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Addition Herbal Feed Additive to Local Duck Egg Production

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Abstract – Increased production of duck eggs with the support of local potential in the form of supplementary rations is still rarely used by laying duck breeders as feed additives, in Indonesia and especially in North Sumatra, it has the potential to support supplementary herbal rations that are easily obtained at low prices and can even be obtained for free. Among them are turmeric, meniran and garlic which contain herbal ingredients as natural antibiotic growth promoters (AGP). The purpose of this study was to determine the benefits of adding herbal feed additives to the production and quality of local duck eggs. The research method used was a non-factorial completely randomized design method consisting of 4 treatments with 5 replications, where treatment 1 was a control ration without the addition of feed additives, treatment 2 was a control ration with the addition of 3% Garlic flour, Treatment 3 was a control ration with the addition of 3% flour and treatment 4 is the control ration with the addition of 3% turmeric flour. Observations of the research carried out were the level of feed consumption, egg production, egg weight, ration conversion and egg yolk index. The results obtained showed that the results were not significantly different in the observations of feed consumption, egg production, egg weight, ration conversion and egg yolk index. The conclusion of this study was that the addition of herbal feed additives in the ration of laying ducks did not have a significant impact on all observations, however, the data improved the quality of the feed conversion and increased egg production and weight due to the performance of the essential oil content which acts as an antibiotic, prebiotic and natural phytobiotic. which is owned by turmeric, garlic and meniran. The advice given is that farmers use herbal feed additives in livestock rations to increase the effectiveness of the ration and egg quality

Keywords – Duck, Eggs, Feed Additive,

I. INTRODUCTION

Ducks are poultry that have the potential to produce eggs after chickens. Eggs provide nutritional intake, especially protein for the body. However, this duck egg has the disadvantage that it has higher fat and cholesterol than chicken eggs. According to Harahap et al 2021, duck eggs contain 14.7 g fat 100 g-1 eggs and chicken eggs contain 11.5 g fat 100 g-1 eggs. Animal products also generally contain large amounts of saturated fatty acids, such as palmitic and stearic acids, as well as monounsaturated fatty acids, such as oleic and small amounts of unsaturated fatty acids (PUFA) (Indriati and Yuniarsih, 2021). Saturated fatty acids are dangerous fatty acids. Meanwhile, unsaturated fatty acids are relatively stable fatty acids and can lower cholesterol levels and do not cause tumors. So there needs to be an effort to produce healthier livestock products, including nutritional engineering. Garlic contains active chemicals such as allicin, skordinin, allil, saponins, diallysulfide and prophyll allyl sulfide and methylalil trisulfide. Allicin (thiopropen sulfinic acid allyl ester) is a compound that is thought to reduce blood cholesterol levels (Putra, 2017). Feed is one of the determining factors in the quality of duck eggs produced. In addition to quality rations, the use of feed additives is also added to optimize the use value of feed. One of the additives used is an antibiotic. Antibiotic rations reduce the number of disease-causing and toxin-producing microorganisms in the digestive tract, thereby increasing the absorption of nutrients (Hathaway et al. 1996). The use of antibiotics in the ration, apart from being a growth promoter and reducing mortality rates, can also increase farmers' income due to increased feed efficiency. The use of antibiotics can cause residues that have a

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negative impact on consumers such as allergies in humans, the emergence of resistant microorganisms in the body of livestock. According to the European Union Community Commission, since January 1, 2006 (Regulation No. 1831/2003) the use of antibiotics such as Avilamycin, Avoparcin, Flavomycin, Salinomycin, Spiramycin, Virginiamycin, Zn-Bacitracin, Carbadox, Olaquindox, and Monensin cannot be used in livestock rations . The use of these additives in livestock rations in several European countries was banned earlier such as Sweden in 1986, Denmark in 1995, and Germany in 1996 (Porwanto et al 2019). Law No. 41 of 2014 concerning Livestock and Health Animals clearly have a ban on supplementary rations in the form of antibiotics. Therefore there needs to be a solution to overcome this problem. Use of feed additives Herbs can be used to replace antibiotics. Herbal feed additives which consists of temulawak (Curcuma xanthorrhiza) and turmeric (Curcuma longa). The content of the active substance curcumin can function as an antibacterial, appetite enhancer and digestibility of feed ingredients. The active substance curcumin given to broiler chickens affects the level of consumption, weight gain and value conversion (Ayundari, 2021). Therefore, it is necessary to do research with the addition of herbal feed additives in duck rations which are expected to improve the quality of local duck eggs.

