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The Effect of AUDI Technology with Improvement Ration on Productivity of Arab's Hen 2nd Phase

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ABSTRACT

This study used the AUDI's technology application with repair rations, aimed at increasing the productivity of Arab's hens in the 2nd phase. The repair ration is focused on the addition of calcium minerals. AUDI technology is a combination of water filtering technology with extract beluntas (*Pluchea indica L.*). The research used seventy two Arab's hen with homogenous body weight. The study used a completely randomized design with 3 treatments, 6 replications, each replication consisting of 3 chickens. The research was conducted in 6 weeks of treatment. The parameters measured in this study were ration consumption, calcium consumption, hen day production (HDP), eggshell weight, and thickness. The results showed that the use of AUDI technology on rations significantly improved ($p < 0.05$) affected ration consumption, calcium consumption, and increased hen day production (HDP), but did not affect weight, and thickness of an eggshell. Feed intake and calcium consumption significantly influenced by differences in calcium and crude protein in the rations. Based on these results, it was found that the use of AUDI technology was able to shorten the clutch cycle in laying hens so that production still reached 60-70% equivalent with phase I. Weight and thickness of eggshells were not affected by the use of AUDI technology and improved rations because the hens used as subject had reached peak production.

1. Introduction

Livestock contributes an important role in supplying consumption protein in Indonesia. Open house farming has many obstacles. One of the obstacles is pollution. Based on research, public believed that poultry farms accounted for air pollution of 59.38% of total global warming [1]. Based on research data, it is known that the contribution of pollution from poultry farming contributes as much as 33% compared to other livestock commodities [2]. This has sparked controversies, especially with the environment and the veterinary community (people who live around that farm, workers). The ups and downs of a poultry farm business centered on the cooperation between the farm owner and the community. Even some livestock businesses have to go out of business due to inadequate waste management.

The benchmark for the success of the livestock business is in waste management which is in line with the increase in feed utilization and or productivity. Arab's hen is one of the domestic chickens that are widely developed in Indonesia. The main commodity is eggs, with white eggshells and a higher selling value than brown eggs. Arab's hen has high productivity, approximately 50-80% [3] [4] [5], productivity variations depend on the quality of feed used [6].

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To reduce the level of existing pollutants, research has been carried out with the use of AUDI on Arab's hens. Furthermore, the study data showed that the nitrogen content in manure has decreased [7]. The nitrogen left in the stool can give off an odor because of the ammonia bonds that are formed. Through this research, it can be concluded that AUDI can suppress pollutants in poultry farms. AUDI technology is an application using beluntas extract with a concentration of 1%, consisted of combination of water purification applied to the drinks.

Beluntas extract is an extract from beluntas leaves (*Pluchea indica L*) which is easy to develop and is usually grown as a hedge plant. Beluntas extract contains an alkaloid, flavonoid, tannin, chlorogenic acid, magnesium, and phosphorus compounds which can inhibit the number of bacteria *Staphylococcus sp*, *Corynebacterium*, *Escherichia coli* in the digestive tract [8] [9]. This inhibitory activity of microorganisms can increase the maximum utilization of nutrients so that no nutrients are wasted and cause odors [9]. The application of AUDI technology is expected to be able to improve nutrient utilization in layer hens so that productivity can be maximized. Based on the background, this study was conducted by evaluating the utilization of nutrients with the aim of productivity of the Arab's hen 2nd phase, still showed positive or not detrimental to the farm.

2. Method

The research used 72 Arab's hen 2nd layer phase with homogenous body weight. The study used a completely randomized design with 3 treatments, 6 replications, each replication consisting of 3 chickens. The research was conducted in situ in the Arab poultry farm in Kalisidi, West Ungaran for 6 weeks of treatment and 1 week of the early adaptation period. The feed ingredients used are yellow corn, rice bran, layer concentrate, completed feed crumble, fish meal, soybean meal, *Azolla microphylla*, $CaCO_3$, oyster shell, top mix.

