Jurnal Ekonomi dan Bisnis Jagaditha
Volume 5, Nomor 2, 2018, pp. 92-96

EISSN 2579-8162
ISSN 2355-4150
https://ejournal.warmadewa.ac.id/index.php/jagaditha

JAGADITHA

Production and Income Over Feed and Chick Cost (IOFCC) of Broiler Chicken Which Feed The Fermented Dragon Fruit Skin Ration (Hylocereus Polyrhizus)

I. N. Tirta Ariana[1], Gusti A. M. Kristina Dewi[2], M. Wirapartha[3], I. W. Wijana[4], I. K. Anom Wiyana[5] and N. W. Sitiari[6]

[1,2,3,4,5]*Fakultas Peternakan, Universitas Udayana, Denpasar, Bali*
[6]*Magister of Management, Postgraduate Program, Universitas Warmadewa, Denpasar, Bali*
tirtaariana@unud.ac.id

Received: 13/04/2018	Revised: 27/06/2018	Published: 30/09/2018

How to cite (in APA style):

Ariana, I, N, T., Dewi, G, A, M, K., Wirapartha, M., Wijana, I, W., Wiyana, I, K, A., Sitiari, N. W. (2018). Production and Income Over Feed and Chick Cost (Iofcc) of Broiler Chicken Which Feed The Fermented Dragon Fruit Skin Ration (Hylocereus Polyrhizus). *Jurnal Ekonomi dan Bisnis Jagaditha*, 5(2), 92-96 doi: http://dx.doi.org/10.22225/jj.5.2.800.92-96

Abstract-The objective of the study is to know the production and the income over feed and chick cost (IOFCC) of broiler chicken which feed the fermented dragon fruit skin ration (Hylocereus Polyrhizus). The design of the study was Randomized Complete Design (RCD) with 3 treatments and 5 replications, where each replication consisted of 10 DOC broiler chicken; so total chicken used was 150 heads. Treatments given were: R0: ration of fruitless fruit skin of dragon, fermented; R1: ration with 5% flour of fermented dragon fruit skin and R2: ration with 7% fermented dragon fruit skin flour. Variables observed: final body weight, body weight gain, ration consumption, FCR, Income over Feed and Chick Cost (IOFCC). The data obtained were analyzed by variance, if between the treatments were significantly different ($P < 0.05$), it continued with the Duncan distance test. The results showed that the treatment of R1 and R2 was significantly different ($P < 0.05$) on the final body weight, body weight gain, feed intake, FCR, Income Over Feed and Chick Cost (IOFCC) against R0. Conclusions of this study: the use of dragon fruit skin flour (Hylocereus Polyrhizus) fermented to 7% in the ration affect the final body weight, body weight gain, FCR, ration, IOFCC broiler aged 5 weeks and 5% without dragon fruit skin (Hylocereus Polyrhizus) fermented.

Keywords: Body weight; broiler chicken; dragon fruit flour; FCR; IOFCC.

INTRODUCTION

In broiler production, maintenance about 60 - 70% of total cost can be attributed to feed cost. Broiler chickens faced with the variety of problems such as the increasing feed prices are enough sharply, because the feed is a primary need at a cost of approximately 70% (Banson., et al, 2015). The high feed costs due to raw materials derived from imported commodities and its use compete with humans. The high price of feed indirectly requires that farmers are looking for alternative feed ingredients so it can lower the feed costs and maximizes revenues.

According to Mustika (2014) dragon fruit peel is agricultural waste which has not been widely used by the community, especially in Indonesia. Dragon fruit is a key raw material in the manufacture of juices, jams, syrups, chips or other food ingredients by key material of the dragon fruit. Part of dragon fruit 30-35% is peel and still rarely or even not been fully utilized although some studies have reported that peel dragon fruit contains high antioxidant and contents phenolics in the dragon fruit peel is amounted 28.16 mg/100 g, and in addition to having antioxidant, it also contains anthocyanins (Citramukti, 2008; Nurliyana et al., 2010). The low protein and high crude fiber in fruit peels is a constraint in the utilization as animal feed especially broiler

chickens.

