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Economic Analysis of Lactic Acid Bacteria (LAB) of Broiler on Percentage of Carcass Weight carcass weight broiler?

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Abstract

Livestock is an agricultural subsector that has an important role to complete increasing needs of animal protein in society. Poultry is susceptible to attack by disease caused by bacteria, viruses, parasites, fungi, environment and nutritional deficiencies. Antibiotic is one of the method to treatment and prevention of disease, but antibiotics that overuse can cause antibiotic residues. The purpose of this study was to know the economic analysis in broiler which addition lactic acid bacteria to increase percentage of carcass weight. About 300 DOC (*Day Old Chicken*) were completely randomized into three treatments, each treatment consisted by 100 heads. The treatment was T0 (commercial feed and water without probiotic), T1 (commercial feed and water + LAB 10^6 CFU/ml), and T3 (commercial feed and water + LAB 10^8 CFU/ml). The result showed that LAB in water has not been able to increase percentage of carcass weight, but still give profit and feasible to do.

Key words: broiler; carcass; Economic analysis; LAB

Introduction

Livestock is an agricultural subsector that has an important role to complete increasing needs of animal protein in society (Pardede, 2015). Poultry is susceptible to attack by disease caused by bacteria, viruses, parasites, fungi, environment and nutritional deficiencies (Tamaluddin, 2012).

Antibiotic is one of the method to treatment and prevention of disease and can be used as feed additives to spur growth, increase production and improve the efficiency of feed (Bahri et. al., 2005). The adding of antibiotic that do not require the accuracy of the dosage can cause residues (Etikaningrum and Iwantoro, 2017).

Probiotic is one of the products containing non-pathogenic living microbes that are given to improve rapid growth, efficiency and conversion feed, and livestock health (Zurmiati et. al., 2014). Probiotic consist of lactic acid bacteria that has ability to maintain normal intestinal microflora balance and inhibit pathogenic bacteria (Salarmoni and Fooladi, 2011).

Groups of lactic acid bacteria from normal flora that often used as probiotics are *Lactobaccillus sp*., *Pediococcus* and *Bifidobacterium* (Yuniastuti, 2014). *Lactobacillus* is a probiotic that can improve host health by increasing microbial balance and intestinal immunity (Shen et. al., 2014). *Bifidobacterium* is useful in protecting the intestinal mucosa to pathogenic microbes, improved intestinal defences, synthesis of water soluble vitamins, digestion of oligosaccharides and polysaccharides, suppressing potentially toxic production and carcinogenic metabolism through modulation of immune responses (Quigley, 2017).

Pediococcus in an antimicrobial compound such as bacteriocin (pediosin) which is able to inhibit bacterial growth (Soomro et. al*.,* 2002).

Addition a combination of lactic acid bacteria can be given through drinking water as an alternative to increase energy metabolism (EM) and Total Digestible Nutrient (TDN) (Ikasari, 2017). Based on this, it is expected that addition of lactic acid bacteria can increase the percentage of carcass weight. Through economic analysis with the parameters of total costs, revenue, profit and loss, and contribution margin, it will be known whether that addition lactic acid bacteria in broiler drinking water is more profitable or not. This study aims to determine the economic analysis of broiler that using lactic acid bacteria combination of *Lactobacillus casei, Lactobacillus plantarum, Lactobacillus fermentum, Lactobacillus acidophilus, Pediococcus* dan *Bifidobacterium* to the percentage of carcass weight.

Material and Method

Carcass weight data collection is carried out after slaughter, hair removal, excretion of digestive tract and organs, separation of head and claw from carcass. Calculation of carcass weight percentage using the formula:

$$\text{Carcass Weight (\%)} = \frac{Carcass\ weight}{Body\ weight}\ x\ 100\%$$

Analysis of experimental data result obtained processed using *Microsoft Excel* then statistically analysed using *Multivariate Analysis of Variance* (MANOVA). If the results are obtained different or very different, it is followed by Duncan's Multiple Distance Test (Kusriningrum, 2008). Statistical analysis using the *SPSS for Windows* 23.0. Economic analysis and financial data calculated using the formula:

a. Production cost
   Total cost = fix cost + variable cost
b. Revenue
   Revenue = price/unit x production total
c. Profit and loss
   Profit and loss = revenue – total cost
d. Contribution margin
   Contribution margin = sales – variable cost