The equipment used were battery cages, digital scales, feed containers, and drinking containers modified by AUDI technology (a combination of water filtering with the use of beluntas leaf extract) and nipple drinking, as well as the basic ingredient of AUDI technology in the form of beluntas leaf extract. The treatment rations consisted of 3 types of rations based on farms whose nutritional balance had been improved, especially calcium and crude protein (Table 1).

Table 1. Research ration composition

Feedstuff	Treatment (%)		
	T1	T2	T3
Complete feed	-	90,5	-
Layer concentrate	60,00	-	-
Yellow corn	11,00	-	40,00
Rice bran	20,00	-	29,00
Fish meal	-	-	-
Meat Bone Meal	-	-	6,50
Soybean meal	-	-	9,00
Azolla microphylla	-	-	6,00
$CaCO_3$	3,00	3,00	3,00
Oyster shell	6,00	6,00	6,00
Top Mix	0,50	0,50	0,50
AUDI Technology Applications 1%	Ad libitum	Ad libitum	Ad libitum
Content of crude protein ration (%)[1]	16,23	15,31	16,98
Content of calcium ration (%)[2]	0,0727	0,0712	0,0408
Content of phosphor ration(%)[2]	0,0042	0,0046	0,0070

[1] : Based on proximate analysis at Laboratory of Nutrition and Feed Science, Animal and Agriculture Science, Diponegoro University; [2] : Based on mineral analysis at Laboratory of Nutrition and Feed Science, Animal and Agriculture Science, Diponegoro University.

T1 ration from farms whose nutritional balance is improved by using $CaCO_3$ and oyster shell. The T2 ration is the 2nd type of farm ration whose nutritional balance is improved by using $CaCO_3$ and

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oyster shell. The T3 ration is a reference ration [3] whose nutritional balance is improved. The ration was given ad libitum measured.

The AUDI technology application was applied on drinking water and given ad libitum for 42 days with a concentration of 1% beluntas extract. The remaining ration was measured the next day before given the next day's ration. Egg production data were collected every day, while data of eggshell weight and thickness were measured at the end of the study. The data analysis was analysis of variance (ANOVA) followed by Duncan's test at 5% level if there were significant data.

3. Results and Discussion

Based on the research, the results obtained were in the form of ration consumption, calcium consumption, hen day production (HDP), eggshell weight, eggshell thickness are as follows :

Table 2. Data of ration, calcium consumption, *hen day production* (HDP), weight of eggshell, eggshell thickness

Parameters	T1	T2	T3
Ration consumption (g/hen/day)^{sig}	143,56^{a}	136,78^{a}	115,06^{b}
Calcium consumption (g/hen/day) ^{sig}	0,52^{a}	0,48^{a}	0,23^{b}
Hen day production (%)^{sig}	66,79^{a}	76,15^{a}	42,31^{b}
Weight of eggshell (g)$^{n.sig}$	4,78	5,16	5,20
Eggshell thickness (mm)$^{n.sig}$	0,75	0,80	0,78

Different superscripts on the mean value line indicate significant; sig : signifikan (P<0,05); n.sig : non significant (P>0,05)

Ration Consumption

Dietary and calcium consumption data showed differences in data between them. The difference in ration consumption data occurred because the crude protein content and metabolic energy in the ration were not the same. Ration improvement was prioritized with adding dietary calcium and crude protein content. This unequal crude protein content causes differences in ration consumption. This was also revealed in different studies, that the unequal content of crude protein and metabolic energy resulted in differences in ration consumption [1] [10].

In the data, it was found that the difference in numbers were based on the Duncan test, T1 was the same as T2 but not the same as T3. The T3 ration was less palatable than the T1 and T2 rations. This happened because of the *Azolla microphylla* on that ration. *Azolla microphylla* had a high crude fiber content of 9.50% and did not experience micronized particles in its administration which may affect the level of palatability of the ration. The daily ration consumption was reflected in the condition of the livestock. If the consumption is far from the existing reference or standard, the livestock may be were experienced health problems, productivity, or stress [11] [12].

