

The Influence Of Feeding And Lighting Frequency Towards The Broilers Body And Carcass Weight

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Abstract. The purpose of this research is to know the perform response of broilers cause of feeding and lighting frequency toward the broilers body and carcass weight. Factorial research design 2 x 2 with 4 times repetition. The fourth treatment is divided based on the frequency of feeding and lighting, as P1C1; the frequency of feeding 2 times/day and *lighting* 1L: 3D and P1C2; the frequency of feeding 2 times/day *lighting* 2L: 2D. P2C1: the frequency of feeding 3 times/day *lighting* 1L: 3D and P2C2; the frequency of feeding 3 times/day *lighting* 2L: 2D. The result of the research showed that there is no interaction frequency by feeding and lighting ($P>0,05$) towards the broilers body and carcass weight. The highest body weight is P2C2: 1,949 kg and the lowest is P1C1 1,761 kg. The highest carcass is P2C1: 72,41% and the lowest is P1C1: 68,98%.

Keyword: Feeding frequency, Lighting, Body weight, Carcass, Broilers

I. INTRODUCTION

The consumption of broiler is improving day by day moreover, it happens because of national economic changing. The population of broiler in 2015 especially in Indonesia was about 1,65 million, increase 3,71% or increase about 59,04 million than 2014. The approximation of population kampung chicken in 2015 was about 285,02 thousand, and increase 9,90 thousand (3,60%) than in the 2014 [13].

The enhancement consumption of broiler predicted will be increased time by time if economic growth happens because there is a correlation between consumption with citizens income is quite high [2].

The prediction of broiler demand for household consumption in 2015 reaches 4,50 kg/capita/year. In 2016-2019, projection of broiler demand for being consumed is increasing, it is about 1,56% per year or 4,69 kg/capita/year so total of broiler needs to be consumed directly in 2016 approximated is about 1,19 million ton and for 2017 1,24 million ton, 2018 is about 1,27 million ton and for 2019 is 1,30 million ton [13].

The society consumption towards broilers is increase day by day and it causes on the demand of broiler, so it should be a good effort on preservation broilers so the meat of broilers has high-end quality. The kinds of preservation of broilers are

giving appropriate management feeding for broilers. Management feeding which is done by feeding wood based on their appropriate ages starts from starter face till finished face.

Feeding for broilers has become one of an important factor in the broiler preservation because broilers have great meat production, and it becomes the target of its marketing. For the breeder, in managing foods and organizing feeding is such of significant thing. This condition cause of time and frequency of feeding on the broiler effect the consumption of broilers itself.

Feeding for broilers has a limitation its because broilers as waves which like to do the eating activity as lots as they want if they have given feeding *ad libitum* (unlimited). This condition is done to prevent over fat on the broilers meat, because of the fact, market needs broilers which have optimal body weight and have carcass certain quality, furthermore broilers which have no over fat in their body.

According to Muslim (1992) said that chicken still capable of consuming wood more than the term and condition, but over feeding will create another problem, such as loss, waste, obesity for the broilers and others negative effects[18], also Mulyantini (2010) said that normal fat accumulation could give good quality perform of carcass and its meat, its because over fat endanger many factors, one of them are kinds of fat such as triglycerides which contain in the system of chicken body[16].

Feeding for broilers should notice the frequency and timing of feeding because of its affect the *feed intake* on

broilers. Feeding broilers usually are done by greedy with feeding frequency 2 times a day, in the morning and in the afternoon. This condition tend did by greater because in the morning and afternoon the environment temperature is more stable than condition at noon which is hot even broiler is kind of animal that could control their body temperatures as well. Even chicken kinds of homoiotherm, an animal which has constant body temperature, even they could live on the higher or lower temperature than their body temperature[30].