Result and Discussion

Percentage Carcass Weight

The results of MANOVA that addition lactic acid bacteria does not show significant differences (p>0,05) on percentage of carcass weight. The results of the percentage of carcass weight can be seen in Table 1. This show that addition lactic acid bacteria in drinking water with a dose of 1 ml/liter has not able to change the percentage of carcass weight significantly. Addition lactic acid bacteria in feed has a higher average increase than addition in drinking water (Olnood et. al*.,* 2015). Patterson and Burkholder (2003), suggested that the efficacy of probiotics was influenced by the method of application, level of addition, basal feed, type of chicken strain and concentration of probiotics. Based on the results of research conducted by Atela et. al., (2018) that addition 5,0 mL/L in 9 weeks old roosters produced a higher efficiency feed conversion.

Table 1. Average and Standart Intersecion Percentage of Broiler Carcasses

Treatment	Percentage (%) ± SD
T0	75,41 ± 2,44
T1	72,96 ± 2,07
T2	74,14 ± 2,39

According to Akhadiarto (2010), *strain*, body weight, quality and quantity of feed and non-carcass weight are factors that can influence carcass weight. One of the factors that influence the results of this study is feed because every phase of growth does not change the feed according to the needs of broilers of each growth phase. Feed quality greatly determines the content and availability of nutrients during the maintenance period (Hafsan et. al., 2018). Results of the study by Li et. al*.,* (2014), proving that feeding on broilers with the same protein and energy does not has an effect on carcass weight. Olnood et. al*.,* (2015), revealed that addition of lactic acid bacteria can increase growth performance and feed efficiency, and has the potential to increase nutrient absorption in broiler.

The average percentage of carcass weight produced in this study was 74.17% according to what was revealed (Tarigan et. al., 2013), that the

percentage of broiler carcass varied between 65-75% of body weight. The percentage of carcass influenced by slaughter weight, carcass weight, abdominal fat weight and livestock health. The high percentage of carcass caused by the carcass weight obtained is greater because it supports the thigh muscle and chest muscle which is better related to gender, age and weight (Jaelani et. al., 2015).

Financial Analysis

Fixed Cost

Fixed cost is cost that remain constant, totally regardless of changes in activity levels (Garrison et. al*.,* 2015). Fixed costs incurred are depreciation of cages, depreciation of cages, depreciation of equipment and labor costs. Cage depreciation costs and equipment depreciation are calculated using a depreciaton formula, investment costs divided by the age of use (economical). Fixed costs can be seen in Table 2.

Table 2. Fixed cost

Description	T0	T1	T2
Cage depreciation (IDR)	277.777,78	277.777,78	277.777,78
Feeder depreciation (IDR)	3.333,33	3.333,33	3.333,33
Drinken depreciation (IDR)	2.500	2.500	2.500
Labor (IDR)	166.666,67	166.666,67	166,666,67
Total (IDR)	450.277,78	450.277,78	450.277,78

Variable Cost

Variable cost is variations in total cost that are directly proportional to changes in activity level. The direct costs used during a period will vary totally in direct form with the number of units produced (Garrison et. al*.,* 2015). Variable costs consist of costs of DOC, feed, drinking water, electricity, husk, formalin, dextrose, formalin, forcent, study equipment and probiotics for treatment. Variable cost can be seen in Table 3.

Table 3. Variable Cost

Description	T0	T1	T2
DOC (IDR)	360.000	360.000	360.000
Feed (IDR)	645.883	645.883	645.883
Drinking water (IDR)	100.000	100.000	100.000
Dextrose (IDR)	55.000	55.000	55.000
Electricity (IDR)	66.667	66.667	66.667
Husk (IDR)	50.000	50.000	50.000
Formalin (IDR)	60.000	60.000	60.000
Forcent (IDR)	500.000	500.000	500.000
Study Equipment (IDR)	33.333	33.333	33.333
Total (IDR)	1.870.883	1.870.883	1.870.883
Lactic Acid Bacteria	0	50.000	75.000
Total (IDR)	1.870.883	1.920.883	1.945.883

Revenue

Revenue is the amount obtained from the sale of a number of expenses generated by the company or producer (Nurdin, 2010). The revenue obtained from the sales per kilogram of broiler carcass. The revenue from the highest carcass sales at T0 is IDR 2,638,692.00 because of the total production is 146.594 kg and the lowest at T1 is IDR 2,451,528.00 with a total weight 136.196 kg. Details of revenue can be seen in Table 4.