Calcium Consumption

Calcium consumption data was obtained based on the calculation between ration consumption and dietary calcium content. Calcium consumption was in line with the data pattern of ration consumption and ration calcium content. The consumption of T3 calcium tended to be low compared to T1 and T2, whereas, the use of *Azolla microphylla*, oyster shell, and $CaCO_3$ provided the largest contribution of calcium. Based on the analysis, the calcium content in *Azolla microphylla*, oyster shell, and $CaCO_3$ were 0.99%; 37.18%; and 39.38%. The use of these three feed ingredients was relatively low compared to other feed ingredients so that the contribution of calcium in the ration was also low. The opinion of previous research, states that calcium consumption is influenced by the calcium content in the ration and the level of palatability of the ration [3].

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***Hen Day Production* (HDP)**

Hen day production (HDP) is a measure of the success of a poultry farm. High HDP can be used as an indicator for farmers in obtaining daily income turnover. HDP of Arab's hen in phase I was higher than that of phase II or nearing the end. HDP of native laying hens could be categorized into 3 groups. High category with 80-90% HDP, medium 60-70%, a low below 50%. Arab's hen is a local domestic chicken category with high HDP average for phase I.

Data of HDP showed a significant difference. HDP in T1 was not significantly different from T2 but significantly different from T3. The T1 diet had a crude protein content of 16.23%. The crude protein content in the T2 ration was 0.92% lower than that of T1. The crude protein content in the T3 ration was 0.75% higher than T1 and 1.67% higher than T2. Meanwhile, the calcium content of the T1 and T2 rations were the same, and the calcium content of the T3 ration was 0.03% lower than the T1 and T2. This difference in crude protein and calcium content can affect the HDP of Arab's hen [13] and [3] but does not become the main reason for the difference in HDP that occurs.

The Arab's hen used in the study was a 2nd phase laying hen, where normal HDP ranged from 30-50%. Nonetheless, in this study, HDP was found to be equal in height to phase I, namely 60-70% in T1 and T2 chickens. To increased the use of rations, used of AUDI technology can be applied to increase HDP. The active substance used in this AUDI technology comes from beluntas extract, where alkaloid compounds, flavonoids, tannins, essential oils, chlorogenic acid are found in this extract. Beluntas extract is also believed to be able to inhibit the number of *Staphylococcus sp, Corynebacterium, Escherichia coli* bacteria in the digestive tract to maximize the absorption of existing nutrients [9] [7]. The use of green plants generally contains antioxidants that can reduce pathogenic bacteria in the digestive tract of chickens.

It is different from the HDP rations treated with T3, where the calcium content of the ration is low and the crude protein of the ration is high. This inconsistency causes the metabolism of calcium and protein absorption to be incompatible and results in lower HDP compared to T1 and T2. The application of AUDI technology did not affect HDP of T3 . Nonetheless, after 2 weeks of AUDI application with the same ration, a phenomenon was found that there was an increase in egg production with HDP by around 60%. That is, in certain cases the application of AUDI can shorten the clutch of laying hens before the end of the day, so that egg production increases.

Weight and Thickness Eggshell

Eggshell weight and thickness were not significantly affected by the use of repair rations and the application of AUDI technology. This is possible because the Arab's hen used has passed the peak production phase [3]. Eggshell weight and thickness are influenced by the use of calcium balance and better bioavailability because the formation process is influenced by the amount of calcium in the blood plasma, although in this study it was not measured. According to the opinion [14] that blood plasma calcium will be used by laying hens for the process of eggshell calcification. The availability of calcium in blood plasma is also influenced by the quality of amino acids in the feed. This is because the absorption of calcium in the blood requires protein, especially the amino acids lysine and methionine in absorption in the intestinal wall [15].

4. Conclusions

The use of AUDI technology with a combination of improved rations can increase egg production of laying Arab chickens before the end of the month. Besides, the use of AUDI technology can shorten the clutch cycle in the phase layer, especially in the second phase.

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