

Table 5. Bone percentage

TREATMENT	DRESSED WEIGHT	BONE WEIGHT	BONE PERCENTAGE
Commercial feeds	1.233	0.226[a]	18.41
Commercial feeds + 50g raw mushroom	1.100	0.206[ab]	18.81
Commercial feeds + 100g raw mushroom	1.050	0.191[b]	18.28
Commercial feeds + 150g raw mushroom	1.00	0.186[b]	18.67

Percentage of Fat

Table 6 presents the fat percentage. The control birds fed commercial feeds only had the highest fat percentage while the birds fed 150 g mushroom deposited the least amount of fat. Meanwhile, the fat percentage gathered from the birds fed 50 g mushroom was comparable to the control and the birds fed 100 g were close in percent fat values to those fed 150 g. This observation supports the claim that oyster mushroom contains lovastin which lowers fat and cholesterol in humans.

Percentage of Skin

Table 7 presents the skin percentage. Statistical result shows that there are highly significant differences among treatments in terms of skin percentage. The birds fed commercial feeds only, commercial feeds + 50 g raw mushroom and commercial feeds + 100 g raw mushroom had higher skin weights compared to that of the birds fed commercial feeds + 150 g raw mushroom. Subcutaneous fats as associated with the skin, therefore, commercial feeds + 150 g raw mushroom which has the least fat percentage has the

Table 6. Fat percentage

TREATMENT	DRESSED WEIGHT	LEAN WEIGHT	LEAN PERCENTAGE
Commercial feeds	1.233	0.58[a]	4.70[a]
Commercial feeds + 50g raw mushroom	1.00	0.48[ab]	4.38[ab]
Commercial feeds + 100g raw mushroom	1.050	0.36[b]	3.46[bc]
Commercial feeds + 150g raw mushroom	1.00	0.31[b]	3.13[c]

Table 7. Skin percentage

TREATMENT	DRESSED WEIGHT	SKIN WEIGHT	SKIN PERCENTAGE
Commercial feeds	1.233	0.165[a]	13.38[a]
Commercial feeds + 50g raw mushroom	1.100	0.146[ab]	13.35[a]
Commercial feeds + 100g raw mushroom	1.050	0.135[b]	12.68[a]
Commercial feeds + 150g raw mushroom	1.00	0.113[c]	11.34[b]

least skin percentage. Additionally, the lesser the skin, the healthier the carcass will be for consumers.

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted on December 2011 to determine the effect of fresh oyster mushroom on the carcass yield and quality of broilers (cob). The said mushroom used is non-marketable and used as feed supplement. It aimed to determine its effect on dressing percentage under La Trinidad condition and which level of mushroom gives the best result.

Results show that slaughter weight, dressed weight and dressing percentage did not vary significantly whether the birds were fed 100% commercial feeds, commercial feeds + 50 grams raw mushroom, commercial feeds + 100 grams raw mushroom or commercial feeds + 150 grams raw mushroom, respectively. The so-called control group reached an average of 1.6 kg per head, 1.5 kg for commercial feeds + 50 grams raw mushroom, 1.46 kg for commercial feeds + 100 grams raw mushroom and 1.41 for commercial feeds + 150 grams raw mushroom. The result was an outcome of purposive selection whereby birds for slaughter were meant to be of similar weights.

On the other hand, the results for lean percentage are different. Commercial feeds + 150 grams raw mushroom achieved the best with an average of 66.84%, followed by commercial feeds + 100 grams raw mushroom with 65.55%, 63.49% with commercial feeds only and 63.44% for commercial feeds + 50 grams raw mushroom. This shows that broilers fed with higher amount of oyster mushroom are more leaner than those broilers fed with lower amounts or none.

In terms of bone percentage, all of the birds had 18% bone:dressed weight proportion had no significant differences were observed.

As far as health is concerned, fat percentage must be low in contrast to lean. Commercial feeds + 150 g mushroom has the best result averaging 3.16%. The birds given commercial feeds + 100 g mushroom yield 3.46%, then 4.38% for commercial feeds + 50 g mushroom. The fat percentage from the birds fed commercial feeds only was the highest at 4.7%.

Skin also goes with fat percentage result because skin is associated with cholesterol. High percentage of it is not desirable. Therefore, commercial feeds + 150 g raw mushroom with least percentage of 11.34% gives the best result, followed by commercial feeds + 100 g mushroom of 12.68%. Commercial feeds + 50 g mushroom resulted to 13.34% skin and commercial feeds only in the control treatment had an effect of 13.37% skin.

Conclusion

It is therefore concluded that in terms of quality, higher amount of oyster mushroom results to higher lean and lower fat percentage.

Recommendation

Based on the results gathered, for better carcass quality and health benefits, it is recommended to use oyster mushroom as feed supplement at the level of 150 g.. It is also recommended to conduct further study on the nutrient content of the carcass or evaluate the effect of higher levels of mushroom.

