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The Effect of Teak Leaf Extract Addition (*Tectona grandis* Linn.F) to Feed on Laying Quails Production Performance

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----------ABSTRACT----------
The research aimed to obtain the effect of teak leaf extract addition (Tectona grandis Linn. f.) phytobiotic as an antibiotic alternative on feed to laying quail production performance. The research was conducted from December 2020 to January 2021. It was held in Mr. Samsul's animal husbandry, in Bunder sub-village, Ampeldento village, Karangploso sub-district, Malang. The research applied 240 laying quails. The research applied a completely randomized design with four treatments six repetitions, where treatment consisted of P0 as control feed without teak leaf extract addition, P1 added 0.8% teak leaf extract to feed, P2 added 1.2% teak leaf extract to feed, and P3 added 1.6% teak leaf extract to laying quail feed. The experimental parameters were consumption, hen day production (HDP), feed conversion, egg mass, and income over feed cost (IOFC). Based on the result, the addition of teak leaf extract to feed provided an insignificant effect (P<0.5) to consumption, hen day production (HDP), feed conversion, egg mass, and income over feed cost (IOFC).
KEYWORDS: *Phytobiotic, Production Performance, Teak Leaf Extract*

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I. INTRODUCTION

Indonesia is a developing country by increasing the society population nowadays. In 2020, the amount of Indonesian population was 270.20 million [1]. By increasing society's population nowadays, the animal husbandry sector increases to carry out protein animal needs. One of the actions to carry out those needs is by increasing quail production performance. The advantage of quail is no need for large space. Quail population was 3,688,687 quails in East Java, 2018 [2]. There are three main factors of development quails such as well management, maintenance, and feed.

Quail has to be feed based on quail nutrient to carry out the development and quail productivity. Feed was a necessary factor that had to be noticed in quail cultivation because 70% cost production was approximately used to buy feed [3]. The quality feed is required by livestock to assist more optimal performance. One of the actions to increase feed quality was additive addition [4].

The additional feed is phytobiotics applying in animal husbandry business as alternative antibiotic. Phytobiotics is an herbal plant with active ingredients and antibacterial properties that could improve the digestive tract condition, feed conversion, increase the food digestibility, and improve performance [5].

A teak leaf is a plant widely founded in Indonesia. It can be applied as a local feed ingredient containing a bioactive component that functions as an antibacterial. Teak leaf has natural pigment content comprised β-carotene, Pheophytin, pelargonidin 3-glucoside, pelargonidin 3, 7-di glucoside, chlorophyll, and anthocyanins [6]. Active compound contents of teak leaf are flavonoid, saponin, tannin, phenolic, alkaloid, triterpenoid, glycoside [7].

Teak leaf extract contained several bioactive flavonoids, steroid, and anthocyanin and had bacterial, antifungal, and antioxidant activity [8]. Flavonoid has the biggest antibacterial in hampering bacterial growth. The bioactive content of teak leaf extract is flavonoids with average percentage of hampered pathogens bacterial growth. The research of using teak leaf extract as a phytobiotic on feed reduces the use of antibiotics and evaluates biologically in feed to production performance.

II. MATERIALS AND METHODS

Materials

This research was conducted from December 2nd, 2020, to January 17th, 2021, in Mr. Samsul's animal husbandry Bunder sub-village, Ampeldento village, Karangloso sub-district, Malang. 240 laying quails aged 21

days was applied in this research. The applied teak leaf was a form of extract. The applied feed was commercial feed from PT. Japfa Comfeed Indonesia tbk. Composition of laying quail feed nutrients on Table 1.

Table 1. Composition of Laying Quail Feed Nutriens

Nutrient	Content (%)
Dry Matter	89,93
Ash	10,17
Crude protein	21,59
Crude fat	4,32
Crude fiber	5,90

Source: The Results of Laboratory of Animal Feed, Animal Husbandry and Fisheries, Blitar Regency.

This research applied 24 battery system cages for the experiment. Each treatment cage consisted of 10 quails. The size of the cage was 30 X 46 X 25 cm each cage.

Methods

The research applied an utterly randomized design consisted of four treatments and six times repetitions. The levels of adding teak leaf extract on basal feed are as follows:

P0: basal feed (without additional treatments)
P1: basal feed + 0.8% teak leaf extract
P2: basal feed +1.2% teak leaf extract
P3: basal feed + 1.8% teak leaf extract

The observed transformation was laying quail production performance such as feed consumption, Hen Day Production (HDP), Feed Conversion, Egg Mass, and Income Over Feed Cost (IOFC).

