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Evaluation of the Use Flour Kenikir (*Cosmos caudatus* Kunth) as an Organic Feed Additive on External Eggs Quality of Laying Hens

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Abstract**—** *This research purpose to evaluate the effect of using flour (stem+leaves) on kenikir plants which is potential as a feed additive to the external quality of laying hens. This research has been conducted in Bacem Village, Sutojayan District, Kab. Blitar. This research uses an experimental method with design Complete Random Design (CRD) consists of 4 X 6 replications. Treatment P0 = Basal Feed + 0% flour (stem + leaf) kenikir, P1 = Basal feed + 0.25% flour (stem + leaf) Kenikir, P2 = Basal feed + 0.50% flour (stem + leaf) kenikir, P3 = Basal feed + 0.75% flour (stem + leaves) kenikir. The data were analyzed by ANOVA and continued by Duncan's Multiple Range Test (DMRT). The parameters observed are egg shell weight, proportion of eggshell and thick eggshell. The results of research showed that the gift of flour (stem + leaves) of kenikir plants as feed additives give significantly different effect (P <0.01) on egg shell weight, proportion of eggshell and not significantly different effect (P>0,05) on thick eggshell. The conclusion of this research gift flour (stem + leaves) of kenikir on level 0,75% can give effect the external quality eggs of laying hens.*

Keywords**—** *External, Egg quality, cosmos caudatus kunth, laying hens, Phytobiotic.*

I. INTRODUCTION

Some general terms that are often discussed about quality and egg standards are the external parts of the egg. The external quality of eggs refers to the weight of the shell, the proportion of the shell and thickness of the eggshell because the external part of the egg is a very important part in protecting the contents of the egg. Eggshell is the outermost part of the egg content obtained by weighing the eggshell and thick eggshell obtained by measuring the blunt part of the upper, middle and pointed parts of the eggshell using a caliper in units (mm). Some factors that often affect the external part of the egg are feed additives.

Feed additives are encapsulated feed ingredients, liquids or flour that are added to the feed mixture in a small amount of maximum use of 1% in a mixture of 100 kg of feed to increase the feed content. The purpose of giving feed additives is to improve the external quality of eggs because eggs with a low shell thickness easily penetrate the contents of the egg so that the eggs will be easily contaminated with pathogenic bacteria such as salmonella sp and Escherichia coli. However, giving AGP feed additives is very worrying because in addition to leaving antibiotic-resistant bacteria also the external quality of the eggs obtained is not able to maintain the contents of the inner egg (internal quality) so that the eggs are easily damaged and broken.

One of the efforts made to overcome this problem is the addition of additive herbal feeds from the leaves and stems of kenikir plants. Because it has active substances (Saponins, polyphenols and flavonoids) that have benefits as antibacterial and immunity in the external qualities of eggs.

II. MATERIAL AND METHODS

A. Location and Time

Bacem Village, Sutojayan District, Kab. Blitar is the location of the study. The study lasted for 5 weeks from 26 November 2018 - 6 January 2019. Proximate analysis of feed ingredients was carried out at the Animal Nutrition and Food Laboratory, Faculty of Animal Husbandry, Universitas Brawijaya. The making process of flour (stem + leaves) kenikir plant was carried out at the Materia Medica Batu Laboratory, Malang.

B. Research Material

The feed used consisted of Corn, Bran, Bone Meal Meat, CPO, DCP, UB feed, stone flour, stone groats, Sodium bicarbonate and feed additives, The animals used in this study were Strain Hy-Line Brown chicken 35 weeks old as many as 240 birds.

C. Research Methods

This research method uses an experimental method using a Completely Randomized Design (ANOVA) consisting of 4 treatments and 6 replications there are 24 experimental units, each unit is filled with 10 laying hens, the treatment is the feed that uses the best level of cosmos *caudatus* kunth plant flour used in the study the first stage. The treatment is given consists of:
P0 = Basal Feed + 0% *Cosmos caudatus* Kunth flour, P1 = Basal feed + 0.25% *Cosmos caudatus* Kunth flour, P2 = Basal Feed + 0.50% *Cosmos caudatus* Kunth flour, P3 = Basal Feed + 0.75% *Cosmos caudatus* Kunth.

TABLE 1. Composition and nutritional content of research basal feed.

Nutrient content	Calculated*	Analysis**
Energy Metabolism (Kcal / Kg)	2780	2780
Dry matter (%)	88,35	89,80
Crude protein (%)	18,00	18,00
Ash (%)	11,58	16,42
Coarse fiber (%)	3,78	4,75
Crude fat (%)	5,98	6,57
Calcium (%)	3,90	-
Total phosphorus (%)	0,85	-
Lysin (%)	0,96	-

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Description: Feed formulations are prepared using Winfeed Formulation
*** Proximate Lab Analysis. Animal Nutrition and Food Universitas Brawijaya*

TABLE 2. Proximate analysis of flour (stem + leaf) Kenikir (Cosmos caudatus Kunth)

Kandungan	Analisis
Dry matter (%)	91,52
Crude protein (%)	21,49
Abu (%)	13,78
Crude fiber (%)	11,70
Crude fat (%)	2,36
Calcium (%)	-
Fosfor (%)	-
Lysin (%)	-

Source: *Proximate Lab Analysis. Animal Nutrition and Food Universitas Brawijaya*

A. Research Procedure

Cosmos *caudatus* Kunth Preparation

Cosmos *caudatus* which is used is cosmos *caudatus* in a freshly harvested condition where the market is sold at a cheap price but still used as a vegetable. cosmos caudatus is dried using an oven at 600c for 24 hours. Cosmos *caudatus* which has been oven dried, then ground into flour is then mixed in a feed to be applied to laying-hens.

