

## THE YIELDING CHARACTERISTIC OF SENTUL CHICKENS FED DIET CONTAINING PAPAYA LEAVES MEAL (*Carica papaya L. Less*)

T. Widjastuti<sup>1</sup>, E. Sujana<sup>2</sup> and S. Darana<sup>3</sup>

<sup>1</sup>Faculty of Animal Husbandry, Padjadjaran University, Phone: +620227798241, Fax: + 620227798212, E-mail: tuti\_widjastuti@yahoo.com

<sup>2</sup>Faculty of Animal Husbandry, Padjadjaran University, Phone: +620227798241, Fax: + 620227798212, E-mail: endang\_sujana@unpad.ac.id

<sup>3</sup>Faculty of Animal Husbandry, Padjadjaran University, Padjadjaran University, Phone: +620227798241, Fax: + 620227798212, E-mail: s.darana@unpad.ac.id

**Corresponding author email:** tuti\_widjastuti@yahoo.com

### ABSTRACT

*Sentul chicken is one of the local chicken come from Ciamis, West Java-Indonesia, and a dual-purpose type that can utilized for eggs and meat production. In other way, this bird is very good for chicken meat species, because has a compact body and white skin color. One of alternative to improve the sentul chicken quality is by giving the ration which has papaya leaf meal; rich of high crude protein, contained carotene, vitamin C and high of minerals. The research aimed to find out how far the treatment on the yielding characteristics. The research used 75 day old chick and then divided into twenty five cages. The experiment conducted with Completely Randomized Design, five papaya leaves meal levels in the ration, namely: 0% (R<sub>0</sub>), 2.5% (R<sub>1</sub>), 5% (R<sub>2</sub>), 7.5% (R<sub>3</sub>), and 10% (R<sub>4</sub>), repeated five times, where each replication consist of three sentul chickens. Final body weight, carcass percentage and abdominal fat percentage were parameters observed. The results showed that by using papaya leaf meal up until 7.5% gave no significant effect ( $P > 0.05$ ) on final body weight, carcass percentage and abdominal fat percentage. But by giving 10% papaya leaf meal gave decreased effect on final body weight, carcass percentage and abdominal fat percentage ( $P < 0.05$ ). The real conclusion of this experiment that by giving 7.5% papaya leaf meal gave the best of carcass quality*

**Keywords :** Yielding characteristic, papaya leaf meal, sentul chicken

### INTRODUCTION

Sentul chicken is one of the local chicken come from Ciamis, West Java-Indonesia, with grey feathers as its distinctive feature, with a variation of grey and brown yellowish feathers and orderly arranged feathers in its breast like dragon scale. Sentul chicken is a dual-purpose type that can utilized for eggs and meat production. In other way, this bird is very good for chicken meat species, because has a compact body and white skin color [15]. Sentul chicken is one of the farm products that have high nutritional value and are preferred by consumers. Effort to meet consumer demand and increased the productivity of sentul chickens, need other alternatives to improve the quality of sentul chicken.

One of the alternative way how to improve the sentul chicken quality is by giving in the ration which has papaya (*Carica papaya*) leaf

meal. Papaya leaf meal supplementation in poultry rations has been proved to reduced the cost and improving profit margin, because contain alkaloids compounds and proteolytic enzymes (papain, papaya peptidase and chymopapain). Papain is an effective natural digestive aid which breaks down protein and makes digestive tract clean [13, 6]

Papain in high concentrations caused toxic effects in the form of perforated wall of the oesophagus [14]. Papain in high concentrations changed the duodenum pathophysiology thus could be inhibit microorganism performance and disturb the digestive function resulting in decreased of body weight gain caused by the protein absorption is not perfect. Chemical process occurs in the duodenum by releasing trypsin enzyme which is useful for hydrolizing protein amino acids. [11] states that the enzyme papain is a proteolytic enzyme that

has a catalyst to break down and reduce the protein.

Papaya leaves also contain  $\beta$ -carotene is pro vitamin A serves as many as 18 250 IU and can be used as a source of natural Xantophyl [3]. Papaya leaves contains 140 mg vitamin C, vitamin E 136 mg, Vitamin B1 0.15, 35 grams of calcium, 63 mg phosphor and iron is 0.80 mg [17]. Beside that their have contain crude protein of 20.88 percent, 0.99 percent calcium, phosphorus 0.47 percent and Gross energy 2912 kcal / kg [3,17]

Papaya leaves have tannins that are the limiting factor and anti-nutritional substances, that bind to proteins and inhibit the protease enzymes activity, forming complexes with proteins so makes the digestibility of protein decreased [11]. Tannins in low concentrations can inhibit bacterial growth pathogen [12]. [2] reported that tannins have ability to form complexes with several molecules including carbohydrate, protein, minerals and digestive enzymes. According to [4] tannins have the ability to form complexes with proteins and digestive enzymes that interfere with the digestion of feed resulting in impaired growth of bird. The content of tannins in fresh papaya leaves of 5-6 percent [17].

