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The Effect of Level Dragon Fruit Peels (*Hylocerus Polyrhizus*) Fermentation in Against Productivity of "Kampung" Chicken 2-10 Weeks Old

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ABSTRACT

The purpose of this study was to examine the effect of provision dragon fruit peels (Hylocereus polyrhizus) fermented of Saccharomyces cerevisiae to the productivity of "kampung" chicken. This study has been held for 12 weeks located in farm of Faculty of Animal Science, Udayana University, Bukit, Jimbaran, Bali. The design used was Completely Randomized Design (RAL) with 4 treatments, 5 replications in which each replication consisted of 10 chickens so the total chicken used was 200 tails. The treatments were R1 (diet without the use of fermented dragon fruit peels), R2 (diet using fermented dragon fruit peels as much as 5%), R3 (diet using fermented dragon fruit peels as much as 7%) and R4 (diet with used of fermented dragon fruit peels as much as 9%). The variables observed were initial weight, final weight, weight gain, diet consumption, Feed Convertion Ratio (FCR) and percentage of carcass. The data obtained were analyzed by variance (ANOVA), if between the treatments were significantly different (P <0,05) then followed by Duncan's distance test.

The results showed that treatment of R1, R2, R3 and R4 showed no significant difference (P> 0,05) to variable of initial body weight and diet consumption. While on the final body weight variable, weight gain, Feed Convertion Ratio (FCR) and the percentage of carcass showed significantly different results (P <0,05). From this research, it can be concluded that "kampung" chicken production given diet with dragon fruit peels (Hylocereus polyrhizus) is fermented up to level 9% take effect to final body weight, weight gain, FCR and carcass percentage, while fermented dragon fruit peels does not affect on initial weight and ration consumption.

KEYWORDS: *"kampung" chicken, Saccharomyces cerevisiae, chicken production, dragon fruit peels*

INTRODUCTION

Optimizing the utilization of agricultural / plantation waste as animal feed is one of the efforts to reduce production costs in the development of livestock business. Feed is one factor that has an important role, about 60-70% of the cost of production comes from the cost of feed. Dragon fruit peels has the potential to be used as feed material views of the nutrients are sufficient, the price is relatively cheap, easy to obtain, and do not compete with human needs.

The dragon fruit peels is potentially used as animal feed, approximately 30-35% dragon fruit consists of the peels (Citramukti, 2008). The dragon fruit peels has a good enough nutrient content of 2887 kcal/kg, 8,76% protein, 25,09% crude fiber, 1,32% fat, 1,75 % calcium , and 0,3% phosphorus (Astuti, 2016). Wu *et al.* (2005) declared super red dragon fruit peels rich in *polyphenols* and a good source of antioxidants. Nurliyana *et al*. (2010) found that the antioxidant content of the dragon fruit skin was higher than in the flesh.

Low protein and high content of crude fiber is a constraint in the use of dragon fruit peels as animal feed, especially poultry ("kampung" chicken). Chickens are monogastric animals that are unable to digest high crude fibers. Efforts to increase the value of dragon fruit peels nutrients can be done with fermentation technology using *Saccharomyces cerevisiae* to increase nutrient content and decrease crude fiber content. *Saccharomyces cerevisiae* is widely used as a fermentor because its growth is relatively easy, fast and does not produce mycotoxins so it is not harmful (Ratanaphadit *et al* ., 2010). Fermentation can lead to profitable changes such as improved feed quality, both in terms of nutrients and digestibility (Lunar, 2012). Several studies have been conducted using *Saccharomyces cerevisiae* as a source of probiotics. Kompiang (2002) used seaweed with *Saccharomyces cerevisiae* in chicken feed and found a positive result of increased body weight after given *Saccharomyces cerevisiae*. Kumprechtova *et al.* (2000) gave *Saccharomyces cerevisiae* with a dose of 200g / 100kg of feed to improve the appearance of chicken and reduce the smell of ammonia in chicken feces. Astuti *et al.* (2015) shows that the use of dragon fruit peels without and with *Aspergillus niger* fermented give the same effect to broiler chickens. The fermented dragon fruit peels can be given up to the 6% level. Based on the description, the researcher is interested to use dragon fruit peels fermented by *Saccharomyces cerevisiae* as animal feed ingredients used in "kampung" chicken. The purpose of this study was to examine the effect of provision dragon fruit peels fermented *Saccharomyces cerevisiae* to the productivity of "kampung" chicken.

MATERIALS AND RESEARCH METHODS

Time and Location Research

This research was conducted at the cage of Faculty of Animal Science, Udayana University, Bukit, Jimbaran with 12 weeks research period.

Kampung chicken

This study used a two-week old kampung chicken as much as 200 tails from PT. Jatinom, Banyuwangi, East Java with initial weight of 118.29 ± 3.10 gram.

