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PERFORMANCE OF NATURE CHICKEN WAS GIVEN RATION CONTAINING MEAL OF BREAD WASTE

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Abstract

Nature chicken is Indonesian local chickens that widely maintained and are very popular in community, because of their distinctive taste and flavour. Expired bread is a food factory waste that has the potential to be used as a feed ingredient for corn substitute rations, because it contains high gross energy and crude protein. The objective of this research was knowing the optimal dosage level of expired bread meal on nature chicken performance. The completely randomized design-based research used 100 one week old nature chicks, with five treatments and four replications. The ration treatments used were of R1(ration with 10% Expired Bread Meal), R2 (ration with 15% Expired Bread Meal), R3 (ration with 20% Expired Bread Meal), R4 (ration with 25% Expired Bread Meal) and R5 (ration with 30% Expired Bread Meal. Parameters measured were feed consumption, final body weight, feed conversion, carcass, giblet and inedible organs. The result can be concluded that ration with 25% expired bread meal gave the optimum performance, therefore it can be used as alternative on nature chicken.

Key words*: expired bread meal, internal organ, nature chicken, performance.*

INTRODUCTION

The native chicken is raised as dual-purpose chicken and can be productive in a harsh environment as well as in the low quality of diets. Native chickens have good adaptations to the environment. Consumer demand for local chicken meat is increasing every year. To support the high productivity of native chickens, one of them is by providing good quality feed so that it can meet the needs of producing eggs and optimal body weight. The ration costs incurred reach 60-70% of the total production costs. Efforts that can be made to reduce the cost of rations are to make ration formulations by utilizing alternative feeds that are cheap but can meet the nutritional needs of livestock. Expired Bread meal is an alternative source of energy and low in price. Therefore, expired bread is expected to replace some of the energy source feed ingredients such as yellow corn.

Expired bread meal from bakery products that have contains 12.25% protein and 2980 kcal/kg metabolic energy so that it can be classified as an energy source (Leeson & Summers, 2005). The results of the analysis show that the expired bread meal contains crude protein 10.25%, crude fiber 12.04% crude fat 13.42%, calcium 0.07%, phosphorus 0.019% and gross energy 4217. The results of the above analysis indicate that expired bread meal is a food factory waste that has the potential to be used as a feed ingredient for native chicken rations as a substitute for corn, because it contains high gross energy and protein. The protein content in the expired bread meal greatly affects the achievement of body weight in native chickens. Protein in the ration is needed for tissue growth, tissue repair, and production as well as part of the structure of enzymes so that protein is known as one of the main constituents of cells and body tissues. Therefore, protein plays an important role in achieving the desired carcass weight (Reddy & Quddratullah, 1996). The resulting body weight gain is an illustration of the quality of the ration given. The increase in body weight resulted from good quality rations. The quality of the protein ration will affect the intake of protein into the meat so that the amino acids are fulfilled in the chicken's body. Weight gain is caused directly by the availability of tissue-forming amino acids, so the consumption of protein rations is directly related to the growth process (Sawosz et al., 2018). Expire Bread meal also contains various nutrients including beta carotene, thiamin (vit. B1) and minerals

such as iodine and calcium (Astawan, 2007). However, the expired bread has bad flavour/taste, damage nutrients, containing fungi and toxins (poisons). Poultry is very sensitive to mycotoxin. There are several species of fungi that produce toxin, such as *Aspergillus* sp, mycotoxins, *Penicilium* sp. and *Fusarium* sp. (Lesson and Summers, 2005). Swammy et al. (2004) reported that mycotoxins affected significantly the decreasing of broiler weight gain from 21 to 42 weeks of age. According to Afzaland Zahid (2004), the levels tolerance of mycotoxin in poultry feed is about 28 ppb that is not affect health and performance of boilers. The use of mycotoxin detoxification enhance antibody which improves body weight and decreases feed conversion significantly. The toxicity level of aflatoxin in feed was 1,2 ppm (Leeson & Summers, 2005). This is considering that the expired bread contains mycotoxin that was sensitive to poultry.