Feeding for broilers is done to support the nutrition based on their needs, in this condition we did many frequencies of feeding 2 times a day, in the morning and afternoon, also the frequency of feeding 3 times a day, in the morning, afternoon and in the night. Environment temperature could change in the morning, at noon or at night. The step which is used is to overcome the condition of environment temperature which relative unstable and it could be done by lighting in the cage for broilers. Otherwise lighting help broilers in consuming the feed in the dark condition.

Lighting has become the significant thing because it could affect the eating behavior of broilers. Rahardjo (2012) said that lighting or manipulating light could stimulate the level of chicken consumption and they prefer to eat yellowish woofs, such as corn and bran[22].

Based on the problem of preservation broilers, which related in the feeding for broilers could influence the environment. This condition causes a level of consumption feeding for broilers because the most influence appetite of broilers is environment temperature.

Dietary habit of broilers effects the production of meats and body weight. It related to the frequency of feeding and lighting towards performing of broiler and it kinds of interesting research to know how much the perform response of broiler towards this research.

II. METHODS

This research is done in Mranggen District Demak Regency. This research is done for 5 weeks, start from June until July 2015. The material which used in this research is DOC broiler, water, disinfectant, commercial feed, vaccine, vitamin for chicken, plastic. The equipment used are a cage, which has wall and base from ram wire 1 cm, lamp 40-60 watt, glass, a place for feed, thermostat, thermometer, thermohydrometer, a digital scale, an electrical installation. Factorial trial design with 2 x 2 treatment, with 4 times repetition. The factors which investigated in this research are

- P1 = Feeding 2 times a day
- P2 = Feeding 3 times a day
- C1 = Lighting 1L : 3D
- C2 = Lighting 2L : 2D

There is 16 units trial with a total of the unit sample trial are 4 broilers, so a total of the broilers are 64. The body weight of broilers gets done by scale the broilers in the age of 5 weeks with a digital scale. The carcass of broilers measurement by scale the carcass in the age 5 weeks. Carcass broilers include broilers body without fur, internal organ, neck, head, and feed. The amount of carcass we got by weight of carcass divide weight of broilers in 5 weeks, times to 100%.

III. RESULT AND DISCUSSION

The result of research showed that there is no interaction of feeding and lighting toward broilers body and carcass weight ($P>0,5$). There is no simple effect by feeding even lighting toward broiler body weight ($P>0,5$). This result happened because the feed which consumed by broiler in this treatment has similar kind of material, by using commercial feed, so it consumed by broiler has similar ingredients. Table 1. Average of body and carcass broiler cause of feeding and lighting frequency, toward broiler body and carcass weight in the age 5 weeks Information: Numbers which followed by similar alphabet in the similar line means real similar on the level 5%.

This research in line with the research by Mather (1982) using white leghorn, there is no significant impact program lighting on body weight, the production of eggs, and weight eggs. Even the fourth factorial treatment above give a real similar result on the parameter body weight. All treatment showed a better result than standard normal live broiler weight without any treatment, only has weight about 1,37 – 1,54 kg on the age 5 weeks [19] or until 1,78 kg [1]. It means feeding treatment 2 or 3 times and lighting

Parameter	Treatment				F result
	P1C1	P1C2	P2C 1	P2C2 9	
Body weight (Kg)	1,761	1,902	1,81 2	1,94 9	0,00 _{ts}
Carcass (%)	70,24	70,62	72,4 1	68,9 8	1,60 _{ts}

1L;3D or 2L;2D are good statistically, in the preservation broiler until age 5 weeks.

Intermittent lighting can affect energy expended through effort a muscle (Macleod, et al,1988) or

indirectly through increased secretion of melatonin [24]. The duration of the release of melatonin is proportional to its length dark phase. Melatonin is an antioxidant which strong could protect from peroxidation lipid in the membranes cellular (Hardelabd, 2005).

The weight the peak agency found in groups with light intermittent [3]. Ohtani and lesson (2000), reported that performs chicken could be improved by lighting intermittent the schedule recurring (1L: 2D).