Besides papaya leaves if used as poultry feed ingredients with high crude fibre content, although attendance is required as a "bulk" and prevent the clumping of food in the stomach [5] because the high crude fibre content and the presence papaya leaf tannin makes difficult in digest and will result decreased of body weight gain, so the resulting of carcass weights will be low. Therefore the use of this papaya leaf need special treatment in advance to be dried and processed them into powder is expected to reduced or even eliminated the influence of the anti-nutrient.

Several studies have been conducted the addition of until 2 percent of papaya meal in the ration had no effect on feed consumption and egg production of local chicken [10]. The addition of papaya leaves as much as 6 percent in commercial rations give the effect on feed consumption, weight gain and increased feed conversion of laying hens [1]. [16] reported that sentul chicken were offered

0, 2.5, 5.0 and 7.5 percent papaya leaf meal had similar on production and egg quality and by using 10 percent can enhance egg yolk color.

Efforts to use the papaya leaf meal as a complement material and give the positive effect on sentul chicken growth is a good idea and makes environment sustain. Based on this reason the current study was conducted to determine the effect of papaya leaf meal in the ration that produce the best final body weight, carcass weight and abdominal fat percentage of sentul chicken.

## MATERIAL AND METHOD

The research used 75 day old chicks, divided into twenty five cages, each flock consisted of three birds. Round feeder and waterer, and 60 watts of hanging bulb lamp as heater at the middle of each flock were provided. The ration consisted of yellow corn-meal, fish meal, rice bran meal, soy-bean meal, papaya leaf meal, vegetable oil, bone meal,  $\text{CaCO}_3$  and premix as additive feed in 17 percent protein and 2900 Kcal/kg of metabolizable energy [15]. The experiment rations were:

- R<sub>0</sub> Ration control, without papaya leaf meal
- R<sub>1</sub> Ration contained 2.5 percent papaya leaf meal
- R<sub>2</sub> Ration contained 5.0 percent papaya leaf meal
- R<sub>3</sub> Ration contained 7.5 percent papaya leaf meal
- R<sub>4</sub> Ration contained 10.0 percent papaya leaf meal

The composition, nutrient content, metabolizable energy content of the Rations are showed in Table 1 and Table 2. Completely Randomized Design (CRD) was used with 5 treatments; each treatment was replicated 5 times. The data was analyzed by using Analysis of Variance, and the difference among treatments were tested by using Duncan's Multiple Range Test. The analyzed variables were final body weight, carcass weight and abdominal fat percentage.

Table 1. The Composition of the rations in percentage

Ingredients	Ration				
	R0	R1	R2	R3	R4
Yellow corn meal	57.00	57.00	57.00	57.00	57.00
Soy-bean meal	14.00	13.00	12.00	12.00	11.50
Rice bran meal	17.50	16.00	14.50	12.00	10.00
Fish meal	7.00	7.00	7.00	7.00	7.00
Papaya leaf meal	0.00	2.50	5.00	7.50	10.00
Vegetable oil	2.50	2.50	2.50	2.50	2.50
CaCo <sub>3</sub>	0.50	0.50	0.50	0.50	0.50
Grit	1.00	1.00	1.00	1.00	1.00
Premix	0.50	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00	100.00

Table 2. The Nutrients and Metabolizable Energy Content of Ration

The Nutrients	R0	R1	R2	R3	R4
Crude Protein (%)	17.14	17.05	17.12	17.10	17.20
Crude Fat (%)	7.57	7.44	7.25	7.18	7.25
Crude Fibre (%)	3.68	3.72	3.97	4.52	4.82
Calcium (%)	1.16	1.18	1.21	1.24	1.26
Phosphorus (%)	0.69	0.66	0.65	0.66	0.66
Lysine (%)	1.22	1.17	1.09	1.06	1.02
Cystine + methionine (%)	0.69	0.68	0.65	0.65	0.63
Metabolizable Energy (Kcal/kg)	2.908	2.918	2.936	2.926	2.910

## RESULTS AND DISCUSSIONS

The effect of dietary treatment diets on final body weight, carcass percentage and

abdominal fat percentage of sentul chicken is shown in Table 3.