Fermentation process is often defined as the process of breakdown of carbohydrates and amino acids in anaerobic, that is, without the need of the oxygen. An increase in the value of dragon fruit skin can be done by applying biofermentation by utilizing microbial services, i.e. utilizing the ability of the yeast Sacharomyces cerevisiae contained in tape. According to Ahmad (2005) Sacharomyces cerevisiae yeast can increase fibrous fiber digestibility and can act as a probiotic in poultry. At the time of fermentation by yeast, the crude fiber content of ration can be degraded, so it can be utilized by poultry. Another benefit of fermentation products is to suppress the enzyme activity of 3-hydroxy-3-methylglutaryl Co-A reductase that serves to synthesize cholesterol in the liver (Tanaka et al., 1992), and can decrease the amount of broiler fat (Ketarin et al., 1999). However, in terms of Sacharomyces cerevisiae can increase the digestibility, application of feed technology is must absolutely be applied in the optimization of waste utilization (Dewi et al., 2016 & 2017). Application of supplementation technology utilizing superior Sacharomyces cerevisiae origin of yeast is very potential developed. So this research is designed to optimize the utilization of dragon fruit leaf waste poultry breeding business development, in order to support the diversification of national meat source and improve the farmer's welfare. Fermented foods may confer several benefits to human health and play an important role in a healthy and balanced diet (Gu et al., 2018).

Research on dragon fruit peel for livestock feed is still rarely done as concluded by some experts (Mustika et al., 2014; Wu et al., 2005). Dragon fruit peel can be given up to the level of 1% - 4% without having negative effects on the body of livestock. However, by-products dragon fruit meal (Hylocereus polyrhizus) fermented has been researched. It was found that it could give increase to the productivity local chickens up to 2-8 week (Dewi et al., 2016). From the description above, we suggest to use dragon fruit (Hylocereus polyrhizus) peel meal without and fermented as a feed ingredients in diets broiler chicken of age of 1-5 week for productivity and income over feed and chick cost (IOFCC).

METHOD

This research was conducted for over three months at the Teaching Farm, Bukit Animal Science of University of Udayana. We used livestock as material of experiment, including broiler chickens produced by PT. Jaffa Ciomas of Denpasar consisting of 150 heads. Diets used in this research was independently prepared by recommendation (Scott et al., 1982) which consisted of yellow corn, fish meal, soybean meal, rice bran, dragon fruit peel meal, dragon fruit peel meal fermented, coconut oil, premix and CaCO3. Diets given were iso energy (2,900 Kcal/kg) and iso protein {20% (Table 1)}.

Cage used in this research is 20 battery cages with a length of 80 cm, width of 50 cm and height of 75 cm, filled with 10 chickens. The cage made of wood, the bottom cage made of wire so that livestock faeces can be accommodated; each plot of cage is equipped with a feed; and drinking water are made of bamboo.

Materials used in this research were a diet and drinking water, torch lighting cage, machine grinding feed, knife, bowl, spoons stirrer, scissors, paper labels, markers, plastic bags, oven, stove, pans, trays, thermometer, wood, bamboo, wire, plastic carpet, sprayer and digital scales.

The cuduction of the study was carried out in two stages, namely making of dragon fruit peel meal, covering the fresh dragon fruit peel was chopped small, then dried and grinded up into flour; we made the dragon fruit peel meal fermented with Saccaromyces Sp. In the process of fermentation, solution was ready for use. Fermentation process dragon fruit peel was chopped small, dried up, inserted in plastic, and then moistened with solution fermentation, closed tightly (3-5 days), after it is dried, ground into flour and ready for use.

This study employed a completely randomized design (CRD) with 3 treatments and 5 replications, each @ 10 birds. Treatments were: R0 = Ration without used dragon fruit skin flour (control); R1= Ration with used 5% dragon fruit skin flour fermented; and R2 = Ration with used 7% dragon fruit skin flour fermented.

Chickens Maintenance

One Day Old Chickens or Day Old Chick (DOC) maintained as many as 45 individuals. Chickens were vaccinated using ND vaccine. Chickens were inserted in a cage that has been given a number treatments and every unit cage was filled with 5 chickens.

Variable Observed: Initial weight, final body weight, body weight gain, feed consumption, feed convertion ratio (FCR) and

IOFCC. The cost of feeds, acquisition and preparation of Ration Fermentation and return from sales of finished broilers were determined in income of over feed and chickcost (IOFCC) which was calculated using the following formula (Magpantay et al., 2013) :

[(Average weight of broilers, kg) x (Price per kg live weight of broiler)]- [(Price of day-old chicks) + (Total feed consumed) x (price of feed)].

