

# How the Pineapple Leaf Residue Silage Influence the Finishing Pigs' Growing Performance and Biochemical Parameters of the Blood

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**Keywords:** pineapple leaf residue silage; the finishing pigs; average daily-weight gain; feed conversion ratio (FCR) ; economic benefits

**Abstract:** 40 mixed-copulated pigs (Du Changda) which is about 40kg and in the same age were divided into 4 groups named A, B, C, D in order to study the effects of pineapple leaf residue silage additive on the finishing pigs' performance and blood biochemical parameters. The ration in the experiment is fermented pineapple leaf residue silage which add 0% , 5% , 10% , 15%. After 90 days feeding experiment, we evaluate the physical development, performance and blood biochemical parameters of the finishing pigs.

The results demonstrated that the weight of every finishing pig in the control group A and the test group B, C, D had increased 68.76kg, 72.37kg, 70.47kg, 69.98kg. And the average daily-weight improved 766.25kg, 806.31kg, 785.25kg, 756.46kg. It showed that there was no profound effect in the fattening period of the pig, even though added 0%, 5%, 10%, 15%

pineapple leaf residue silage in the feed. Accordingly, adding 5% pineapple leaf residue silage in the feed was most effective. On the other hand, comparing the control group and the test group, there is clear difference between GPT (glutamic-pyruvic transaminase) and GOT (glutamic-oxaloacetic transaminase), but the ratio of GPT and GOT is not very obvious.

Compared with the control group and the test group, the ratio of creatinine, total cholesterol, cholesterol/triglycerides is also not clear. Therefore, adding the varying proportion pineapple leaf residue silage in the feed is safe and feasible, and is worth spreading and utilizing. Because there is no serious side effect upon pig's growth performance. On the contrary, it not only can promote the growth of finishing pigs, but also can enhance the quality of carcass.

## Introduction

In recent years, following the quick development of pineapple fibre in the south hot area, there are 2000 million tons of leaf residues after extracting the fibre from pineapple leaf each year. Most of those leaf residues have been abandoned and are not full. It is both wasting resources and polluting the environment. The research demonstrates that the leaf residue after extraction the fibre from pineapple fibre includes digested energy 5.48MJ/kg, prolific gross protein, crude fat, sugar content and nitrogen free extract<sup>[3]</sup>. The leaf residue is good feedstuff resource for animal by

fermented with feed.

At present, the research of utilizing pineapple leaf residue as animal feedstuffs is only in its infancy. Some researchers do the test that feed the milk cow with abandoned pineapple leaf residue silage in phases. The result shows that, instead of some concentrate feed, feeding the abandoned pineapple leaf residue silage increases milk production about 9.8%. It also improves the ratio of milk above 25.8°. The abandoned pineapple leaf residue silage can obviously decrease the feeding cost, and increase the milk production and the ratio of milk<sup>[9]</sup>. However, there is few research about the pineapple leaf residue silage in fattening. In order to acquire the accurate research data, this paper focus on different proportion pineapple leaf residue silage's nutrition adding to the diet of fattening pig. It also analyzes the perfect proportion of adding, and evaluates the growth performance and blood biochemical parameters. These are serviced for confirming the basis of the manufacturing the pineapple leaf residue silage for finishing pigs, and establishing the utilization of the pineapple leaf residue silage.

## Material and method

**Testing Material.** The Pineapple Leaf Residue Silage Used in the Experiment. According to the design proposal, the test proceeding the pineapple leaf residue silage is from the base workshop of the Mechanical Agriculture Institute of Chinese Tropical Sciences Academy. Put the pineapple fresh residue after extracting the fiber, and dehydrate to 70% water content probably. Add 3‰ leavening agent into the pineapple fresh residue mixed well. Then let them in the 200 silage bags(40kg) which are crammed, tightened and sealed below the room temperature to ferment about 20 days. The composition of fermented pineapple leaf residue is shown in Table 1.

Table 1 The composition of fermented pineapple leaf residue (calculated on a dry-matter basis) %

Variety	Crude Protein	Crude Fat	Crude Fiber	Crude Ash	Nitrogen-free Extract	Calcium	Phosphor
Content	12.35	3.56	36.48	15.46	32.18	1.32	0.48

**The Place and Pig Breed of the Test** The test place is Gaoyang Pig Farm in Zhanjiang, Guangdong. 40 mixed-copulated fattening pigs(Du Changda) which is about 40kg(not more or less than 1.5kg) and in 90-days age were divided into 4 groups. And the amount of male and female is same.