Table 3. The average of Final Body Weight, Carcass Weight and Abdominal Fat Percentage

	R0	R1	R2	R3	R4
Final Body Weight (g)	867.36 <sup>a</sup>	881.84 <sup>a</sup>	890.92 <sup>a</sup>	872.24 <sup>a</sup>	703.34 <sup>b</sup>
Carcass Weight (%)	65.40 <sup>a</sup>	65.77 <sup>a</sup>	64.32 <sup>a</sup>	64.12 <sup>a</sup>	58.97 <sup>b</sup>
Abdominal Fat (%)	2.36 <sup>a</sup>	1.73 <sup>a</sup>	1.65 <sup>a</sup>	1.60 <sup>a</sup>	1.56 <sup>b</sup>

Note : The similar superscript in the same row show non significant difference (P>0.05)

### Final Body Weight

The final of body weight were variation from the lowest R4= 703.34 gram to the highest 890.92 gram (Fig.1). Analysis of variance showed (Table 3) that by addition of papaya leaf meal has significant effect (P< 0.05) on final body weight of broiler. Adding the papaya leaf meal until 7.5 percent in the ration of broiler still gave a good result. The result was parallel on feed and protein consumption those were also no significant different (P >0.05) among the treatment (R0, R1, R2 ,R3) and significant different to R4. Its mean that the papaya leaf meal from 2,5 percent until 7.5 percent in the ration did not influence diet palatability and chicken appetite, but have limitedness on final body weight achievement.

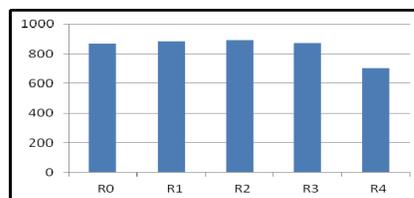


Fig. 1. Final Body Weight (%)

A decrease in final body weight of R4 (10%) due to increased levels of enzyme papain in papaya leaf meal with increasing concentrations of papaya leaf meal in the ration given to R 4 can not tolerated by the body of sentul chicken. Papain in high concentrations caused the change in the duodenum pathophysiology, thus inhibiting the performance of microorganisms and disturb the digestive function resulting of

body weight gain decreased caused by the absorption of protein is not perfect. According [14] papain in high concentration can cause toxic effects in the form of perforated wall of oesophagus. Therefore the use of papaya leaf meal should be limited given as an the active compounds. However, papaya leaves have tannins that are the limiting factor and an anti-nutritional substances can affect the function of amino acids and the use of protein. According to [4] tannins have the ability to form complexes with proteins and digestive enzymes that interfere with the digestion of feed resulting in impaired of bird growth.



Photo 1. Sentul Chicken from Ciamis, West Java-Indonesia

### Carcass Percentage

The carcass percentage were variations, from the lowest R4 = 58.97% to the highest R1 = 65.77 % (Fig.2). Analysis of variance showed (Table 3), that by giving papaya leaf meal until 7.5% percent in the ration did not significantly influence ( $P>0.05$ ) on carcass percentage, but has significant effect ( $P<0.05$ ) when using 10 percent in the ration on carcass percentage of sentul chicken. 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 of protein consumptions were relatively equal in each treatment. The function of protein is primarily to build muscle or meat. A carcass a part of chicken that contains muscle or meat. Carcass weight is proportional to the final body weight, so when calculated on a percentage of the final body weight result is relatively the same percentage [9]. R4 was the lowest produced on carcass weight and percentage. The proportion of papaya leaf in R4 was higher than those in R1, R2 and R3,

therefore, the ration contain more fibre and tannin , so although the feed consumption was lower than others. Tannins have ability to form complexes with proteins and digestive enzymes that interfere to the digestion of feed resulting in impaired growth of bird, so the carcass percentage (R4) was decreased.

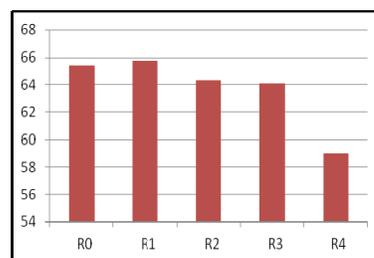


Fig. 2. Carcass Percentage (%)

According to [9] feed consumption was affected by energy contain of the feed and crude fibre, tannin and consumption protein affected the production consumption protein affected the production of carcass.

### Abdominal Fat Percentage

The abdominal of fat percentage levels were variation, where R4 by giving 10 % papaya leaf meal in the ration is most lowest 1.56% and those in R0 without papaya leaf meal or standard ration (R0) was the highest 2.36% (Fig. 3). Analysis of variance showed (Table 3), by treatment adding 2.5 – 7.5 % papaya meal in the ration have no significantly effect ( $P>0.05$ ) on the abdominal fat percentage.