Table 4. Revenue Carcass Sales

Price/unit (IDR/kg)	Production Total		Revenue (IDR)
	Treatment	Weight (kg)	
18,000	T0	146.594	2,638,692
18,000	T1	136.196	2,451,528
18,000	T2	142.009	2,556,162

Profit and Loss

Profit is the company's main target (Dewi et. al., 2017). The highest profit at T0 is IDR 317,531.22 because of the high production weight and the absence of LAB cost. The lowest profit at T1 is IDR 80,367.22 which is influenced by the minimum weight of production produced and the burden LAB cost. Details of profit and loss can be seen in Table 5.

Table 5. Profit Carcass Sales

Treatment	Reevenue (IDR)	Total Cost (IDR)	Profit (IDR)
T0	2,638,692	2,321,160.78	317,531.22
T1	2,451,528	2,371,160.78	80,367.22
T2	2,556,162	2,396,160.78	160,001.22

Economic Analysis

Contribution Margin

Contribution is differences between sales revenue with variable cost. Contribution margin use to cover fix cost and the balance become profit (Yahya, 2018). Contribution margin can cover total fix cost can be seen in Table 6.

Table 6. *Contribution Margin*

Treatment	Revenue (IDR)	Variable Cost (IDR)	Total (IDR)
T0	2,638,692	1,870,883	767,809
T1	2,451,528	1,920,883	530,645
T2	2,556,162	1,945,883	610,279

Conclussion

Addition lactic acid bacteria in drinking water has not been able to increase percentage of carcass weight in broiler, but economic analysis based on contribution margin can cover totality of fix cost still feasible to do**.**

Reference

Akhadiarto, S. 2010. Effect of Addition Temban, Biovet and Biolacta Probiotic on Carcass Percentage, Abdomen Fat Weight and Organ in Broiler Chicken. Indonesian Science and Technology Journal. Vol. 12. No. 1: 53-59.

Atela, J.A., V. Mlambo and C.M. Mnisi. 2018. A multi-strain Probiotic Administered Via Drinking Water Enhances Feed Conversion Efficiency and Meat Quality Traits in Indigenous Chickens. Animal Nutrition XXX: 1-6.

Bahri, S., E. Masbulan, and A. Kusumaningsih. 2005. Production Process as an Important Factor in Producing Animal Safe Products for Humans. Journal of Agricultural Research 24 (1).

Dewi, D.R.R., S.B. Wibowo and N.W. Sulistyowati. 2017. Analysis of Margin Relationship Contribution for Profit Planning in Gamelan Margo Laras Kauman Magetan Period 2014-2016. The 9th FIPA: Scientific Accounting Education Forum. Universitas PGRI. Madiun.

Etikaningrum and S. Iwantoro. 2017. Study of Antibiotic Residues in Indonesia Poultry Products. Journal of Animal Husbandry Production and Technology. Vol. 05. No. 1: 29-33.

Garrison, R.H., E.W. Noreen, P.C. Brewer, N.S. Cheng and K.C.K. Yuen. 2015. Managerial Accounting. Second Edition. MC Graw Hill Education. 2 Penn Plaza. New York.

Hafsan, G. Bayu, Ar. S. Hidayat, L. Agustina, A. Natsir and A. Ahmad. 2018. Bobot Karkas dan Persentase Organ Dalam Broiler dengan Suplementasi Fitase dari *Bukholderia sp.* Strain HF.7. Prosiding Seminar Nasional Biologi dan Pembelajarannya. Inovasi Pembelajaran dan Penelitian Biologi Berbasis Potensi Alam. Carcass Weight and Percentage of Broiler Organ with Supercentration of Phytase from *Bukholderia sp.* Strain HF.7. Proceedings of Biology Nasional Seminar and Learning. Learning Innovation and Biological Research Based on Natural Potential.

