

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

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**Abstract**— The purpose of this study was to evaluate the effect of phytobiotic *Cosmos caudatus* Kunth on the performance of laying. This research was conducted in Bacem Village, Sutojayan Sub-District, Blitar District. A total of two hundred and forty, 35-week-old Isa Brown laying hens were randomly allocated into 4 dietary treatments with 6 replications (10 birds per replicate) This study uses an experimental method with a completely randomized design (ANOVA) consisting of 4 treatments and 6 replications. 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 flour. The parameters observed were production performance (Feed Consumption, Energy Consumption, Protein Consumption, Hen Day Production, Egg mass Feed conversion and egg weight). Data were analyzed by using ANOVA. Duncan's multiple range test was used to determine the statistical significance among the treatment means. The results showed that the effect of the use of phytobiotic *cosmos caudatus* Kunth had a very significant effect ( $P < 0.01$ ) on the Feed Consumption, Energy Consumption, Protein Consumption, Hen Day Production, Egg mass Feed conversion, and egg weight. The results of the study it can be concluded that the content of the active compounds of flavonoids, polyphenols, and saponins in *Cosmos caudatus* Kunth flour as a potential feed additive increases the performance and quality of egg-laying eggs.

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

## I. INTRODUCTION

Laying hens are brown hens that are kept in order to produce a lot of eggs. Eggs are one source of animal protein that has a taste that is delicious, easy to digest, and has a high content. Eggs can be used as side dishes, mixtures of various foods, and medicines. Poultry eggs contain many nutrients such as protein, lipids, vitamins, minerals and some of the nutritional needs needed for embryonic development [1].

Animal husbandry and animal health statistics for 2017, laying hens population has increased over the past 5 years, namely in 2013 amounting to 146,622, in 2014 amounting to 146,669, in 2015 amounting to 155,007, 2016 amounting to 161,350 and 2017 166,623. Increasing demand for egg protein is a challenge for laying hens to increase the productivity of laying hens. The growth rate of laying chicken is very influenced by several factors, one of which is the addition of feed as a feed additive. The existence of feed additives in feeds is proven to be able to improve feed efficiency so that it can benefit laying hens. Feed additives are ingredients that are

added to the feed in relatively small amounts to increase the value of the food content. The AGP feed additive is intended to spur growth, increase the health productivity of livestock, increase production efficiency and reduce the population of pathogenic microorganisms in the digestive tract so that livestock are healthier and can utilize better feed nutrition for growth or production. However, the AGP feed additive is feared to cause microorganisms that are resistant to antibiotics. Bacteria that are resistant to antibiotics such as *Salmonella* sp and *Escherichia coli*, which are formed in the digestive tract of livestock, can move or infect humans through physical contact or through food. This will be very detrimental because humans infected with these resistant bacteria can no longer be treated with antibiotics.

One of the efforts made to overcome the above problems is the addition of phytobiotics from flour *Cosmos caudatus* Kunth because they contain active compounds of flavonoids and saponins, polyphenols and essential oils which have various health benefits, including increasing body weight, increasing intestinal relaxation smooth so that the absorption of nutrients for growth becomes optimum. *Cosmos caudatus* Kunth has antimicrobial active compounds in both Gram-positive bacteria (*Bacillus subtilis*, *Staphylococcus aureus*), Gram-negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*), and fungi (*Candidia albicans*) [2]. The results of the study by the authors of *cosmos caudatus* phytobiotic contain the active compounds of flavonoids, saponins, and polyphenols as antibacterial can inhibit the growth of *Salmonella* sp bacteria and *Escherichia coli* bacteria.

## II. MATERIAL AND METHODS

### A. Location and Time

This research has been carried out in Bacem Village, Sutojayan District, Blitar Regency.

### B. Research Materials

The feed used in this study is self-mix feed, whose ingredients consist of corn, bran, Bone Meal meat, CPO, DCP, UB feed, stone flour, stone groats, Sodium bicarbonate. The animals used in this study were 35-week-old Hy-Line Brown strain of laying hens as many as 240 birds. Research equipment used in this study: Battery system enclosures, Tarpaulins, Cables and Lights, Paralon pipes, Feed places, Egg trays, Drinking places, Sweepers, Digital scales, Caliper, Dipper, Buckets, Stationery.