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APPENDICES

Appendix Table 1. Slaughter weight (kg)

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	1.600	1.500	1.750	4.850	1.616
T_1	1.700	1.400	1.500	4.600	1.533
T_2	1.400	1.600	1.400	4.400	1.466
T_3	1.400	1.400	1.450	4.250	1.416
GRAND TOTAL				18.100	
GRAND MEAN					1.508

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	90625.00	30208.33	3.9189^{ns}	4.06	7.59
Error	8	6166.67	770833			
TOTAL	11	174166.67				

^{ns} = Not significant

Coefficient of variation = 7.66%

Appendix Table 2. Dressed weight (g)

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	1.150	1.200	1.350	3.700	1.233
T_1	1.200	1.050	1.050	3.300	1.100
T_2	0.950	1.150	1.050	3.150	1.050
T_3	0.950	1.050	1.050	3.000	1.000
GRAND TOTAL				13.150	
GRAND MEAN					1.095

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	90625.00	30208.33	3.9189^{ns}	4.06	7.59
Error	8	6166.67	770833			
TOTAL	11	152291.67				

^{ns} = Not significant Coefficient of variation = 8.01%

Appendix Table 3. Dressing percentage

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	71.87	80.00	77.34	229.01	76.34
T_1	70.58	75.00	70.00	215.58	71.86
T_2	67.85	71.87	75.00	214.72	71.57
T_3	67.85	71.42	72.41	211.68	70.56
GRAND TOTAL				870.99	
GRAND MEAN					72.58

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	59.1741	19.7247	1.8312^{ns}	4.06	7.59
Error	8	86.1735	10.77169			
TOTAL	11	145.3476				

^{ns} = Not significant Coefficient of variation = 4.52%

Appendix Table 4. Lean weight (kg)

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	0.725	0.765	0.850	2.350	0.783
T_1	0.770	0.660	0.665	2.095	0.698
T_2	0.620	0.750	0.695	2.065	0.688
T_3	0.635	0.675	0.695	2.005	0.668
GRAND TOTAL				8.515	
GRAND MEAN					0.709

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	90625.00	30208.33	3.9189^{ns}	4.06	7.59
Error	8	6166.67	770833			
TOTAL	11	152291.67				

^{ns} = Not significant

Coefficient of variation = 8.30%

Appendix Table 5. Bone weight (kg)

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	0.220	0.220	0.240	0.680	0.226
T_1	0.220	0.205	0.195	0.620	0.206
T_2	0.180	0.205	0.190	0.575	0.191
T_3	0.180	0.185	0.195	0.560	0.186
GRAND TOTAL				2.435	
GRAND MEAN					0.202

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	2906.2500	968.75	7.6230**	4.06	7.59
Error	8	1016.6667	127.0833			
TOTAL	11	3922.9167				

** = Highly significant

Coefficient of variation = 5.56%

Appendix Table 6. Fat weight (kg)

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	0.50	0.55	0.070	0.175	0.058
T_1	0.55	0.45	0.045	0.145	0.048
T_2	0.030	0.45	0.035	0.110	0.036
T_3	0.020	0.35	0.040	0.950	0.031
GRAND TOTAL				0.525	
GRAND MEAN					0.043

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	1289.5833	429.8611	5.5766*	4.06	7.59
Error	8	616.6667	77.08333			
TOTAL	11	1906.2500				

* = Significant Coefficient of variation = 20.07%

Appendix Table 7. Skin weight (kg)

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	0.155	0.160	0.180	0.495	0.165
T_1	0.155	0.140	0.145	0.440	0.146
T_2	0.125	0.150	0.130	0.405	0.135
T_3	0.115	0.105	0.340	0.340	0.113
GRAND TOTAL				1.680	
GRAND MEAN					0.140

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	4216.6667	1405.556	24.6558**	4.06	7.59
Error	8	933.3333	116.6667			
TOTAL	11	5150.000				

ns = Not significant

Coefficient of variation = 8.01%

Appendix Table 8. Lean percentage

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	63.04	63.75	63.70	190.49	63.50
T_1	64.16	62.85	63.33	190.34	63.45
T_2	65.23	65.21	66.19	196.63	65.54
T_3	66.84	67.50	66.19	200.53	66.84
GRAND TOTAL				777.99	
GRAND MEAN					64.83

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	24.7612	8.253719	24.6558**	4.06	7.59
Error	8	2.6781	0.334758			
TOTAL	11	27.4392				

** = Highly significant

Coefficient of variation = 0.89%

Appendix Table 9. Bone percentage

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	19.13	18.33	17.77	55.23	18.41
T_1	18.33	19.52	18.57	56.42	18.81
T_2	18.94	17.82	18.09	54.85	18.28
T_3	18.94	18.50	18.57	56.01	18.67
GRAND TOTAL				222.51	
GRAND MEAN					18.54

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	0.5123	0.170764	0.5418^{ns}	4.06	7.59
Error	8	2.5215	0.315192			
TOTAL	11	3.0338				

^{ns} = Not significant Coefficient of variation = 3.03%

Appendix Table 10. Fat percentage

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	4.35	4.58	5.18	14.11	4.70
T_1	4.58	4.28	4.28	13.14	4.38
T_2	3.15	3.91	3.33	10.39	3.46
T_3	2.10	3.50	3.80	9.40	3.13
GRAND TOTAL				47.04	
GRAND MEAN					3.92

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	4.9578	1.6526	5.5331*	4.06	7.59
Error	8	2.3894	0.298675			
TOTAL	11	7.3472				

* = Significant

Coefficient of variation = 13.94%

Appendix Table 11. Skin percentage

TREATMENT	REPLICATION I	II	III	TOTAL	MEAN
T_0	13.47	13.33	13.33	40.13	13.38
T_1	12.91	13.33	13.80	40.04	13.35
T_2	12.63	13.04	12.38	38.05	12.68
T_3	12.10	10.50	11.42	34.02	11.34
GRAND TOTAL				152.24	
GRAND MEAN					12.69

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARE	MEAN OF SQUARE	COMPUTED F	TABULAR F .05	.01
Treatment	3	8.1757	2.725222	11.3480**	4.06	7.59
Error	8	1.9212	0.24015			
TOTAL	11	10.0969				

** = Highly significant Coefficient of variation = 3.86%