

# UTILIZING OF BANANA PEEL (*Musa sapientum*) IN THE RATION AND ITS INFLUENCE ON FINAL BODY WEIGHT, PERCENTAGE OF CARCASS AND ABDOMINAL FAT ON BROILERS UNDER HEAT STRESS CONDITION

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## Abstract

Heat stress is the mayor problem, adversely affecting feed intake, body weight, and growth and carcass characteristics and is also the principal cause of mortality and economic losses in tropical environments. Heat stress not only reduces feed intake but also impairs the digestibility of the diet. The digestibility of amino acids decreased in broiler exposed to high environmental temperatures. Heat stress led to a decreased digestibility of protein, fat and starch. The use of other nutrients such as banana peels has been proved beneficial in alleviating the adverse effects of heat stress. The presence of mineral (Ca 0.36%, P 0.10%), vitamin (vitamin A 5.1%, 20% vitamin C, vitamin B, 2,6%) and protein content (10.09%) is high enough. As waste, the potential of banana peel can be use as alternative feed ingredient for broiler. The research was conducted to determine the use of banana peels in rations to reduce heat stress in broiler chickens. The research involved 100 broiler chickens by using a Completely Randomized Design. The temperature between 28-35<sup>o</sup>C. Treatments were ration without Bananas peel meal (R<sub>0</sub>) and 3 rations which contained Banana peel at different levels which were R<sub>1</sub> (10 percent), R<sub>2</sub> (20 percent), and R<sub>3</sub> (30 percent), each treatment was repeated 5 times, reared up to 6 weeks of age. Observed variable were final body weight, percentage of carcass and abdominal fat percentage. The giving of banana peel in rations was started when the chicken age was 3 weeks. The results showed that the use of a banana peel in the ration up to the level of 20 percent had no effect on final body weight (R<sub>0</sub> = 1290.40 grams, R<sub>1</sub> = 1117.8 grams, R<sub>2</sub> = 1265.2 grams), percentage of carcass (R<sub>0</sub> = 71.40 percent, R<sub>1</sub> = 65.80 percent, R<sub>2</sub> = 66.16 percent) and abdominal fat percentage (R<sub>0</sub> = 2.72 percent, R<sub>1</sub> = 1.78 percent, R<sub>2</sub> = 1.97 percent, R<sub>3</sub> = 0.92 percent), but the use of 30 percent of banana peel significantly decreased the final body weight (1038.4 g), percentage of carcass (60.72%) and abdominal fat percentage (0.9%). The conclusion is, that the use banana peel to the level of 20 percent in the ration on broiler suffering from heat stress can still support the good results in the final broiler weight, percentage of carcass and percentage of abdominal fat within normal limits.

**Key words:** banana peels, final weight, percentage of carcass, abdominal fat percentage, heat stress

## INTRODUCTION

Heat stress is associated with compromised performance and productivity in poultry due to declines in feed intake, nutrient utilization, growth rate, feed efficiency and immunity. Heat stress is also linked with increased economic losses due to mortality of chickens. As a general term, stress is used to describe the sum of non-specific responses or defence mechanisms of

the body when confronted with abnormal or extreme demands [11]. For broiler chicken, the thermo-neutral zone ranges between 18 and 22<sup>o</sup>C with a humidity of 50-70 percent [3; 11]. Broiler chickens that live in the upper zone thermo-neutral will produce more heat in the body. This resulted in the heat balance in the body becomes impaired and eventually chicken suffering heat stress.

High ambient temperature has a detrimental effect on growth in broilers [13; 11]. Reductions feed intake and depressed growth in rapidly growing broilers are very common symptoms of heat stress. Several