B. Variables Observed

Laying performance: Feed consumption, energy consumption, protein consumption, daily egg production (HDP) (%), feed conversion, egg mass, and egg weight.

C. Data Analysis

The data obtained are tabulated with the Microsoft Excel program. The experimental design used was a completely randomized design (CRD) with treatment and replication (4 x 6). Data were analyzed using variance analysis (Analysis of variance = ANOVA), if there were differences between treatments then continued Duncan's Multiple Distance Test".

III. RESULTS AND DISCUSSION

A. Effect of Treatment on External Quality of Eggs

The external quality of the eggs studied in this study consisted of the weight of the eggshell, the proportion of egg shells and the thickness of the eggshell.

The average value of the external quality of eggs can be seen in Table 3.

TABLE 3. Mean values of egg shell weight, Proportion of eggshells And shell thickness.

Variable	P0	P1	P2	P3
Shell weight (g)	8,53±0,08^{a}	8,62±0,08^{a}	8,68±015^{ab}	8,87±0,21^{b}
Proportion of shells (%)	14,09±0,13	14,18±0,19	14,26±0,23	14,38±0,35
Thickness of shell (mm)	0,335±0,007^{a}	0,338±0,008^{b}	0,341±0,006^{bc}	0,355±0,019^{c}

Description: Different superscripts in the same column show very significant differences (P <0.01).

Weight and Proportion of eggshell (g/%) Eggshell is the outermost part of the egg that wraps the contents of the egg and serves to reduce physical and biological damage, and is equipped with shell pores that are useful for exchanges from outside and inside the eggshell. Egg shells are influenced by several factors, namely feed, environmental temperature, age and type of chicken.

The mean values for the calculation of shell weight data and the proportion of egg shells during the study from the lowest to the highest were as follows (P0) 8.53 ± 0.08 (g) (P1) 8.62 ± 0.08 (g), (P2) 8.68 ± 015 (g) and (P3) 8.87 ± 0.21 (g) and the proportion of shells (P0) 14.09 ± 0.13 (%), (P1) 14.18 ± 0 , 19 (%), (P2) 14.26 ± 0.23 (%), and (P3) 14.38 ± 0.35 (%). The Duncan's Multiple Distance test results show that the mean eggshell weight between treatments was very significantly different (P <0.01). This increase in shell weight occurs because the digestive tract of healthy chickens is due to the active compound of the phytochemical kenikir inhibiting the growth of pathogenic bacteria so that there is an increase in absorption of calcium and phosphorus in chicken feed. [1] reported that the content of calcium and phosphorus in feed is an essential macromineral for calcification in eggshells. [2] reported that calcium supplementation, phosphorus from herbal plants azolla microphylla in the feed of laying hens can improve the quality of eggshells. The source of calcium feed plays an important role in the formation of eggshell [3].

Thick Eggshell (mm)

The thickness of the eggshell is a factor that affects egg quality, because the shell can protect the contents of the egg. The thickness of the shell is influenced by calcium in the feed which will determine the availability of calcium salts in the blood for egg formation [4]. Factors that affect the thickness of the eggshell are the age of the chicken, feed and ambient temperature.

The mean value of the calculation of eggshell thickness data during the study from the highest to the lowest is as follows (P3) 0.355 ± 0.019 (mm), (P2) 0.341 ± 0.006 (mm), (P1) 0.338 ± 0.008 (mm), and (P0) 0.335 ± 0.007 (mm). The Duncan's Multiple Distance test results show that the mean eggshell thickness between treatments was very different (P <0.01). The increase in eggshell thickness in this study due to the addition of phytobiotic kenikir contains bioactive compounds that can kill or inhibit the growth of pathogenic bacteria so that livestock are healthier in consuming feed and can increase absorption of nutrients which ultimately function in the thickness of eggshell formation. [5] reported that the administration of phytobiotic feed as a feed additive in feed can balance the intestinal microflora, increase absorption of nutrients such as ash, calcium, phosphorus and in line with increased egg weight, Hen Day Production and shell strength. [5] reported that administration of caudatus cosmos as phytobiotics in rat feed had calcium of 1% so that it was given as effective as calcium in feed so as to prevent increased bone resorption in ovariectomized rats. [6] reported that giving prebiotic supplementation and different accusters and calcium and phosphorus to the feed of laying hens can increase the thickness of egg shells.

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Factors that influence the increase in eggshell thickness in this study are also due to ambient temperature. Environmental temperature at the time of study 270C, where at cold temperatures this also affects the formation of thick eggshells. [7] that laying hens will not react to increase the rate of respiration to remove body heat in a cold environment so that this causes an increase in CO2 in the blood and blood pH. [8] reported that the maintenance of laying hens in different conditions would differ in blood pH and blood calcium. The lower the blood pH, the higher the amount of calcium in the blood used for the formation of shells, the consequence is that the shell becomes thicker. Shell thickness and shell weight have a positive correlation. The thicker the shell, the heavier the weight. The thick formation of the shell is affected by calcium deposits found in the uterus.

IV. CONCLUSION

The addition of kenikir fitobiotic as a feed additive at the level of 0.75% can improve the optimal external egg quality.

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