Data analysis

Data were analyzed statistically by ANOVA and when there were significant differences, it was continued by providing test of Duncan (Steel., & Torrie, 1993). The data were analyzed using statistic application program SPSS 17.

RESULTS AND DISCUSSION

Performance

The effects of ration on performance of broiler chickens aged 5 weeks are summarized in Table 2. The results of the study showed that the broiler chickens given feed R1and R2 increase the feed consumption significantly ($P<0.05$) than R0m of the feed consumption. It is possibly due to the dragon fruit (Hylocereus polyrhizus) peel meal without fermentation. Body weight gain and the highest utilization of ration efficiency through treatment of R2 are the results with the highest substrate degradation ability and with the highest cellulose enzyme activity. Dewi et al., (2014) and Hagan et al., (2016) observed differences in feed intake and FCR of Broiler. It is found that a well managed system should be in range of 1.9 to 2.15, depending on the nutrient density and feeding and feeding management of broiler (Kamran et al., 2008).

The increase in body weight by feed dragon fruit (Hylocereus polyrhizus) peel meal fermented in R1 and R2. This is probably due to dragon fruit (Hylocereus polyrhizus) peel meal fermented. It was able to produce a variety of fiber degradation microbes and microbial probiotics that are able to improve digestibility and methabolism of the rations. According Mahata et al., (2014) dragon fruit peel in broiler diet is up to 15% and did not affect protein content of thigh meat. This shows that the phytochemivhal content in dragon fruit peel (Lycopen, Betacarotene and Tanin) did not affect the protein absorption or protein disposition in thigh meat. The inclusion of 5% dragon fruit peel in diet lowers cholesterol effectively.

Feed conversion ratio (FCR) measured from broiler reared for four weeks in this study is shown in Table 2. Ration dragon fruit (Hylocereus polyrhizus) peel meal fermented

Table 1.
Composition Ingredients Ration and Nutrient Content of Diets (age 1-5 weeks)

Ingrediens (%)	Composition (%)			
	R0	R 1	R 2	
Corn	43,57	41.39	40.86	
Fish Meal	8	8	8	
Soybean Meal	18,44	18,49	18,51	
Race Brand	25	21,93	20,43	
Dragon Fruit Skin Flour Fermented	0	5	7	
Coconut Oil	4,79	5	5	
Premix	0,1	0,1	0,1	
CaCo3	0,1	0,1	0,1	
Nutrient Content of Diets				*Standard
Energy KCal/kg	2900	2900	2900	2900
Crude Protein (%)	20	20	20	20
Crude Fat (%)	10,35	10,14	9,95	8
Crude Fiber (%)	3,08	3,73	3,90	5
Calsium/Ca (%)	0,65	0,73	0,77	0,90
Phosfor/P (%)	0,67	0,64	0,62	0,60

Explanation: R0= Ration without used dragon fruit skin flour (control); R1= Ration with used 5% dragon fruit skin flour fermented; and R2 = Ration with used 7% dragon fruit skin flour fermented
* Standard (Scott et al.,1982)

R1 and R2 significantly (P<0.05) affected feed conversion ratio than R0. This showed that addition of dragon fruit (Hylocereus polyrhizus) peel meal fermented in R1 -R2 caused the difference in feed utilization efficiency.The body weight gain of Broiler chickens were higher with better feed utilization indicating that they were given the rations by using 9% of dragon fruit skin flour fermentation improved the process of digestion of feed in their digestive tract. This is likely due to dragon fruit skin flour fermentation containing various microbes that degrade fiber and probiotic microbes so it will be able to increase the ration digestibility and metabolism. According to Weiss & Hogan (2007) material having the antioxidant content of livestock can reduce the effects of free radicals, such as increasing the feed consumption. Mustika et al., (2014) mentioned that this condition is caused by free radicals which can lead to oxidative stress in livestock resulting in lower feed consumption. Oxidative stress is a state of imbalance between the amount of free radicals and antioxidants in the body that can trigger the occurrence of cell damage and lower the immune system (Nurliyana et al., 2010). The Phytochemichal content in dragon fruit feel (Lycopen, Beta-carotene and Tanin) did not affect the intestinal and caeca length. According to Weiss & Hogan (2007) a material having the antioxidant content of livestock can reduce the effects of free radicals such as increasing feed consumption.The effect of treatment for performance and IOFCC can be seen on the table 2.