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	-

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

D. 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.

E. Variables Observed

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

F. 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. Production Performance

The appearance of livestock production is one of the main parameters in the livestock business. Indirectly the influence of phenolic compounds contained in phytobiotics has an influence on pathogenic microbes in the digestive tract.

The effect of the use of Cosmos *caudatus* plant flour as additive feed into feed on production appearance from the results of the study gave a very significant effect (P <0.01) on feed consumption, energy consumption, protein consumption, HDP, egg mass feed conversion and egg weight. The average value of this research result can be seen in table.

Variable	P0	P1	P2	P3
Feed consumption (g/head/day)	113,71±0,13 <sup>a</sup>	113,93±0,06 <sup>b</sup>	113,96±0,21 <sup>b</sup>	114,45±0,36 <sup>c</sup>
Energy Consumption (g/head/day)	312,36±0,35 <sup>a</sup>	312,95±0,17 <sup>a</sup>	313,04±0,57 <sup>ab</sup>	314,39±0,99 <sup>b</sup>
Protein Consumption (g/head/day)	21,33±0,02 <sup>a</sup>	21,37±0,01 <sup>a</sup>	21,38±0,04 <sup>b</sup>	21,47±0,07 <sup>c</sup>
Hen Day Production (%)	84,38±0,98 <sup>a</sup>	84,71±0,65 <sup>ab</sup>	85,06±0,83 <sup>b</sup>	86,27±0,77 <sup>c</sup>
Egg mass (%)	51,30±0,26 <sup>a</sup>	51,66±0,68 <sup>ab</sup>	52,69±0,76 <sup>bc</sup>	53,55±0,78 <sup>c</sup>
Feed Conversion	2,22±0,01 <sup>a</sup>	2,21±0,003 <sup>a</sup>	2,16±0,03 <sup>b</sup>	2,14±0,03 <sup>b</sup>
Egg weight(g)	60,58±0,29 <sup>a</sup>	60,78±0,38 <sup>ab</sup>	60,88±0,31 <sup>b</sup>	61,68±0,55 <sup>c</sup>

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

Feed consumption

Duncan's Multiple Distance test results showed that the addition of knicker flour to feed had a very significant effect (P <0.01) on feed consumption. The increase in feed consumption in this study occurred due to several factors, one of which was the addition of phytochemical cosmos containing active compounds inhibiting the growth of pathogenic bacteria in the digestive tract so that livestock were healthier and could increase feed consumption utilizing nutritional feed for growth and production. This is in line with the opinion of [3] Stating that laying-hens given phytobiotics have a higher feed consumption compared to those given control feed. [4] stated that the use of phytobiotics in laying hens has increased feed consumption because there are active compounds. The active compounds contained in teak leaf phytobiotics can improve the digestion process of feed so that

the rate of flow of digesta in the digestive tract will be faster which is then followed by a tendency to increase feed consumption.

Energy consumption

Duncan's Multiple Distance Test results show a very significant influence (P <0.01). Increase feed energy consumption in this study because the weather at the time of the study was cold weather. Cold weather conditions chicken will consume large amounts of feed to maintain body temperature. This is in line with the opinion of [5] stating the energy requirements of metabolism depending on the temperature of the environment. The mechanism of adaptation to environmental temperature can be observed from the ups and downs of feed consumption caused by the presence of a thermodynamic mechanism that controls the intake and

expenditure of energy into and out of the body to maintain body temperature stability.

Energy consumption affects the livestock environment. Livestock that is maintained in tropical or cold climates will have different needs for energy consumption. The climate with a hot and weather environment with high levels of humidity and strong wind movements will cause livestock to lose a lot of heat, so there are some energy and nutrients used to replace the lost heat. Conversely in cold weather livestock will try to produce body heat to protect themselves from cold air, so that livestock can maintain normal body temperature [6].