From the results of the study, using expired bread mixed with Garlic Straw in the ration can replace 30% of the use of yellow corn, it has no effect on egg production and efficiency of ration. If 60% yellow corn is used in the ration, the addition of 18% expired bread meal still provides the same quality as using 60% yellow corn (Suasta, 2001). The use of baby food waste in broiler rations, the best performance was obtained at the level of 20% (Djaenudin et al., 2004). According to the calculation of the addition of expired bread meal up to 30% in the metabolic energy ration and the content of food substances for native chickens is still fulfilled. By looking at the composition of the expired bread meal, it is suspected that this material will be easily digested like yellow corn meal but must be proven biologically. Therefore, the purpose of this study is to see how the addition of various levels of expired bread meal in the ration has on the performance of native chickens.

MATERIALS AND METHODS

The study used 100 local day-old chickens (DOC) without sex separation (straight run).

DOC body weight has an average coefficient of variation of 8.13%. The cage used is cage-shaped, as many as 20 units with a length of 0.7 m, width 0.5 m, and height of 0.7 m. Each cage unit consists of 5 chicks and is equipped with a round feeder-shaped feeder and a round-water drinking container made of plastic, and a 25-watt incandescent lamp. Chicken rearing is carried out from the age of 1 day to 12 weeks, the provision of rations and drinking water is carried out *ad libitum*.

The study was conducted by experimental method and using a completely randomized design (CRD) with five kinds of ration treatments and repeated four times. The ration treatments used were of R1 (ration with 10 % expired bread meal), R2 (ration with 15 % expired bread meal), R3 (ration with 20 % expired bread meal), R4 (ration with 25 % expired bread meal) and R5 (ration with 30 % expired bread meal), given to native chickens up to 12 weeks of age ad-libitum. The ration is based on the crude protein content of 17 % and metabolizable energy of 2,850 kcal/kg (Widjastuti, 1996). The composition of the experimental ration used in the study is shown in Table 1 and the nutrient content and metabolizable energy is shown in Table 2.

Parameters measured were feed consumption, body weight gain, feed conversion, carcass weight, giblet weight and inedible organ of native chicken.

Tabel 1. The composition of the experimental ration

Feed ingredients	R1	R2	R3	R4	R5
	%				
Expired bread meal	10.00	15.00	20.00	25.00	30.00
Rice bran	12 .50	12.50	12.50	12.50	12.50
Yellow corn	48.00	44.00	40.50	36.50	32.00
Coconut meal	5.50	5.50	5.50	5.50	5.50
Soybean meal	15.00	14.00	12.25	11.50	11.00
Fish meal	8.00	8.00	8.00	8.00	8.00
Bone meal	0.50	0.50	0.50	0.50	0.50
CaCO3	0.50	0.50	0.50	0.50	0.50
Amount	100	100	100	100	100

Table 2. Nutrient Content and Metabolizable Energy of Experimental Ration

Nurient content	R1	R2	R3	R4	R5
Metabolizable energy (kkal/kg)	2,865	2,870	2,882	2,838	2.899
Crude protein (%)	17.28	17.13	15.05	17.03	17.18
Crude Fat (%)	6.47	6.54	6.69	6.99	7.00
Crude Fibre (%)	4.89	4.97	5.15	4.92	5.35
Calcium (%)	1.05	1.27	1.54	1.87	1.98
Phosphor (%)	0.61	0.63	0.63	0.62	0,62
Lysin (%)	1.42	1.41	1.40	1.36	1.38
Methionin (%)	0.35	0.38	0.43	0.45	0.42

Note: R1 = Ration contain 10% Expired bread meal; R2 = Ration contain 15% Expired bread meal; R3= Ration contains 20% Expired bread meal; R4=Ration contains 25% Expired bread meal; R5=Ration contains 30% Expired bread meal

RESULTS AND DISCUSSIONS

The results of addition of expired bread meal in the ration on the feed consumption, body weight gain, feed conversion, carcass weight, gizzard weight and inedible organ for each treatment can be seen in Table 3.

Table 3. Average feed consumption, body weight gain, feed conversion, carcass weight, gizzard weight and inedible organ

Observed variables	Treatment				
	R1	R2	R3	R4	R5
Feed Intake (g)	3545.50 a	3454.30 a	3305.45 a	3140.37 a	2954.30 b
Body weight gain (g)	820.20 a	810.40 a	780.90 a	720.40 a	680.20 b
Feed Conversion	4.32 a	4.26 a	4.23 a	4.36 a	4.54 a
Carcass weight	535,70 a	526.76 a	507.59 a	498.87 a	450.13 a
Gizzard weight	52.40 a	53.80 a	54.10 a	54.45 a	55.10 a
Inedible organ weight	202.35 a	232.23 a	252.33 a	285.10 a	282.35 a

Note : Different superscript shows significant differences.