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The manuscript was received: 14.04.2012  
Accepted for publication: 27.04.2012

studies have shown that heat stress may adversely influence the immune system of poultry, decreased minerals (e.g., Na, K, Mg and Cl) and vitamins (e.g., A,C, and D) levels in the blood and increased their excretion from the body [7; 11]. Several methods are currently available to alleviate the detrimental effects of heat stress. The use of other nutrients such banana peel has been proven beneficial in alleviating the adverse effects of heat stress. One to bananas fruit contain 1.00 grams of protein, 28 grams carbohydrates, 2.8 grams fiber, 0.6 grams fat, 467 mg sodium, 1.00 mg potassium, 9.2 mg calcium, 44.1 mg of magnesium, 5.1% vitamin A, 20% vitamin C, vitamin B, 2.6% thiamine, 5.3% riboflavin, niacin 4% [9]. While the waste, e.g. banana peel contain nutrients and minerals that are not much different from the banana fruit [12; 6]

Protein content of a banana peel 10.09%, 18.01% crude fiber, fat, 5:17%, dry matter 55.59%, calcium 0.36%, Phosphor 0.10% and gross energy 3727 kcal/kg. Banana peel also contains vitamin C, E, and B6. Vitamin C can act as an antioxidant while *serotonin* is thought to play an anti-depressant so as to increased feed intake and body weight on heat stress conditions [4; 1].

Protein and mineral content of banana peel that is high enough to replace the lack of nutrients and minerals lost during heat stress, but has the high crude fiber content and the presence of tannins in the banana peel that makes it difficult to digest. Therefore, its use cannot be too much in the ration. The aim of

this experiment are to study the optimal percentage banana peel meal in the ration on broiler with heat stress suffering can still support good results in the final broiler weight, percentage of carcass and percentage of abdominal fat

**MATERIAL AND METHODS**

The research used 100 day old chick, at the 20<sup>th</sup> day chickens were weighed with average body weight 450 grams. The birds kept in cage system, as much as 20 cages consisted of 5 chickens. In the early maintenance (day 1 until today 20) every cage is equipped by round feeder and round watered, 60 watts bulb as heater hanging in the middle of each cage and then (day 21 to day 42) cages arranged so that temperature was 28 – 34<sup>0</sup>C as heat stress condition.

The diet formula has 22% protein and 3000 kcal/kg of metabolizable energy. The banana peel meal were made in, Faculty of Animal Husbandry, Universitas Padjadjaran.

The formula rations were:

- R<sub>0</sub> : Control diets without banana peel meal;
- R<sub>1</sub> : Diets contain 10 percent banana peel meal;
- R<sub>2</sub> : Diets contain 20 percent banana peel meal;
- R<sub>3</sub> : Diets contain 30 percent banana peel meal.

The composition of the formula ration is showed Table 1, and The metabolizable energy and nutrient content is in Table 2.

Table 1 Composition of the Formula Ration (%)

Ingredients	Diets			
	R0	R1	R2	R3
Soybean meal	16.50	16.50	17.00	17.50
Coconut meal	6.00	5.50	4.00	0.00
Rice bran	8.00	5.00	3.00	3.00
Yellow corn	54.50	48.00	41.00	34.50
Vegetable oil	2.00	2.00	2.00	2.00
Fish meal	12.00	12.00	12.00	12.00
CaCo3	0.50	0.50	0.50	0.50
Top Mix	0.50	0.50	0.50	0.50
Banana peel meal	0.00	10.00	20.00	30.00
Total	100.00	100.00	100.00	100.00

Table 2 The Nutrient and Metabolizable Energy Content

The nutrients	Diets			
	R0	R1	R2	R3
Crude Protein (%)	22.00	22.02	22.17	22.14
Crude Fat (%)	7.15	6.84	6.53	6.18
Crude Fibber (%)	4.08	5.28	6.46	7.51
Calcium (%)	1.07	1.09	1.11	1.13
Phosphor (%)	0.64	0.62	0.60	0.58
Lysine (%)	0.76	0.72	0.70	0.68
Methionine (%)	0.48	0.46	0.44	0.42
Cystine (%)	0.30	0.37	0.34	0.32
EM (Kcal/Kg)	3011	3023	3024	3020

Completely Randomized Design (CRD) was used in this experiment with 4 treatments and each treatment was repeated 5 times. The data was analyzed by random simple test; among treatments with Duncan's Multiple Range Test. Variable analysis were final body weight, carcass percentage and percentage of abdominal fat.