Ikasari, A. T. 2017. Effect of Probiotic to Percentage of Carcass and Carcass Fat in Broiler. Faculty of Science and Technology. Universitas Islam Negeri Alauddin. Makassar.

Jaelani, A., A. Gunawan dan S. Syaifuddin. 2015. Effect of Addition Storbio Probiotic to Salughter Weight Percentage of Carcass and Percentage of Abdominal Fat of Broiler Chicken. Ziraa'ah. Vol. 39. No. 2: 85-94.

Kusriningrum, R.S. 2008. Design of Experiments. Airlangga University Press. Surabaya.

Li, C.-Y., Lu, J.-J., Wu, C.-P., and Lien, T.-F. 2014. Effects of Probiotics and Bremelain Fermented Soybean Meal Replacing Fish Meal On Growth Performance, Nutrient Retention and Carcass Traits of Broiler. Livestock Science 163: 94-101.

Nurdin, H.S. 2010. Analysis of Net Revenue Business Plant of Pineapple Farmers in Palaran Samarinda. Eksis Journal. Vol. 6. No. 1: 1267-1266.

Olnood, C.G., S.S.M. Beski., P.A. Iji and M. Choct. 2015. Delivery Routes for Probiotics:

Effects on Broiler Performance Intestinal Morphology and Gut Microflora. Animal Nutrition 1: 192-202.

Pardede, S. 2015. Cost Analysis and Business Benefit of Pig Farming in Cigugur Village, Cigugur Subdisctrict, Kuningan Regency West Java. Universitas Padjajaran. Bandung.

Patterson, J.A. and Burkholder, K.M. 2003. Application of Prebiotics and Probiotics in Poutry Production. Poultry Science 82: 627-631.

Salam, S., A. Fatahilah, D. Sunarti and Isroli. 2013. Carcass Weight and Abdominal Fat of Broiler Chicken Addition of *Nigella sativa* in Ransum during Summer. Animal Husbandry Science. Vol. 11 (2): 84-90.

Salarmoni, M. and M.H. Fooladi. 2011. Efficacy of *Lactobacillus acidophilus* as Probiotic to Improve Broiler Chicks Performance. J. Agr. Sci. Tech. Vol. 13: 165-172.

Shen, X., and Yi, Xueqin Ni, D. Zeng, B. Jing, M. Lei, Z. Bian, y. Zeng Tao Li and J. Xin. 2014. Effects of *Lactobacillus plantarum* on Production Performance, Immune Characterisctics, Antioxidant Status and Intestinal Microflora or Bursin Ummunized Broilers. Canadian Journal of Microbiology. Vol. 60. No. 4: 193-202.

Soomro, A.H., T. Masud and K. Anwaar. 2002. Role of Lactic Acid Bacteria (LAB) in Food Preservation and Human Health a Review. Pakistan Journal of Nutrition. 1(1): 20-24.

Tamalluddin, F. 2012. Broiler, 22 days Harvest more Profit. Penebar Swadaya. Jakarta.

Tarigan, R., O. Sjofjan and I. H. Djunaidi. 2013. Effect of Addition Cellulotytic Probiotic (*Cellulomonas sp*) in Feed to Carcass Quality, Abdominal Fat and Organ Weight of Broiler. Universitas Brawijaya. Malang.

Quigley, E.M.M. 2017. Bifidobacteria as Probiotic Organisms: An Introduction. The Microbiota in Gastrointestinal Pathophysiology. Chapter 12. United States.

Yahya, D.B. 2018. Penerapan *Cost Volume Profit Main Product* dan *Byproduct* Sebagai Alat Bantu Perencanaan Laba Pada Peternakan Ayam Slorok Farm. Cost Volume Profit Main Product and Byproduct Application of Chicken Husbandry Profit Planning in Chicken Slorok Farm. Economic Faculty. Universitas Negeri Surabaya. Surabaya.

Yuniastuti, A. 2014. Monograf Book: Probiotic (In Health Perpective). Unnes Press. Semarang.

Zurmiati, M.E.M, M.H. Abbas dan Wizna. 2014. Application of Probiotic for Duck. Indonesian Livestock Journal. Vol. 16 (2): 134-144.