The results showed that IOFCC values were respectively Rp. 35159.75 (R2), Rp. 34764.54 (R1) and Rp. 33188.1 (R0) (Table 2). In Table 2 it can be seen that R1 treatment obtained by IOFCC is amounted to Rp. 1576.44, - greater than treatment (R0), while treatment of R2 of Rp. 1971.65, - biggest than R0 and treatment R2 is amounted to Rp. 395.21, - from treatment R1. Provision of 7% of rations of fermented dragon fruit skin can save the ration cost, that is, Rp. 1971.65, -/ ekor/period, compared with control (R0).

Table 2.
Effect of Treatment for Performance and IOFCC

Variable	Treatment 1)			SEM 3)
	R0	R1	R2	
Initial Weight (g)	144.60a	144.43a	144.61a	10.02
Final body Weight (g)	1360.00b	1388.00[a]	1397.80[a]	11.25
Body Weight Gain (g)	1215.4 b	1243.57a	1253.12a	10.1
Feed Consumption (g)	1873.53a	1808.5b	1810,43b	10.06
Feed convertion Ration (g)	1.54 a	1.45b	1.47b	0.6
IOVCC	33188.10	34764.54	35159.75	

Explanation: 1) R0 = Ration without used dragon fruit skin flour (control); R1 = Ration with 5% dragon fruit fruit skin flour fermentation and R2 = Ration with 7% dragon fruit peel fruit skin flour fermentation, 2) Values with the same superscript in the same row shows the difference was not significant (P>0,05), 3) SEM: *Standard Error of the Treatment Means*

CONCLUSIONS

It can be concluded that research on dragon fruit skin flour (Hylocereus Polyrhizus) fermented to 7% in the ration affect the final body weight, body weight gain, FCR, ration, IOFCC broiler aged 5 weeks and 5% without dragon fruit skin (*Hylocereus Polyrhizus*) fermented.

ACKNOWLEDGEMENT

This research was funded by Indonesia Ministery of Research, Technology, and Higher Education through LPPM, University of Udayana - (Group Research Divisi Research Grant. All authors are grateful for excellent technical helps during the experiment period.

REFERENCES

Ahmad, R.Z. (2005). Pemanfaatan Kamir Saccharomyces cerevisiae untuk Ternak. Wartazoa, 15(1), 45-55.

Banson, E.K., Muthusamy., & Kondo. (2015). The import substituted poultry industry; evidence from Ghana. J. Agric, 5, 166-175.

Citramukti, I. (2008). Ekstraksi dan Uji Kualitas Pigmen Antosianin Pada Kulit Buah Naga Merah (Hylocereus Costaricensis), (Kajian Masa Simpan Buah dan Penggunaan Jenis Pelarut). (Skripsi). Jurusan THP Universitas Muhammadiyah Malang. Malang.

Dewi, G.A.M.K., Mudita., Nuriyasa., & Wijana, I.W. (2014). The effect of inclusion bio-suplement as probiotic in the diet for productivity of Bali duct. Proceedings of the

AAAP Animal Science Congress, 2, 10-14.

Dewi, G.A.M.K., Nuriyasa, I.M., & Wijana, I.W. (2016). Optimalisasi Peningkatan Produksi Ternak Unggas dengan Pemanfaatan Limbah Kulit Buah naga (Hylocereus sp) Terfermentasi. Laporan Penelitian LPPM, Universitas Udayana. Bali.

Dewi, G.A.M.K., Nuriyasa, I.M., & Wijana, I.W. (2017). Production of chicken carcass and non carcass of Kampung chickens who received rations skin dragon fruit flour (Hylocereus polyrhizus) fermented. Proceedings of the 7th Tropical Animal Production, 11-14.

Gu, J., Liu, T., Hou, J., Pan, L., Sadiq, F.A., Yuan, L., & He, G. (2018). Analysis of bacterial diversity and biogenic amines content during the fermentation processing of stinky tofu. Food Research International, 111, 689-698.