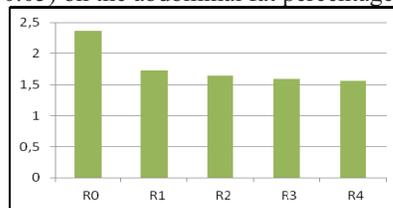


Fig. 3. Abdominal Fat Percentage (%)

By adding 10 % papaya leaf meal in the ration, there was a tendency that the level of abdominal fat percentage content going to decreased ( $P<0.05$ ). In treatment R4, proportion of papaya leaf were higher than those R1, R2 and R3. The higher fibre in ration will reduced feed consumption and intake energy is used in addition to make body balance. So the addition 10 % of papaya

leaf in ration gave significant effect on abdominal fat percentage. The low percentage of abdominal fat (1.56 – 2.36 %) results because broiler chicks on development period, much of fat is formed because the nutrients are absorbed by the body is still used for growing. According [8] that abdominal fat depend on the age of the chicken.

## CONCLUSIONS

It can be concluded that by using the papaya leaf meal until 7.5 percent level in ration was still able to support a good result on broiler final body weight, carcass weight and abdominal fat percentage.

## REFERENCES

- [1]Bota, B.J. 2007. *Pengaruh Penambahan Tepung Daun Pepaya (Carica papaya L Less) Dalam Pakan Komersil Terhadap Konsumsi Pakan, Pertambahan Bobot badan dan Konversi Pakan Pada Ayam Pedaging Jantan*. Undergraduate Tesis Airlangga University Library. Surabaya. Available online at : <http://www.Jiptunair.com/search:daunpepaya>
- [2]Cannas 2001. *Tannins*. *Animal Science at Cornell University*. Available online at: <http://www.ansci.cornell.edu/plants/toxicagents/tannin/index/html>.
- [3]Departemen Kesehatan Republik Indonesia. 1991. *Daftar Komposisi Bahan Makanan*. Bhratara Karya Aksara. Jakarta.
- [4]Fahey and Jung .1989. *Phenolics compounds in forages and fibrous feedstuffs*. In: P.R. Cheeke (Ed.). *Toxicants of Plant Origin*. Vol. IV, Phenolics. CRC Press Inc. Boca Raton, Florida.
- [5]Juju Wahyu. 1997. *Ilmu Nutrisi Unggas*. Gajah Mada University Press.
- [6]Kamaruddin, M. dan Salim. 2006. *Pengaruh Pemberian Air Perasan Daun Pepaya Pada Ayam : Respon Patofisiologik Hepar*. *J. Sain Vet.*: 37 – 43.
- [7]Karumajewa, H. 1984. *Effect of Protein and Energy Level on Laying Performance of Strain of Different Body Weight*, *Australian J. of Experimntal Agriculture and Animal Husbandry*. 12 : 3850 – 3900
- [8] Leenstra, F.R. (1986). *Effect of Age, Sex, Genotype and environment on fat deposition in broiler chicken*. *World J. Poultry Sci.* 42 :12-25
- [9] Leeson, S. and Summers, J.D. 2005. *Nutrition of The Chicken*. 4<sup>th</sup> Ed. University Books. Guelph, Ontario, pp 131-139.
- [10] Paramita. W., Setyono. H., Nurhayati. T dan Lamid. M.2001. *Prospek Pemanfaatan Daun Pepaya Untuk Meningkatkan Produksi telur dan Konsumsi Pakan Pada Ayam Buras*. *Jurnal Penelitian Medika Eksata*. Vol.2 : 10 – 16.
- [11] Poulter, N.H. and J.C. Caygill, 1985. *Production and utilization of papain-a proteolytic enzyme from Carica papaya L*. *Trop. Sci.*, 25: 123-137.
- [12] Robinson. 1995. *Analysis of tannins in seeds and skins of Shiraz grapes throughout berry development*. *Australian Journal*
- [13] Sharma, V.C. dan O. N. Ogbeide. 1991. *Renewable energy resource for the Production of alcohol fuels* 7 (10): 871 -873
- [14] Syamsudin dan Siate. 1987. *Farmakologi dan Terapi*. Bagian Farmakologi Kedokteran, U.I. Ed. 3 p. 458 – 460.
- [15] Tuti Widjastuti, 1996. *Penentuan Efisiensi Penggunaan Protein, Kebutuhan Protein Dan Energi Untuk Pertumbuhan dan Produksi Telur Ayam Sentul Pada Kandang Sistem Cage Dan Sistem Litter*, Disertasi, Universitas Padjadjaran , Bandung
- [16] Tuti Widjastuti. 2009. *Pemanfaatan tepung daun pepaya (Carica papaya. L. Less) dalam upaya peningkatan produksi dan kualitas telur ayam sentul*. *Jurnal Ilmu-ilmu Pertanian Agroland*. Vol 16 (3) :268 – 273.
- [17] USDA Phytochemical and Ethnobotanical Database. 2001. *Treating Livestock Medical Plant Benefical or Toxic? Carica papaya*. <http://probe.nalsuda.gov:8300/ogi-in/browse/phytochemdb>