On the other hand, feed which given to broilers by different feeding frequency, those chicken still get similar feed each day. Herlina, *et all* (2015) said that timing of feeding which given in every treatment has a similar effect so the result of broiler growth is relatively equal [10].

The similar result also showed by [9] Hasan *et all* (2013) that limitation feeding with kinds of feeding frequency is not effect ($P>0,05$) body weight which reaches by broiler. It happens because timing treatment does not influence the amount of feed which consumed by broiler. Level similar consumption of feed gives similar effect on the growth and accession weight [3].

Descriptive data showed that frequency feeding 3 times (P2) give a higher result on the parameter of body weight even on the carcass broiler. It showed that feeding 3 times a day could support optimal nutrition needs of the broiler, beside that broiler which consume woof feed 3 times a day could contribute nutrition for the body as well. Feeding 3 times a day in the morning, afternoon and at night is more efficient for broiler body weight, even when afternoon environment temperature is high than in the morning or night, but broiler still did an activity such eating in the afternoon.

Sulistyoningsih said that the results of carcass best found on intermittent lighting (1L;2D) and (1L;3D), as compared lighting constant [28]. The result of this research support the results of research that the programmed lighting intermittent increase productivity broiler than lighting constant [25] [23]. Kuhn et al in olanrewaju et al 2006, stated that broiler chicken male preserved in lighting intermittent (1L / 3d) having rapidity of growth higher.

Chicken is kind of homoiotherm animal, such an animal which has constant body temperature even they live in the higher or lower temperature environment than their temperature body [30]. Imamudin, *et all* stated that chicken consumes feed to overcome energy needs for biology process in their body normally so the growth is running well [11].

Feeding 3 times a day for broiler could give a good response of broiler carcass because feeding 3 times a day could overcome a number of broiler needs and efficient timing of feeding for feed consumption. Feeding 3 times cause chicken get much fresh woof (3x) times than only given 2 times the even total amount of feed is similar. Chicken like to eat feed has just given, the smell of feed give positive stimulation towards appetite. High production and quality of meat from broiler could be reached if the feed given has good quality and its given in an appropriate way as chicken needs [25].

It happens because of treatment on 1L: 3D and 2L: 2D given to broiler and it has done for 12 hours, from 6 p.m. till 6 a.m. WIB beside that in the morning until afternoon the lighting used sunlight. This condition showed that chicken gets *intermittent lighting* for 12 hours only, it's different if *intermittent lighting* applied for 24 hours. On the other hand, sunlights which get by broiler in the morning until afternoon could effect by the condition of weather or climate. Mulyantini (2010) said that sunlight as the general source for chicken has a different duration; intensity and wavelength depend on the location, weather, climate and kinds of the cage [16].

Treatment *lighting* 2L: 2D with a total light lamp for 6 hours give great response toward parameter of broiler body weight. It means similar with research which done by Fijana showed that shorter lighting given by broiler will effect the chicken consume feed as their needs [7]. The time of lighting most influence toward feed consumption, getting long the lighting so getting much the feed of broiler. The longer dark period will decrease broiler chance to get feed, so the consumption of feed will decrease and the body weight is not optimal. The broiler is kind of animal which sensitive with lighting. Lighting will effect of biology process by hormonal activity, such as influence growth. Kamyab (2000), stated that lighting intermittent

reduce death and leg disorder[12]. Based on Rahardjo (2012) lighting or manipulating light could stimulate the level of broiler consumption which prefers with yellowish feed such corn and bran[22].

The result of research showed that there is no interaction between feeding and lighting frequency toward broilers carcass in the age 5 weeks. There is no simple effect on feeding or lighting frequency towards carcass of the broiler. All data research (Table 1) showed that there is no different ($P>0,5$). It means fourth treatment, all is good than the normal carcass on broiler only 65 – 70 % [17].