#### Protein consumption

Duncan's Multiple Distance Test results show a very significant influence ( $P < 0.01$ ). Increase consumption of this protein is due to the associated phytochemicals from *cosmos caudatus* which contain active compounds which can inhibit the growth of pathogenic bacteria in the digestive tract so that the digestive tract is healthier and can utilize nutritional feed well for growth so that feed consumption improved and protein consumption and ambient temperature improved. cold protein will function as an energy reserve. This is in line with opinion [7] stating that protein is also useful as an energy reserve. Although the process is not efficient, in the absence of energy, the body's protein will be converted into energy. This is a sign of how important energy is because energy is needed for all gestures. This can be seen if the chicken is fasting continuously its body weight will decrease during not eating. The reason is that body fat has been overhauled into energy and for the rest of the protein is overhauled. [8] Reported that protein in a feed is very important because of protein functions in the formation of avian feathers.

#### Hen Day production (%)

Duncan's Multiple Distance Test results show a very significant influence ( $P < 0.01$ ). This means that the addition of *cosmos caudatus* phytochemical on feed can increase Hen Day Production. This increase in Hen Day Production is related to phytochemical *cosmos caudatus* which contains active compounds in laying hens can inhibit the growth of pathogenic bacteria in the digestive tract so that healthier livestock use the nutritional feed for production. In accordance with the opinion of. [9] reported that extract of katuk extract as a feed additive containing active compounds in feed can inhibit the growth of pathogenic bacteria in the digestive tract so that birds will be healthier to use feed for growth and production so that Hen Day Production will increase (HDP). [10] states that phytochemicals also play a role in improving the morphology of the small intestine by increasing villi height, which then affects the absorption of nutrients and can maximize egg production and can increase egg production.

#### Egg mass

Duncan's Multiple Distance Test results show a very significant influence ( $P < 0.01$ ). The improvement in egg mass value is due to the percentage value of Hen Day Production and egg weight increases so that the value of egg mass increases as well. The percentage increase in Hen Day Production and egg weight is related to the addition of *cosmos caudatus* phytochemical which contains active compounds that can improve the morphology of the small intestine by

increasing villi height which then affects the absorption of nutrients and can maximize egg production. This is according to opinion. [11] Egg mass is influenced by egg production and egg weight, if one or both is higher, the egg mass increases too and vice versa, egg production, and weight are closely related to egg mass. [12] states that the nutritional content (protein, energy, fat, etc.) in the ration are the basic ingredients of egg formation. If the nutrient absorption ability to laying hens is good, it will facilitate the formation of white and egg yolk with a higher egg mass. Thus the higher the digestibility of nutrients, the better absorption of nutrients, so that the egg mass produced will be higher.

#### Feed conversion

Duncan's Multiple Distance test results showed that the mean feed conversion between treatments was very significantly different ( $P < 0.01$ ). These results illustrate that the ability to laying hens to utilize feed consumed for growth and production by giving phytochemical *cosmos caudatus* is able to convert feed into eggs. This is in line with the opinion of [13] reporting that the administration of Garlic flour has active compounds in feed can reduce chicken feed conversion in laying hens. [14] that laying hens feed with Heryumix® commercial phytochemical supplementation had feed conversion of 2.14 to 2.24.

#### Egg weight (g)

Duncan's multiple distance test results showed that the mean egg weight between treatments differed very significantly ( $P < 0.01$ ). Increase egg weight occurs due to the provision of *cosmos caudatus* phytochemical containing active compounds can inhibit growth and kill pathogenic bacteria, so that livestock are healthier in consuming feed so that the digestive process is more perfect which ultimately can support the egg formation process. This is in accordance with the opinion of [15] Reporting that the administration of phytochemicals in poultry feed will be able to inhibit bacterial growth so that the available feed in the digestive tract is useful for productivity and production. [16] that laying hens aged 30 to 40 weeks were fed with the addition of phytochemical garlic leaf extract and katuk had an egg weight of 60.29 to 61.38 g / grain.

## IV. CONCLUSION

The use of *cosmos caudatus* plant flour as a feed additive increase the production performance of laying-hens.

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