## RESULTS AND DISCUSSIONS

The final body weight, carcass percentage and percentage of abdominal fat broiler under heat stress is showed in Table 3.

### Final Body Weight

The average of final body weight showed at Table 3. The final body weight levels were variation, where R3 giving 30 percent banana peel is the lowest (1038.40 gram) and those in R0 without banana peel was the highest (1290.40 gram).

Table 3 Average levels of Final Body Weight, Carcass Percentage and Abdominal Fat Percentage Broiler Under Heat Stress

Variable	Treatments			
	R0	R1	R2	R3
Final Body Weight (g)	1290.40 <sup>b</sup>	1117.80 <sup>b</sup>	1265.2 <sup>b</sup>	1038.40 <sup>a</sup>
Carcass (%)	71.40 <sup>b</sup>	65.80 <sup>b</sup>	66.16 <sup>b</sup>	60.72 <sup>a</sup>
Abdominal Fat (%)	2.71 <sup>a</sup>	1.78 <sup>b</sup>	1.97 <sup>b</sup>	0.91 <sup>a</sup>

Note: a,b Rows means with different superscript were significantly different ( $P < 0.05$ )

The average final weights of broiler chickens suffering heat stress tend to decrease when given a banana peel meal (figure 1). High ambient temperature have a detrimental effect on growth in broiler, depressed growth, decrease feed intake, mineral and vitamin levels in blood and increased their excretion from the body [7;

11]. An increased in the ambient housing temperature from 21.1 to 32.2°C caused a drop in feed intake of about 9.5% per bird/day from the first week to the sixth week of age [10]. At high temperatures, thyroid activity is arrested, which in turn affects metabolic rate, oxygen consumption, feed intake and growth rate.

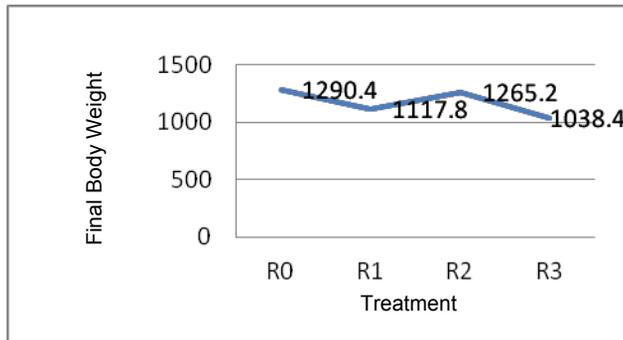


Figure 1. Average final Body Weight

Analysis of variance, showed that there was difference effect ( $P>0.05$ ) of addition banana peel into the ration on the final weight. Duncan results showed that the average weight of the final treatment of R0, R1 and R2 had similar and significantly higher than the R3. Using banana peel meal 0 – 20 percent in ration can still support the good results in the final broiler weight suffering from heat stress. If connected to feed consumption which was significant, then the existence of banana peel made the ration easier to digest.

Chickens suffering from heat stress will reduce feed intake as part of efforts to suppress heat production to maintain body temperature remained within normal range. When the chicken is believed to lack of nutrients in the body and will be manifested decreased body weight. The content of protein, minerals and vitamin C in a banana peel is able to replace lost body fluids such as minerals and vitamins due to hot conditions. The use banana peel has been proven beneficial in alleviating the adverse effects of heat stress. According to [5] the expelling of digests from the crop or small intestine was suppressed by high temperature ( $32^{\circ}\text{C}$ ) and activities of three enzymes (trypsin, chymotrypsin and amylase) were decreased at this temperature.

Under heat stress condition, by giving 30 percent banana peel in the ration (R3) the final body weight become decreased, because heat stress not only reduces feed intake but also impairs the digestibility of diet. By adding 30 percent banana peel into ration, broiler received much more fiber and tannin, so the

crop or small intestine had extra work and more energy is used in addition to the balance of the body [2] reported that exposure to heat stress led to a decreased digestibility of protein, fat and starch.