**The Compositions of Concentrate and Nutrition.** The ration included soybean meal, maize, wheat bran is from the Zhangjiang Hero Feed Company Limited. The compositions of diet and nutrition are shown in Table 2.

Table 2. Composition and Nutritional Level

Diet composition ( % )		Nutritional level	
Maize	64	DE(MJ/kg)	14.27
Soybean meal	23	CP(%)	15.13
Wheat bran	8	CF(%)	2.86
Soybean oil	1	Ca(%)	0.69

Premix	4	P(%)	0.52
Total	100	Lysine(%)	0.92
		Methionine	+ 0.56
		Cystine(%)	

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## Method of Experiment

**Design of Experiment.** The experiment use the single factor method randomly. 40 mixed-copulated pigs(Du Changda) which is about 40kg and in the same age were divided into 4 groups named A,B,C,D. Every group has ten pigs. The test groups make the pineapple leaf residue silage as the racecourse of crude fiber. The diet in the experiment is fermented pineapple leaf residue silage which add 0% , 5% , 10% , 15%. That means the control group only feeds the basic diet; the test group B feeds diet and 5% fermented pineapple leaf residue silage; the test group C feeds diet and 10% fermented pineapple leaf residue silage; the test group D feeds diet and 15% fermented pineapple leaf residue silage.

**Time and Place.** The test place is Gaoyang Pig Farm in Zhanjiang, Guangdong. And the time is from September 1<sup>st</sup> to November 10<sup>th</sup> in 2015.

**Feed Management in the Test.** Before the test, all of black goats are vaccinated, expelled parasites, castrated and numbered. The pig house has abundant light supplied and in a dry and ventilated place. Clean the house every day for 2 times, and keep suitable density of feed. In the test, the feed method keep the same step in the management except the stated difference in the design. Before feeding the pineapple leaf residue silage, record the amount of throwing. And record the rest feed, then calculate the feed intake. During the period, record the amount of diet and pineapple leaf residue silage every day in each group. The test pigs are fed by the special messenger, and clean the house to keep neatly.

**Measure the Indexes of Fattening Pigs.** Measuring the index of growth performance includes initial weight on an empty stomach, final weight on an empty stomach, the total feeding consumption, the total leaf residue consumption, weight gain, average daily-weight gain, the ratio of feed to gain, the ratio of feed to grass. And measuring the blood biochemical parameters involves: ALT(U/l), Total Protein(g/l), Albumin(g/l), Globulin(g/l), Cholesterol(mmol/l), Urea Nitrogen(mmol/l) and so on.

**Data Processing.** Deal the whole original data with MICROSOFT EXCEL in the first step, and the use the SPSS19.0 to analysis.

## Result and Analysis

**The Influence of Feeding Different Proportion Pineapple Leaf Residue Silage to the Daily Weight Gain of the Fattening Pigs.** After 90 days feeding test, the Table 3 reveals that there is no dramatic difference in initial weight and final weight among the four groups. The pig's weight of the control group A and the test group B,C,D increases 68.76kg, 72.37kg, 70.47kg, 69.98kg respectively, and the average daily weight gain raises 766.25kg, 806.31kg, 785.25kg,756.46kg respectively. It shows that there is no dramatic influence in adding 5%, 10%, 15% pineapple leaf residue silage to the diet to increasing the weight of the finishing pigs. But adding 15% silage

reveals the decline trend of the growth performance. The test group D's daily weight gain is 756.46g/d that is obviously lower than the other groups. It illustrates adding 15% pineapple leaf residue silage into the diet would decline the daily weight gain of fattening pigs. The feed intake of the test group C is greater than the group A and D perhaps because the proportion of the pineapple leaf residue silage is too much and prevent absorbing the nutrition. Analyzing the daily weight gain and feed conversion ratio, the test group B has the best effect with feeding the diet and 5% pineapple leaf residue silage. We can get that fixed quantity of pineapple leaf residue silage can stimulate appetite and digestion, help the growth of the finishing pigs, and decline the feed conversion ratio. (See the Table 3)

