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Production Performance of Broiler Chicken Supplemented with *Lactobacilus plantarum* and *Lactobacilus casei* Incubated In Different Medium Infussion

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ABSTRACT

This study was aimed to evaluate the effect of *Lactobacillus plantarum* ($0{,}25\times10^6$) and *Lactobacillus cassei* ($1{,}62\times10^6$) in production performance of broiler chicken. 150 DOC divided into 4 treatments: control (P1), probiotic in the sweet potato (P2), dates (P3), and *tempe* (fermented soybean cake / FSC) (P4) for 28 days. The result show that probiotic addition in broiler chicken have no significant effect on feed intake, body weight, and feed conversion rate in the 1^{st} – 3^{rd} week. However, feed conversion ratio on 4^{th} week have significant effect. It could be concluded that probiotic *Lactobacilus plantarum* and *Lactobacilus casei* in infusion of sweet potato (*Ipomea batatas*), dates (*Phoenix dactylifera*), supported a production performance for broiler chicken, due to its effect as growth promotor and immunomodulator.

Key words *: Broiler chicken, Production performance, Probiotic, Lactobacilus plantarum, Lactobacilus casei*

Introduction

Researchers worldwide are working on organic alternatives due to the ban of a wide range of drugs in feed for animal production especially for broiler chicken (Cimrin *et al*., 2020; Pertiwi *et al.,* 2019), one of the alternatives of it is using probiotics which in the recent years have recived high attention in the healthcare, scientific and public areas (Cunningham *et al.,* 2021). Probiotics are food additives that contain beneficial microbes whose existence improves the balance of microorganisms in the digestive tract by improving the natural flora and preventing colonization of pathogenic organisms and thus, securing optimal nutrients absorption (Loh *et al.,* 2014). Probiotics supplementation in feed can replace antibiotic growth promoters (AGP) utilization, and prevent risk of antibiotic residues in the chicken meat respected to the consumer safety from antimicrobial resistance risk (Amer and Khan, 2012).

Probiotics of the genus *Lactobacillus sp.* is often used in chicken farms (Rofik *et al.,* 2014). *Lactobacillus sp.* able to produce antimicrobial components called bacteriocin such as acidoline, acidophylline, lactosidine (Lokapirnasari *et al*., 2019). In previous studies, increasing of probiotic *Lactobacillus casei* and

Lactobacillus rhamnosus could increase feed consumption in broilers due to the presence of probiotics in feed can increase enzymatic reaction and help digestion process, therefore the efficiency of feed digestibility increases significantly (Lokapirnasari *et al*., 2016). However only limited study discuss about effectivity of *Lactobacillus sp* which cultured in various medium on the broiler performance, thus this study subjected evaluating the effect of *Lactobacillus plantarum* and *Lactobacillus cassei* growth in infussion of sweet potato (*Ipomea batatas*), dates (*phoenix dactylifera*), and *tempe* on production performance of broiler chicken

Materials and Methods

This research was conducted in the expemerimental animal cage belonging to Faculty of Veterinary Medicine Airlangga University Indonesia. 150 days old chicks (DOC) divided into 4 treatments: control (P1), *Lactobacillus casei* 1.67 x 10^6 and *Lactobacillus plantarum* 0.25 x 10^6 incubated in the sweet potato (P2), dates (P3), and fermented soybean cake (FSC) / (*tempe)* (P4) infusion water. Before administration, probiotic was cultured in the various mediums at room temperature (24 – 30 ^oC) for 6 days, then given to the broiler chicken in the drinking water at 15% probiotic infusion + 85% sweet potato /dates / tempe infused water during 28 days. Daily feed intake , body week and feed convertion ratio (FCR) was measured and calculated every weeks. Data obtained were analyzed by ANOVA test using *SPSS 16* software.