Feed Intake

From Table 3, it can be seen that the average feed consumption in various treatments ranges from 3140.37 – 3545.50 grams. The results of statistical analysis showed that the addition of waste bread meal to the ration have significant effect (P< 0.05) on feed consumption. Feed consumption of R5 was significantly lower than those of R1, R2, R3 and R4. Feed consumption of R1, R2, R3 and R4 were not significantly different, these were caused by the low proportion of expired bread meal. The consumption of rations can be influenced by the condition of the ration itself, including taste, color and taste. The low feed consumption of R5 was probably because of the excess proportion of expired bread meal that caused different flavor. Expired bread meal might be grown by fungi. The content of mycotoxin was estimated still bellow the toxic level. The tolerant levels of mycotoxin in the poultry feed was 28 ppb (Afzal & Zahid, 2004). The substitution of yellow corn with more expired bread meal, with a lighter ration color makes chickens more interested in consuming more rations. The addition of up to 25 percent of expired bread meal showed a very good ration composition due to the right balance between yellow corn and expired bread meal. According to opinion Sarastani et al. (2002) reported that long of storage may cause several decreasing of nutrition quality, safety, flavor (taste) and texture.

Body weight gain

The results of the variance showed that the treatment had a significant effect (P<0.05) on body weight gain. Body weight gain in treatment R1, R2, R3, and R4 was higher as a result of increased consumption. The more rations consumed, the faster the growth rate achieved. The substitution of corn with 30% expired bread meal (R5) significantly decreased weight gain. The decrease of weight gain was caused by a taste or flavour and mycotoxin from expired bread meal. According Watt et al. (2003) reported that mycotoxin in the feed decreased the weight gain of broiler (from 1 to 21 days).

The body weight gain of R1, R2, R3 and R4 was not significantly different, it may be caused by mycotoxin content in R1 -R4 was still in the normal range that did not interfere the growth process. The composition of the ingredients used in making bread is one of them is milk and it is a source of protein and calcium for the body, with the addition of expired bread meal can increase the calcium content in the ration which can then be utilized by the body, especially bones and muscles so that it will affect the increase in body weight.

Expired bread meal is a food factory waste that has the potential to be used as an ingredient in chicken rations as a substitute for corn, because it contains high gross energy and protein. The bread was made of several materials such as wheat flour, eggs, sugar, margarine, cooking oil and some materials. All of these components are source of protein and amino acids. The quality of the protein ration will affect the intake of protein into the meat so that amino acids are fulfilled in the chicken's body. Bodyweight gain is caused directly by the availability of tissue-forming amino acids, so that the consumption of protein rations is directly related to the growth process.

Feed Conversion

In Table 3, it can be seen that the addition of expired bread meal to the conversion value gives a positive increase. The use was expired bread meal 0-30 % in the ration had not affected on feed conversion ratio, although the R5 had the lowest feed consumption and body weight gain. The addition of expired bread meal which is an energy source can increase palatability.

This is because the composition of the ingredients used in making bread is milk. Milk contains lactose which can be used as a medium for the growth of beneficial bacteria in the digestive tract of chickens such as lactobacillus. These bacteria anaerobically produce lactic acid which can increase bile secretion into the small intestine so that it can improve and increase cell metabolism, resulting in increased absorption of nutrients in the jejunum and ileum.

The increased absorption of substances will in turn improve the efficiency value of the use of rations, so that it will affect the conversion value of the ration.

Carcass weight

Carcass weight is closely related to the live weight of chickens at harvest time. In addition, part of the ration that is very influential for carcass formation is the protein content of the ration (Widjastuti et al., 2021). Carcass weights were not significantly different ($P>0.05$) in all using of expired bread meal 10% - 30% (R1-R5), though the R5 had the lowest feed consumption and body weight gain. This is because to the bread was made of several materials such as wheat flour, eggs, sugar, margarine, cooking oil and some materials. All of these components are source of protein and amino acids. In the R5 treatment, expired bread meal was used more as a substitute for corn so as to provide better feed quality. Therefore, even though the consumption of R5 feed was the lowest, it could still produce the same carcass weight. Expired bread meal mixture in the form of milk has complete amino acids, especially essential amino acids. The function of protein is mainly to build muscle/meat. Carcass is the part of the chicken that contains the muscle/meat. The proportion of expired bread meal on R5 was higher than on R1, R2, R3 and R4, so it may contain more complete amino acids, so that although feed consumption and body weight gain decreased, carcass weight did not differ significantly. Research Quentin et al. (2005) concluded that amino acids affect carcass production.