Hagan, M.A.S., Armstrong, D., & Dadson. (2016). Growth performance and economic evaluation of broiler chicken fed with rain tree (Samanea saman) seed meal. Cogent Food and Agriculture, 2,1-10.

Kamran, Z., Sarwar., Niss., ANadeem., Mahmood., Babar., & Ahmed. (2008). Effect of low-protein diets having constant energy-to-protein ratio on performce and carcass characteristics of broiler chickens from one to thirty-five days of age. Poult. Sci. J, 87, 468-474.

Kataren, P.P., Sinurat., Sainudin., Purwadarta., & Kompiang. (1999). Bungkil inti sawit dan produk fermentasinya sebagai pakan ayam pedaging. Jurnal Ilmu Ternak dan Veteriner, 4(2), 107-112.

Magpantay, V.A., Cu, R.K.S., Oliveros., & Hutada. (2013). Groth performance and carca3331ss drip loss and water holding capacity of broilers fed low density diets supplemented with liquid multi-vitamin and amino acid during periods of stress. Philipp. J. Vet. Anim. Si, 39, 201-210.

Mahata, M.E., Mahlil Y., Fajri Y., Aditia R., & Yose, R. (2013). The utilization of red dragon fruit (Hylocereus polyrhizus) peel as broiler feed. Abstract summary, International Congress and general meeting. Society for Southeast Asian Agricultural Science (ISSAAS) in Collaboration with SAEDA. Tokyo University of Agriculture and JSTA. Tokyo.

Mahfudz, L.D. (2000). Pengaruh Penggunaan Tepung Ampas Tahu Terhadap Efisiensi Penggunaan Protein dan Kualitas Karkas Ayam Pedaging. Jurnal Ilmiah Sain Teks, Universitas Semarang, 7(2), 88-97.

Mustika, A. I. C., Sjofjan., & Widodo. (2014). Pengaruh Penambahan Tepung Kulit Buah Naga Merah (Hylocereus Polyrhyzus) dalam Pakan terhadap Penampilan Produksi Burung Puyuh (Coturnix Japonica). Universitas Brawijaya Malang. Malang.

Nurliyana, R., Syed, Z., Suleiman., Aisyah., & Kamarul, R. (2010). Antioxidant Study of Pulps and Peels of Dragon Fruit: A Comparative Study. International Food Research Journal, 17, 367- 375.

Scott, M.L., Nesheim., & Young. (l982). Nutrition of The Chicken. Dept. of Poult. Sci. and Graduate School of Nutrition Cornell. University of Ithaca. New York.

Sinurat, A.P., Bintang., Togotorop., Pasaribu., Purwadaria., J. Dharma., J. Rosida., Sitompul., & Wahyu. (2002). Pemanfaatan Bioaktif Tanaman Sebagai Feed Additive Pada Ternak Unggas, Seminar Nasional Teknologi Peternakan dan Veteriner. Pusat Penelitian dan Pengembangan Peternakan. Bogor.

Steel, R.G.D. & Torrie. (1993). Prinsip dan Prosedur Statistika (Pendekatan Biometrik) Penerjemah B. Sumantri. Gramedia Pustaka Utama. Jakarta.

Tanaka, K., Youn., Santoso., Otan, & Sakaida. (1992). Effect of fermented feed products from Chub Mackerel extract on growth and carcass composition, hepatic lipogenesis ando n various lipid praction in the liver and thigh muscle of broiler. Anim. Sci. Technol, 63, 32-37.

Weiss, W.P., & Hogan. (2007). Effects of Dietary Vitamin C on Neutrophil Function and Responses to Intramammary Infusion of Lipopolysaccharide in Periparturient Dairy Cows. Journal of Dairy Science, 90(2), 731-739.

Wiset, L., Poomsa-Ad, N., & Srilaong, V. (2012). Comparison of antiokxidant activity and bioactive compounds of dragon fruit peel from various drying method. World Academy of Science, Engineering and Technology, 70, 446-449.

Wu, L.C., Hsu, H.W., Chen, Y.C., Chiu, C.C., Lin, Y., & Ho. A. (2005). Antioxidant and Antiproliferative Activities of Red Pitaya. Food Chemistry, 95, 319-327.