Treatment *lighting* 1L: 3D gave the best result on the parameter of broiler carcass. On the result presentation carcass of broiler with *lighting* C1 (1L: 3D) with total lighting lamp, 3 hours make broiler produce melatonin hormone longer because on the *lighting* C1 has longer dark period than C2. Pineal gland or pituitary gland produce melatonin hormone (it called as epiphyseal or enzyme N-acetyl transferase) on the chicken which secreted in the night (in the dark). This condition cause chicken on the treatment C1 has lower activity so the physiology process of body parts broiler is better than C2 with a longer light period[30].

Period of giving longer lighting effect consumption of feed on the broiler is increase so the protein which consumed is quite high[26]. On the dark period, protein digested well and supported by melatonin hormone. Feeding and consumed in the night is efficient and allocated for system body shaped[20]. Feed which consumed in the night (low temperature) digestion and absorption of nutrients from feed consumed. So that process of digestion and absorption is better, cause the increase of weight gain is much better[26].

The dark period, the protein could digest as well supported by melatonin hormone. Protein which in the body of broiler should break apart become amino acids first before it absorbed by the body[26]. The capability of broiler determined by enzyme activity in degrades protein. Based on Sari, *et all* (2014) several synthesis protein factors such as hormonal, enzyme and vitamin[27]. By increasing enzyme digestion, so getting many nutrients which can be break part and absorb become a carcass product bigger weight[29].

IV. CONCLUSIONS

The result of research showed that there is no interaction of γ feeding and lighting frequency toward broilers body and carcass weight ($P>0,5$). There is no simple influence of feeding and lighting frequency toward body and carcass weight at age 5 weeks ($P>0,5$). The fourth treatment gave result body and carcass weight better than broiler which preserves conventionally. Suggestions are given by this research as follows:

1. It should be further research in different lighting treatment.
2. This research could be develop again for research by using another Aves.

REFERENCE

- [1] Abidin, Z. 2002. Meningkatkan produktivitas Ayam Ras Pedaging. Jakarta : AgroMedia Pustaka
- [2] Alex. 2014. Jurus Sukses Beternak Ayam Pedaging. Yogyakarta: Pustaka Baru Press.
- [3] Banong, S & M.R Hakim. 2011. Pengaruh umur dan lama pemuasaan terhadap performans dan karakteristik karkas ayam pedaging. Jurnal Ilmu dan Teknologi Peternakan, 1 (2), 98-106.
- [4] Bolukbasi, S. C. dan H. Emsen. 2006. The effect of diet with low protein and intermittent lighting on ascites induced by cold temperatures and gGrowth performance in broilers. Poultry Sci. 5 : 988 – 991.
- [5] Classen, H.L., C. Ridell and F.E. Robinson, 1991. Effect of Increasing photoperiod length on performance and health of broiler chickens. Br. Poultry Sci. 32: 21-29.
- [6] Classen, H.L., C. Riddell, and F.E. Robinson, 2004. Effect of photoperiod manipulation and feed restriction on broiler health and performance. Poultry Sci. 67 : Supplement 1, p 68 (Abstr).
- [7] Fijana, M.F., E. Suprijatna., & U. Atmomarsono. 2012. Pengaruh proporsi pemberian pakan pada siang malam hari dan pencahayaan pada malam hari terhadap produksi karkas ayam broiler. Jurnal Animal Agriculture, 1 (1), 697-710.
- [8] Hardeband R., Cardinali DP, Brown GM. PandiPeruma SR. 2015. Melatonin and brain inflammaging. Prog Neurobiol.; 127-128;46-63.
- [9] Hasan, N.F., U. Atmomarsono., & E. Suprijatna. (2013). Pengaruh frekuensi pembatasan pakan terhadap bobot akhir, lemak abdominal, dan kadar lemak hati ayam broiler. Jurnal Animal Agriculture, 2 (1), 336-343.
- [10] Herlina, B., R. Novita., & T. Karyono. 2015. Pengaruh jenis dan waktu pemberian ransum terhadap performans pertumbuhan dan produksi ayam broiler. Jurnal Sains Peternakan, 10 (2), ISSN 1978-3000, 107-113.
- [11] Imamudin., U.Atmomarsono., & M.H. Nasoetion. 2012. Pengaruh berbagai frekuensi pemberian pakan pada pembatasan pakan terhadap produksi karkas ayam broiler. Jurnal Animal Agriculture, 1 (1), 87-98.
- [12] Kamyab, A and J. D. Firman, 2000. Digestible threonine requirement of female nicholas poult during the starter period. J. Appl. Poult. Res. 9 (1):62-65.
- [13] Kementrian Pertanian. 2015. Outlook Komoditas Pertanian Sub Sektor Peternakan Daging Ayam. Pusat Data dan Sistem Infomasi Pertanian Sekjen Kementrian Pertanian.
- [14] Leeson, S., dan Summers. 1980. Production and carcass characteristic of the broiler chicken. Poultry Sci. 59 : 786-798.
- [15] Mather, F.B. 1982. Intermitten lighting for layers in open-type housing. Poultry Sci. 61 : 1507 (abst).