Cages and Supplies

The enclosure used in the research is a cage system "*battery colony*" as many as 20 units of cages with the size of each plot enclosure of 65 cm x 55 cm x 40 cm. Each cage unit is equipped with a feeding and drinking water place made of plastic. Under each unit of cage is placed plastic as a place of feces and spilled food remains so easy to clean.

Diets with Addition of Fermented Dragon Fruit Peels

The diet to be used in this study are based on the calculations of Scott *et al.* (1982). The ingredients used in the research are yellow corn, fine bran, soybean meal, fish meal, fermented dragon fruit peels, coconut oil, premix and $CaCo_3$.

The processing of fermented dragon fruit peels is done by first setting up a dragon fruit peels in small pieces, then dried and made the fermentation process. After fermented the dragon fruit peels back dried and then finely ground into a flour. Provision of rations to livestock chicken done by *ad libitum*.

Experimental design

The experimental design used in this study was a Completely Randomized Design (RAL) with four treatments and five replications. The treatments were R1 (diet without the use of fermented dragon fruit peels), R2 (diet using fermented dragon fruit peels as much as 5%), R3 (diet using fermented dragon fruit peels as much as 7%) and R4 (diet with used of fermented dragon fruit peels as much as 9%).

Observed Variables

The variables observed in this study were initial body weight, final body weight, weight gain, diet consumption, *Feed Convertion Ratio* (FCR) and percentage of chicken carcass.

a. Initial body weight
   The initial body weight is obtained by weighing in at baseline before treatment is given chicken.
b. The final body weight
   Final body weight was obtained by weighing in at the end of the study.
c. Weight gain
   Weight gain is obtained by reducing the final body weight by the initial body weight of the study.

d. Diet consumption
   The diet consumption is calculated daily by reducing the amount of diet administered with the rest of the diet on the day. Total feed consumption is obtained by summing the daily feed intake during the study.
e. *Feed Convertion Ratio* (FCR)
   FCR was calculated by comparison between the amount of diet consumed by body weight gain during the study. FCR is a benchmark for assessing the level of efficiency in the use of rations.

$$FCR = \frac{\text{Total diet consumption}}{\text{weight gain}}$$

f. Percentage of carcass
   Carcass percentage was obtained by comparing carcass weight with 100% life weight (Mastika et al., 2016).

$$\text{Persentase karkas} = \frac{\text{Carcass weight}}{\text{heavy cut}} \text{ x } 100\%$$

Data analysis

The data of the research were analyzed by variance. If the results are significantly different (P<0,05) followed by Duncan's Multiple Range Test (Steel and Torrie, 1993). Data processing using SPSS 16 statistical application program.

RESULTS AND DISCUSSION

The results showed that the provision of fermented dragon fruit peels of *Saccharomyces cerevisiae* in diet gave no significant effect on initial body weight and diet consumption in "kampung" chicken (P>0,05). While the final body weight variable, weight gain, Feed Convertion Ratio (FCR) and percentage of carcasses showed significantly different results (P <0,05).

The results showed different results were not significant (P>0,05) to initial body weight of chicken. Each treatment had the same effect on initial body weight with an average body weight of 117,81–118,72 grams. This indicates that the chicken used in the study has a homogeneous weight average.

The results of the study on the final body weight and weight gain of "kampung" chicken showed significantly different (P<0,05) with R4 treatment showed the highest result. "Kampung" chickens treated without the fermented dragon fruit peels (R1) showed the lowest final body weight (479,04 grams), and the highest final body weight was shown by the treatment of R4. The results showed that treatment of R2, R3, and R4 had a higher final body weight of 1,69%; 8,95% and 9,13% higher than R1. While in treatment of R2, R3 and R4 have weight gain each 2,22%; 11,75% and 11,98% higher than R1.

Based on statistical analysis, the provision of 7% (R3) and 9% (R4) of fermented dragon fruit peels real (P<0,05) can be increase the final body weight and weight gain of "kampung" chicken 10 weeks old compared with control treatment R1) and treatment with dragon fruit peels addition of 5% (R2). The final body weight is affected by the amount of feed consumed and the nutrient content consumed. The more nutrient content absorbed by the chicken body will provide higher final body weight because it will increase the development of tissue in the body of livestock (Ariesta *et al.*, 2015). Dewi and Wijana (2011) stated that "kampung" chickens diet containing balance of higher energy and protein resulted in higher body weight. Wahyu (2004) revealed that weight gain is largely determined by the high low consumption of nutrient supply in livestock. The final weight gain and weight gain of "kampung" chicken can also be caused by *Saccharomyces cerevisiae* which is able to degrade food with increasing metabolized energy value of feed and feed digestibility. This is in accordance with the opinion of Bidura *et al.*, (2012) which states that giving yeast *Saccharomyces cerrevisiae* in the diet allows the yeast in the chicken gastrointestinal tract that can help enzymatic activity in the chicken intestine.