#### Carcass percentage

The carcass percentage were variations, from the lowest (R3 = 60.72%) to the highest (R0 = 71.40%). Analysis of variance showed (Table 3), that giving banana peel meal until 20 percent in the ration did not significantly influence ( $P>0.05$ ) on carcass percentage, but has significant effect ( $P<0.05$ ) when using 30 percent in the ration on carcass percentage of broiler under heat stress condition. Using banana peel meal until 20 percent in the ration (R0 –R2) still gave good results on broiler carcass percentage. This result parallel to feed consumption and final body weight those were also no significantly different among the treatment groups. No differences on these parameters because protein consumptions were relatively equal in each treatment. The function of protein is primarily to build muscle /meat.

The proportion of banana peel in R3 were higher than those in R0, R1 and R2, therefore, the ration contain more fiber and tannin, so although the feed consumption has lower than others. The low feed consumption of R3 was probably because of the banana peel meal that different a taste and flavour, so the carcass percentage (R3) under heat stress was decreased. According to [10], Feed consumption was affected by energy contain of the feed and crude fiber, and consumption protein affected the production of carcass.

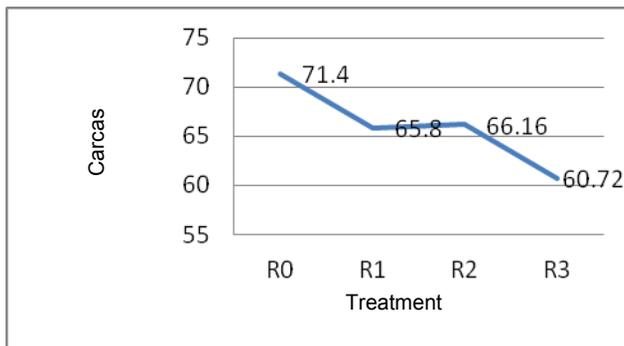


Figure 2. Average of carcass Percentage

**Abdominal fat percentage**

The abdominal fat average showed in Table 3. The abdominal fat percentage levels were variations, from the lowest (R3: 0.91%) until the highest (R0 :2.71%) Analysis of variance showed that banana peel meal

addition into the ration was not significantly ( $P>0.05$ ) effect on abdominal fat percentage.

The use of banana peel 10%, 20%, and 30% in heat stress condition lowering the fat percentage, as seen in Figure 3.

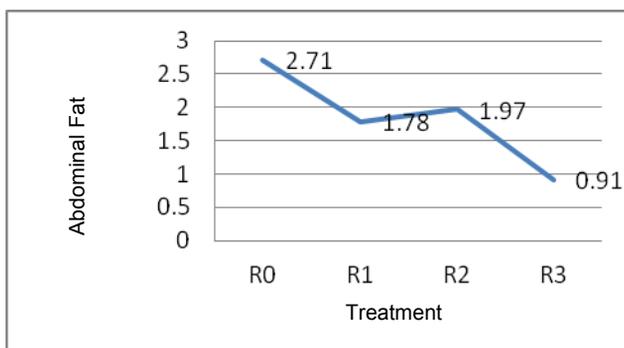


Figure 3. Average of abdominal fat percentage

Broiler chickens suffering from heat stress, causing the abdominal fat decreased because of the tannins contained in the banana peel is 1.99 - 7:36% [6]. Tannins are nutritional inhibitor and act as anti-nutrients, and can inhibit enzyme activity, affect the metabolism of carbohydrates with starch binding thus difficult to digest. The higher tannins in the ration will reduce feed consumption and intake energy is used in addition to the balance of the body, so the addition of 10 – 30 percent of banana peel in ration gave a non significant effect on abdominal fat percentage broiler under heat stress. Also, the low percentage of fat results

because broiler chicks still on development period, much fat are formed because the nutrients are absorbed by the body is still used for growing. According [8] that abdominal fat depends on the age of chicken.

**CONCLUSIONS**

By adding banana peel meal up to 20 percent in the ration can still support the good results in the final broiler weight, carcass percentage and abdominal fat percentage within normal limits under heat stress condition

## ACKNOWLEDGEMENTS

The author would like to thank to Dede Saefullah and Fresdi Pratama Friansa for the implementation of research.

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