II. Materials And Methods

Methodolgi

Experimental research methodology was used to determine the response of the impact of adding herbal feed additives to local laying ducks on the level of consumption and egg production. Completely randomized design used in this experiment consisted of: treatment 1 conventional ration, treatment 2 conventional ration 100% + 3% garlic flour, treatment 3 conventional ration 100% + 3% flour Meniran, treatment 4 conventional ration 100% + 3% flour Turmeric.

Population and sample of the study

The research population used in this study was 100 local female laying ducks aged 6 months which were fed according to the treatment for 3 months of egg production.

Material

The research materials used in this experimental study were: 100 local female laying ducks, the raw materials for conventional feed consisted of Meninran Flour, Garlic Flour, Turmeric Flour, Bekatur, Corn, Coconut Cake, Palm Kernel Cake, Soybean Meal, Fish Flour and Minerals, Complete equipment in the form of feed and drinking containers and observation cages, stationery and notes

Experimental design

The experimental design used was a completely randomized design consisting of 4 treatments with 5 replications using 100 local female laying ducks, treatment 1 conventional ration, treatment 2 conventional ration 100% + 3% Garlic Flour, treatment 3 conventional ration 100% + 3 % Meniran flour, treatment 4 100% conventional ration + 3% turmeric flour. Feeding and drinking is carried out ad-libitum

Procedure

The research was carried out with procedures for constructing experimental cages, cleaning and disinfecting the experimental area, selecting experimental animals, preparing feed according to treatment, feeding management, recording data and analyzing research data.

Data Gathering

Data collection was carried out after adaptation of local female laying ducks to the treatment feed given, the data taken were ration consumption, egg production, egg weight, ration conversion and egg yolk index.

Field experiment

Preparation of cages and livestock

This study used 100 local laying ducks aged 6 months which were placed into 20 experimental plots filled with 5 experimental ducks in each plot. Each plot treatment was treated according to a randomly assigned design.

Data Gathering

Data collection was carried out by measuring the level of consumption of the given ration, then calculating the amount of egg production, and carrying out laboratory analysis of the quality of the eggs produced.

Observation of egg production was carried out from the beginning of laying eggs for three months of production. Observation of egg quality was carried out in the third month of laying period when egg size was stable.

III. Result And Discussion

From the research observations, the research results obtained with observation parameters including ration consumption, egg production, egg weight, ration conversion and egg yolk index. The consumption of the ration given starts from the introduction of livestock into the research plot according to the treatment, the laying ducks used in this study were ducks aged about 6 months.

Table 1. Consumption of research laying ducks ration

Treatment	Feed consumption
Treatment 1	148,80 ± 2,07
Treatment 2	150,20 ± 1,30
Treatment 3	150,40 ± 3,56
Treatment 4	151,40 ± 2,95
F	1,07
P-value	0,39
F crit	3,24

The ration consumption data obtained is the consumption data of the research conducted for 3 months of observing the consumption of rations after starting egg production. From the results of the study, it was obtained that the results were not significantly different where the highest consumption of duck rations was obtained in the P4 treatment (feed with the addition of turmeric flour). good digestive tract food will increase the level of consumption From the results of the study, it was obtained that the highest average consumption of duck rations in treatment P4 (with the addition of turmeric flour in the feed) obtained the highest consumption of 151.40 G/head/day and the lowest was in treatment P1 (control feed) with an average consumption of 148.80 G/head/day. When compared with the results of other studies, the research results obtained have a lower level of consumption compared to the results of Sinurat (2000) which states that the ration requirements for ducks at the age of >20 weeks (adults) are 160-180 g/head/day for ducks. layer period. This shows that the amount of duck consumption at the time of the study was almost fulfilled and caused by environmental temperature and calories are the main factors that affect the daily consumption of rations (Amrullah 2004). According to Purba and Ketaren (2011) during the growth phase, ducks generally require relatively large and quality rations in order to grow and develop perfectly and the use of fish meal with a high enough level (up to 23% in the ration) is able to trigger ducks to consume large amounts of rations. many. Fan et al. (2008) also stated that the provision of rations containing high energy can increase ration consumption which is closely related to the growth of poultry. Fish meal besides having a high protein content (56.07%) also has a fairly high fat content (5.68%).