Results

After 28 days treatment of *Lactobacillus plantarum* (0.25×10^6) and *Lactobacillus cassei* (1.62×10^6), the result show that administration of *L.plantarum* and *L.casei* have no significant effect on feed intake in 1^{st} – 4^{th} , body weight in 1^{st}-4^{th}, and feed convertion rate in the 1^{st} – 3^{rd} week. however in the final feed convertion rate on 4^{th} week have decreased significantly (Table 1). According to Lokapirnasari (2016) the higher FCR means the feed using is less economical. The smaller the amount of feed is needed to produce a good product in the form of chicken body weight gain, it means that the feed is more efficient.

Discussion

Tempe is a traditional Indonesian food which is made from soybeans fermented with *Rhizopus oryzea. Rhizopus sp*. has proteolitik and lipolitik character. it could produce extracellular enzymes such as protease, amilase, and lipase that improve digestibilty and feed absorbtion in the intestine (Pratiwi *et al.,* 2014). Additionally, previous study has shown that lactic acid bacteria are the dominant microbes in *tempe* in numbers 10^7-10^8 cfu/g (Efriwati *et al*., 2013). According to Touw (2014), several lactic acid bacteria from tempe have been identified by *Enterococcus faecium, Lactobacillus plantarum, Pediococcus acidilactici, Wisella confuse, Pediococcus pentosaeceus,* and *Lactobacillus fermentum.*

Lactobacillus sp are resistant to low pH, could help to break down complex molecules of nutrients into

Table 1. Daily feed intake, body week and feed convertion ratio (FCR) of broilers chicken supplemented with *Lactobacillus casei* and *Lactobacillus plantarum* incubated in various different medium infussion

Parameter	P1	P2	P3	P4
Feed intake week 1st	43.0±9.73	43.44±9.50	43.40±9.78	43.25±9.52
Feed intake week 2nd	52.97±3.29	51.61±2.56	52.30±3.27	53.14±3.15
Feed intake week 3rd	94.98±28.81	94.02±29.06	93.54±28.65	95.65±20.07
Feed intake week 4th	175.47±39.14	175.29±38.75	174.38±39.20	178.30±39.45
Body weight week 1st	306.0±40.64	274.57±42.93	262.0±46.93	273.00±36.33
Body weight week 2nd	467.14±64.83	475.5±77.45	425.29±53.31	462.00±62.96
Body weight week 3rd	702.86±124.72	692.57±87.46	610.86±80.64	706.57±116.13
Body weight week 4th	980.71±184.52	969.14±67.61	893.43±113.33	1224.9±105.19
Feed Convertion Rate week 1st	1.82±0.43	2.04±0.43	2.17±0.54	2.02±0.21
Feed Convertion Rate week 2nd	1.99±0.31	1.96±0.37	2.16±0.20	2.01±0.27
Feed Convertion Rate week 3rd	1.49±0.35	1.48±0.25	1.69±0.31	1.48±0.31
Feed Convertion Rate week 4th	1.86^a±0.44	1.81^a ±0.26	1.98^b ±0.28	1.46^{ab} ±0.25

Mean values bearing different superscript with in a row differ significantly (P<0.05)

simple ones which easier to absorb by intestinal vilus (Riswandi *et al.,* 2012). beneficial fungus or yeast species also could chategorize as probiotics (Sugiharto, 2014). One of the them that can be used as probiotics is *Rhizopus oryzae* which is a group of filamentous fungi (Yudiarti *et al.,* 2012). In Indonesia, it commonly use to produce *tempe* from soybeans.

Lactobacillus is used as a probiotic in broilers farm to increase productivity and immunity of broiler chicken (Primacitra *et al*., 2014; Pertiwi *et al.,* 2019). *Lactobacillus casei* is able to inhibit various types of pathogenic bacteria such as *Salmonela sp., Vibrio sp., Shigella sp., Staphylococcus sp*., and *E.coli* (Sunaryanto *et al.,* 2014).

Conclusion

Administration of *Lactobacillus plantarum* (0.25×10^6) and *Lactobacillus cassei* ($1{,}62\times10^6$) incubated in Fermented Soybean Cake (*Tempe*) infussion could decrease final feed convertion ratio on 4^{th} due to sinergy effect of *Lactobacillus sp* and *Rhyzopus sp.* to promote health and productivity

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