Table 3: The influence of feeding different proportion pineapple leaf residue silage to the daily weight gain of the fattening pigs ( kg)

Group	Amount	Days	Average Initial Weight/kg	Average Final Weight/kg	Weight Gain /kg	Daily Weight Gain /g
A	10	90	41.43±2.13	112.19±1.9	68.76±1.62	766.25±20.26
B	10	90	42.46±1.84	116.83±2.14	72.37±1.83	806.31±19.63
C	10	90	41.32±1.96	113.79±1.96	70.47±1.76	785.25±22.37
D	10	90	43.14±2.16	113.02±1.74	69.98±2.16	756.46±21.96

**The Influence of Seeding Different Proportion Pineapple Leaf Residue Silage to the Blood Biochemical Parameters.** The blood participates body's metabolism and every activity, and serves some important functions of assuring the metabolism, adjusting the use and balancing the internal and external environment. Analyzing the routine blood , the indexes of leucocyte, number of neutral cell, erythrocyte, haemoglobin don't have remarkable difference(P>0.05). The total bilirubin is used to diagnose whether have liver disease or abnormality of the biliary tubing. comparing the control group and the test group, there is clear difference between GPT(glutamic-pyruvic transaminase) and GOT(glutamic-oxaloacetic transaminase), but the ratio of GPT and GOT is not very obvious. Compared with the control group and the test group, the ratio of creatinine, total cholesterol , cholesterol/triglycerides is also not clear. Therefore, adding the varying proportion pineapple leaf residue silage in the feed is safe and feasible,and is worth spreading and utilizing. Because there is no serious side effect upon pig's growth performance. On the contrary, it not only can promote the growth of finishing pigs, but also can enhance the quality of carcass.

Table 4:The Influence of Seeding Different Proportion Pineapple Leaf Residue Silage to the Blood Biochemical Parameters

Detecting Project	The Control group	The Test Group A	The Test Group B	The Test Group C
Alkaline Phosphatase (U/l)	95.50±2.12 a	100.00±2.83	108.00±2.1	111.50±4.95
Alanine Aminotransferase (U/l)	28.50±2.12	27.25±1.77	28.25±1.78	30.00±2.83

Total Protein(g/l)	63.15±1.91	65.80±2.83	66.80±2.84	64.30±2.69
Albumin(g/l)	26.15±0.49	25.90±0.57	25.80±1.57	25.95±0.21
Globulin( g/l)	25.35±1.48	26.45±1.63	26.95±1.68	27.50±1.56
Total Cholesterol(mmol/l)	2.11±0.45	2.01±0.35	2.21±0.36	2.06±0.12
Urea Nitrogen(mmol/l)	5.55±0.42 b	5.56±0.57		4.22±0.078

## Conclusion

**The Influence of Feeding Different Proportion Pineapple Leaf Residue Silage to the Daily Weight Gain of the Fattening Pigs.** According to the average daily weight gain, there is no influence after adding different proportion pineapple leaf residue silage in the diet among the test group. The group B and C have the good effect on feeding, and the group D is worse. The test groups B, C put a suitable proportion when feed the pigs. The pineapple leaf residues silage has the aromas of liquor which is attracted the pigs, and strengthens the stomach and promotes digestion. Meanwhile, the pineapple leaf residues silage is tasty, involves abundance crude protein, crude fat and so on. And crude fiber is the low chloride content in the pineapple leaf residues silage. Therefore, pigs have efficient digestion and weight gain. The test group D adds too much pineapple leaf residues residue in the feed that makes the pigs eating too much crude fiber. This causes the decrease the ratio of digestion. So, the effect of fattening in the period is not as good as the test group B, C.

**The Influence of Seeding Different Proportion Pineapple Leaf Residue Silage to the Blood Biochemical Parameters.** Adding the varying proportion pineapple leaf residue silage in the feed is safe and feasible, and is worth spreading and utilizing. Because there is no serious side effect upon pig's growth performance. On the contrary, it not only can promote the growth of finishing pigs, but also can enhance the quality of carcass.

To sum up, adding 5% pineapple leaf residues silage into the diet of the fattening pigs improves the digestion and weight gain. This also can turn pineapple leaf residues back into useful items, and improve the economic benefit. This is very worth to spread.

## Acknowledgement

This work was supported by the Special Fund for Agro-scientific Research in the Public Interest (No. 201203072).

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