Egg production is calculated based on the number of eggs produced compared to the total population of ducks that are kept. The egg production data obtained is still in production calculations for 3 months of egg production as shown in the following graph:

Table 2. Egg Production Table of research eggs

Treatment	Egg Production
Treatment 1	70,80 ± 1,64
Treatment 2	71,25 ± 1,22
Treatment 3	71,81 ± 1,30
Treatment 4	72,12 ± 0,73
F	1,08
P-value	0,38
F crit	3,24

From the results of the study, it was obtained that the results were not significantly different where the highest production of duck eggs was obtained in treatment P4 (feed with the addition of turmeric flour) which was 72.00% and the lowest was in treatment P0 (Control feed) of 70.80%, this is because the benefits of curcumin content in the digestive tract can increase the absorption of nutrient rations in the digestive tract so as to maximize the value of nutrients absorbed and have an effect on the level of egg production produced. The results showed that the highest production level was in treatment P4 which was 72% and the lowest was in P1 which was 70.80% when compared to the results of the research by Indrasanti et al, 2018 which resulted in egg production of Tegal ducks as much as 64.89% and Magelang ducks as much as 75.44% , and Setioko and Rohaeni (2001) who reported that Alabio ducks fed with Haliling (water snails) produced an average egg production of 66.68% with a peak production of 80.69%. where the research results are not much different from the results obtained. Solihat et al. (2003) stated that egg production is influenced by feed, genetics and speed of sexual maturity. And according to Yuwono et al. (2005), another possibility that causes differences in egg production is the amount and nutrient content of the ration is not optimal, because the nutrient requirements during the egg formation process are inadequate.

North and Bell (1990) stated that differences in egg production are influenced by genetic differences, which are caused by inheritance of traits from their parents, namely early sexual maturity, high egg intensity, laying percentage, clutch, and early breeding period. Tuiskula-Haavisto et al (2002) reported that egg production characteristics were influenced by genetics, namely QTL (Quantitative Trait Loci) which affected the age at first laying eggs, egg weight, and the number of eggs contained on the Z chromosome.

This temporary ration conversion data is obtained from the total number of rations consumed divided by the total number/weight of eggs that have been produced. The research data on the average egg weight during the study can be seen in the following graph:

Table 3. Conversion of duck rations during the study

Treatment	Feed Conversion
Treatment 1	2,22 ± 0,07
Treatment 2	2,14 ± 0,10
Treatment 3	2,15 ± 0,07
Treatment 4	2,12 ± 0,10
F	0,29
P-value	0,82
F crit	3,23

The data from the research above shows that the highest duck ration conversion was found in treatment P4 (control feed) in the ration of 2.18 and the lowest was in treatment P1 (with the addition of turmeric flour) of 2.14. The results obtained are lower than the results of Imam Suswoyo and Rosidi (2017) which states that the overall average ration conversion in this study is 3.70 + 0.62 with the lowest ratio 3.16 and the highest 4.83. And the research results Hidanah et al. (2011) who reported that the ration conversion of laying ducks in the production period ranged from 5.84 ± 1.55. Furthermore, Ketaren et al. (1999) said that the poor conversion of duck rations was caused by the eating habits of ducks, including the habit of immediately seeking drinking water after eating. In general, the rations are scattered/wasted when the ducks move from the ration to the drinking place or are also dissolved in when the ducks drink. The poor conversion of the ration may also be caused by the inability of the ducks to control the amount of ration consumption which is regulated by the amount of energy consumption as can be done by chickens. However, the results of this ration conversion study were still much better than the results of the Purba and Ketaren (2011) research which showed ration conversions of 5.03±0.06 to 5.35±0.25. Iskandar et al. (2001) also showed that there was a high average feed conversion rate for Mojosari ducks, which was 6.59 given a ration of 20% trash fish and 80% bran. The conversion of these different rations indicates a fairly high difference if the rations are made from different ration materials