- [16] Mulyantini. 2010. Ilmu Manajemen Ternak Unggas. Yogyakarta: Gadjah Mada University.
- [17] Murtidjo, B.A. 1987. Pedoman Beternak Ayam Broiler. Yogyakarta : Kanisius.
- [18] Muslim, D. A. 1992. Budidaya Mina-Ayam. Yogyakarta: Kanisius.
- [19] North, M. 1984. Commercial Chicken Production Manual. Webspot, Connecticut.
- [20] Nova, K. 2005. Pengaruh perbedaan persentase pemberian ransum antara siang dan malam hari terhadap performans broiler strain CP 707. *Jurnal Animal Production* 10(2), ISSN 1411-2027, 117-121.
- [21] Olanrewaju, H.A. J.P. Thaxton, W.A. Dozier, J. Purswell, W.B. Roush and S.L. Branton. 2006. A Review of lighting programs for broiler roduction. *Int. J. of Poult. Sci.* 5 : 301-308.
- [22] Rahardjo, Y. 2012. Mengatasi Stres Ayam . Bandung: Nuansa Cendekia.
- [23] Rahimi, G. 2005. The Effect of Intermittent Lighting Schedule on Broiler Performance. *Poultry Sci.* 4 : 369 – 398.
- [24] Rozenboim, I., I. Biran, Y. Chaiseha, S. Yahav, A. Rosenstrauch, D. Sklan and O. Halevy. 2004. The effect of green and blue monichromatic light combination on broiler growth and development. *Poultry Sci.* 83 : 842-845.
- [25] Samadi, B. 2010. Buku Terlengkap Sukses Beternak Ayam Ras Pedaging dan Petelur. Jakarta: Pustaka Mina.
- [26] Saraswati, A., N. Suthama., & V.D.Y.B Ismadi. 2015. Penggunaan protein akibat pemberian porsi ransum berbeda dikombinasikan dengan lama pencahayaan pada ayam broiler. *Jurnal Animal Agriculture*, 4 (1), 182-189.
- [27] Sari, M. L., F. N. Lubis., & L. D. Jaya. 2014. Pengaruh pemberian asap cair melalui air minum terhadap kualitas karkas ayam broiler. *JurnalAgripet*, 14 (1), ISSN 1411-4623, 71-75.
- [28] Sulistyoningsih, M. 2013. Performans ayam kampong pada dua jenis alas kandang dengan pencahayaan berselang. Disertasi. Undip, Semarang.
- [29] Vidyani, I.N.T Ariana, dan K.A Wiyana. 2015. Pengaruh probiotik dalam ransum komersial terhadap recahan karkas ayam broiler. *Journal Of Tropical Animal Science*, 3 (2), 353 - 365.
- [30] Yuwanta, T. 2004. Dasar Ternak Unggas. Yogyakarta : Kanisius .