Giblet Weight

Giblet is an edible product consisting of a combination of heart, liver, and gizzard organs. The average weight of native chicken obtained from this study can be seen in Table 3. The results of the analysis of diversity showed that the addition of expired bread meal gave no significant difference ($P>0.05$) on the giblet weight of native chicken. This can be interpreted that the giblet weight in each treatment is still in the normal range, although there is an increase in the average weight and percentage of giblet in treatments R4 to R5, but this is not significantly different.

The giblet weights that were not significantly different ($P>0.05$) were thought to be caused by the final live weights that were not significantly different. Live weight is the result of the process of growth and development of livestock which

is supported by various internal and external factors, such as the nation and the ration used. Genetics as well as the intake of ration nutrients that can be absorbed are factors that can affect the size, shape, and body composition of an animal. Ideally, the external and internal organs will also increase along with the increase in live weight. The sizes of body parts will proportionally adjust to live weight, this is so that each organ is able to work optimally on the individual livestock. In line with the statement Setiadi et al. (2012) that live weight affects giblet weight. The higher the live weight, the higher the giblet weight produced.

In addition, there was no increase in giblet weight, because basically the enlargement of the heart, liver, and gizzard organs was more influenced by their activity. One of the activities that can improve the performance of these organs is in digesting the crude fiber content in the ration. Poultry will increase their metabolic ability to digest crude fiber thereby increasing the size of the heart, liver, and gizzard (Hetland et al., 2005). However, the provision of too high crude fiber will reduce the consumption of rations, because the chickens will feel full longer, causing a lower final live weight to be produced. According to Haryadi et al. (2015), when the crude fiber in the ration exceeds the requirement, the livestock will need more energy to digest. Thus, the energy that can be used to digest protein and other substances will be reduced. The crude fiber content of the ration used in this study was < 6%, the crude fiber content was not higher than the standard requirement for native chickens, namely a maximum of 7%-8% (SNI, 2013). In addition, the addition of expired bread meal in the ration proved that there was no significant increase in the performance of the heart, liver, and gizzard. The crude fiber content in the treatment rations in this study could still be tolerated by livestock so that it did not have a significant effect on increasing the size/weight of the heart, liver, and gizzard produced.

The in-edible part

In-edible parts consist of bone and slaughtered waste which includes blood, feathers, head, feet, gastrointestinal system including digestive and intestinal fat, abdominal fat, as well as other wastes such as windpipe, lungs, reproductive organs, pancreas, spleen and kidney (Murawska et al., 2011). The results of the analysis showed that giving expired bread meal to the ration had no significant effect (P>0.05) on the in-edible weight of native chickens. Nature chickens at the age of 12 weeks, the weight of the internal organs has exceeded the maximum growth limit, so that the increased body weight is not followed by an increase in the weight of the internal organs (Dennis, 2016). The internal organs except for the reproductive organs in the livestock body are parts of the body of livestock that are ripe early because they are important in providing metabolic products for growth, as well as the head and legs, because the head is a very important organ in regulating all livestock life, namely the brain, while the legs are an important tool in finding food from the time of hatching. The weight of the in-edible part shows results in the range of 139.8-162.1 grams. Forest et al. (1975) stated that the percentage of in-edible parts decreased with increasing live weight. If the in-edible weight of this study is calculated as a percentage, the results obtained are 24.67-35.9 percent. The percentage of in-edible varies between 20-38 percent of body weight (Card & Nesheim, 1976). By looking at the composition of expired bread meal, it is suspected that this material will be easily digested, such as yellow corn meal, it can maintain digestive function in the body and the work of the digestive tract does not experience disturbances so that the weight that cannot be eaten remains in normal condition.

CONCLUSIONS

1. The use of expired bread meal up 30% in diet produced optimal performance compared to 30%. The use expired bread meal 30% decreased feed consumption and body weight gain.
2. The use expired bread meal up to 25% in the ration can be used as alternative source of energy on nature chicken.

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