Egg weight was obtained by weighing eggs using a digital scale with egg weight units of grams/grain, the results of the research carried out were obtained in the following graph:

Table 4. Table of egg weights during the study

Treatment	Egg Weight
Treatment 1	68,21 ± 1,92$^{(tn)}$
Treatment 2	69,42 ± 2,70$^{(tn)}$
Treatment 3	69,64 ± 2,07$^{(tn)}$
Treatment 4	70,81 ± 2,28$^{(tn)}$
F	1,10
P-value	0,37
F crit	3,23

The results showed that the highest egg weight analysis was found in treatment P4 (with the addition of turmeric flour to the ration) of 70.80 g/grain and the lowest was in treatment P0 (Control Feed) of 68.20 g/grain. The results of this study are almost the same as those of Prasetyo and Ketaren (2005) who reported that the egg weight of Tegal ducks was 70.8 ± 4.7 g/grain. However, it is higher than the results of the study. The egg weight of Magelang ducks was 65.370±4.580 g/grain, which was lower than that of Susanti et al. (2019). The egg weight of Mojosari ducks was 71.370±4.863 g/egg, which was higher than the research by Prasetyo and Ketaren (2005), which reported the egg weight of Mojosari ducks was 60.3±6.2 g/egg. The opinion of Tamzil Results (2017) which states that ducks are voracious birds, if the population is too high with a limited ration space, it is very possible for events to crush and stamp on each other while eating. Another possibility that can occur is that the energy consumed is used more for motion energy so that it has a negative impact on egg production and weight. In contrast to the opinion of Prasetyo and Susanti (2000) that the weight of ducks when they first lay their eggs is very influential on the weight of the first egg, where ducks that have a light weight when they first lay eggs tend to produce a smaller weight of the first egg.

The yolk index analysis has not been obtained because the measurement of the yolk index on eggs will be carried out at the end of the observation period as shown in the following graph:

Table 5. Duck egg yolk index during the study

Treatment	Yolk Index
Treatment 1	0,37± 0,02
Treatment 2	0,38 ± 0,02
Treatment 3	0,36 ± 0,02
Treatment 4	0,37 ± 0,03
F	0,42
P-value	0,73
F crit	3,23

The results showed the average value of the egg yolk index ranged from 0.37 to 0.38 and from the analysis results showed that the results were not significantly different. This happened because the treatment given to ducks had no effect on the yolk index, and when compared to the results of the research, Sunarti et al (2019) stated that the index value for white egg yolks was 0.37 ± 0.04 with a coefficient of variation of 11.247 and colored eggs. bluish green was 0.38 ± 0.03 with a coefficient of variation of 8.49. A good yolk index ranges from 0.40-0.42, if eggs are stored too long, the yolk index decreases to 0.25 or less. This is because the yolk is getting thinner and has a yolk index of 0.30 to 0.50 (Indratiningsih and Rihastuti, 1996). The average yolk index produced is within the range of the results of the study by which stated that intensively reared ducks produced an egg yolk index ranging from 0.4056 – 0.4074 and semi-intensive 0.4136 – 0.4144. Yosi (2014) stated that the normal duck egg yolk index ranged from 0.36 - 0.41

This is in accordance with the opinion of Sujana et al. (2006) which states that measurement of the yolk index carried out at the same time will produce a variety of measurement values that are relatively the same. Widyantara et al. (2017) stated that the older the age of the egg will cause the diameter of the egg white to widen so that the egg white index value is getting smaller

IV. Conclusions

The addition of herbal feed additives in the ration of laying ducks had an insignificant impact in increasing the efficiency of the use of rations and improving the quality of duck eggs, but the data improved the quality of the ration conversion and increased egg production and weight due to the performance of the essential oil content which acts as an antibiotic, prebiotic and natural phytobiotics owned by turmeric, garlic and meniran.

V. Recomendations

Laying ducks feed should use self-mixing rations by adding herbal feed additives such as turmeric, garlic and meniran to increase the efficiency of the use of rations and improve the quality of the eggs produced which ultimately increase the income of laying duck farms.

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