Feed consumption in each treatment showed no significant results (P>0,05) with the R1 treatment showed the highest feed consumption is 1470,6 grams. The results showed that the diet consumption at treatment of R2, R3 and R4 was lower 0,014%; 0.,844% ; and 2,111% compared with R1 treatment. This is because the provision of dragon fruit feed fermented in the diet to the level of 9% has the energy and protein content is relatively the same. Diet consumption is influenced by large and chicken nations, environmental temperature, feeding

system, animal health, sex, livestock activities and quality of rations (Rasyaf, 2007). Further explained that the level of consumption in poultry is strongly influenced by the level of energy consumption. Chicken will stop consuming diet when their energy needs are met. So the provision of rations with relatively equal energy content will cause the level of ration consumption to be relatively the same.

Diet conversion (*Feed Convertion Ratio)* in this study obtained results respectively that is 4,09; 4,00; 3,58; 3,52 on the treatment of R1, R2, R3 and R4. The higher the level of fermented dragon fruit peels is able to reduce the diet conversion in "kampung" chicken. This may be influenced by the higher weight gain in R4 treatment so that the lower FCR values are lowered (Table 1). Diet conversion is the ratio between the amount of diet consumption and weight gain. Decreasing the value of FCR can also be affected by increased nutrient digestibility. This is due to an increase in the provision of the dragon fruit peels fermented by *Saccharomyces cerevisiae*. The use of yeast *Saccharomyces cerevisiae* as a feed fermentor can improve the digestibility of feed substances, and when administered to chickens will be able to work as probiotic microbes in the chicken digestive tract that will have an impact on increasing the efficiency of diet use. Kompiang (2009) revealed that probiotics will be able to suppress the growth of pathogenic microbes so that digestive tract health will increase and cause better nutrient absorption.

Table 1 .
Productivity of "kampung" chicken 2-10 weeks old fed with fermented dragon fruit peels

Variabel	Perlakuan[2)]				SEM[3)]
	R1	R2	R3	R4	
Initial Body Weight (g)	118,72[a1)]	118,78 [a]	117,81 [a]	117,83 [a]	0,76
Final Body Weight (g)	479,04 [a]	487,28 [a]	526,12 [b]	527,20 [b]	3,98
Weight Gain (g)	360,32 [a]	368,50 [a]	408,31 [b]	409,37 [b]	3,91
Diet Consumption (g)	1470,6 [a]	1470,4 [a]	1458,18 [a]	1439,56 [a]	5,29
Feed Convertion Ratio (FCR)	4,09 [b]	4,00 [b]	3,58 [a]	3,52 [a]	0,04
Carcass(%)	60,74 [a]	61,11 [a]	62,80 [ab]	63,13 [b]	0,36

Information:
1) Values with the same superscript on the same line show an unreal difference (P> 0,05).
2) R1 = Diet without the use of fermented dragon fruit peels
R2 = Diet using fermented dragon fruit peels as much as 5%
R3 = Diet using fermented dragon fruit peels as much as 7%
R4 = Diet using fermented dragon fruit peels as much as 9%
3) SEM: *Standard Error of The Treatment Means*

The percentage of carcass in this study showed significantly different results (P<0,05), with R4 treatment having the highest percentage of carcass (Table 1). The high percentage of chicken carcasses in R4 treated with fermented dragon fruit peels by *Saccharomyces cerevisiae* caused by more nutrients absorbed by the chicken body due to the addition of fermented dragon fruit peels higher to level 9% compared to treatment R2 and R3 that is as

much as 5% and 7%. Kompiang (2002) states that the use of *Saccharomyces cerevisiae* in chicken feed, is able to degrade well with increasing digestibility of feed, in the chicken digestive tract that can help emzimatis activity in the chicken digestive tract, can increase body weight (Haroen, 2003) and Astuti *et al.* (2015) stated that carcass weight is very closely related to cutting weight and weight gain. Energy and protein are the main nutrients that are very influential on carcass production. Scott *et al.* (1982) states that to obtain a high carcass weight, it can be done by providing a diet with a good balance between protein, vitamins, minerals and high energy. When compared with research Carles *et al*. (2017), grower (6-14 weeks) chicken consuming free choice produce average carcass percentage 57,57%, carcass weight and percentage of chicken carcass of this research is bigger that is 61,95% average.

CONCLUSSION

From this research, it can be concluded that chicken production provision diet with dragon fruit peels (*Hylocereus polyrhizus) is* fermented up to level 9% influence to final body weight, weight gain, FCR and carcass percentage, while fermented dragon fruit peels does not affect on initial body weight and diet consumption.

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