Data Analysis

The obtained data were analyzed using analysis of variance (ANOVA). If the result provided significant effects, it would continuously be analyzed using Duncan Multiple Range Test.

III. RESULT AND DISCUSSION

The result of teak leaf extract characteristics was conducted by analyzing the biochemistry content of teak leaf extract comprised of flavonoid, and antioxidant IC_{50} (see Table 2).

Table 2. The Bioactives compound of Teak Leaf Extract.

Analysis	Result
Flavonoid	6,24 µg/ml
Antioxidant IC_{50}	11,64 µg/ml

Source: The Instrumentation Chemistry Analysis Result of State Polytechnic Malang Laboratory.

Based on the substance content test result for teak leaf extract in Table 2, Flavonoid content was 6.24 µg/ml. Flavonoids were the biggest antibacterial addictive in hampering bacterial growth [9]. The result of research was higher [10], flavonoid content in teak leaf extract using 2.99 mg/100g methanol solution.

Antioxidant content IC50 in Table 2 was 11.64 µg/ml on teak leaf extract. [11] the result was higher, 1.958% and according to [12], was lower, 47.61%. Based on the result above, f bioactive flavoniod content and antioxidant were caused by differences in solvent and extraction. The applied solvent for extraction should be polar. [13] reported that solvent should be polar among ethanol, methanol, acetone, and water. The results of feed consumption, Hen Day Production (HDP), Feed conversion, Egg Mass, and Income Over Feed Cost (IOFC) were described in Table 3.

Table 3. Feed Consumption, Hen Day Production (HDP), Feed Conversion, Egg Mass, and Income Over Feed Cost (IOFC).

Transformation	Treatments			
	P0	P1	P2	P3
Feed consumption (g/bird/day)	20,16±0,11	20,35±0,23	20,17±0,33	20,14±0,40
HDP (%)	78,57±5,85	77,38±3,55	75,71±4,61	75,00±2,67
Feed Coversion	2,46± 0,20	2,50 ± 0,09	2,50 ± 0,17	2,51 ± 0,16
Egg Mass (g/ bird)	8,22 ± 0,62	8,14 ± 0,33	8,11 ± 0,58	8,04 ± 0,47
IOFC (Rp)**	$117,49±18,02^{c}$	$70,41±8,51^{b}$	$49,71±16,16^{a}$	$26,31±15,27^{a}$

Note: a different superscript showed significant differences in the identical column (P<0.01)**.

Daily Feed Consumption

The effects of teak leaf extract addition on feed toward feed consumption displayed in Table 3 the consumption value while researching the highest to the lowest were P1 (20.35±0.23), P2 (20.17±0.33), P0 (20.16±0.11), P3 (20.14±0.40). The result of statistical analysis showed that F-count was smaller than F-table (P<0.05). It showed that teak leaf extract addition provided insignificant effects because it applied an identical basal feed component. The content of feed component can affect texture, palatability, aroma, density, and feed consumption value.

Based on the result, the lowest consumption was P3 with 1.6% teak leaf extract addition. It could be caused that there was a tannin compound inside teak leaf extract, which was an anti-nutritional compound with the ability to form protein complexes on feed consequently, the protein could not be digested [14].

The low feed consumption showed that rations were unpreferred. The low consumption may be caused by an exorbitant content energy, while the high consumption but did not follow by raising production showed that rations had low quality [15]. Feed consumption was affected by feed quality (nutrients composition) and management (environment, cage density, feed availability, and water). [16] stated that more or less feed consumption highly depended on livestock body size, genetic properties, environmental temperature, feed, and disease.

Hen Day Production

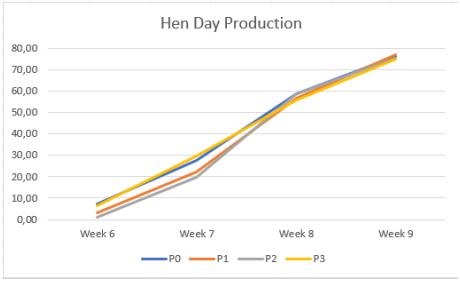

Fig. 1. Hen day production graph

The effects of teak leaf extract addition on feed toward hen day production displayed in Table 3 value of hen day production while researching the highest to the lowest were P0 (78,57±5,85), P1 (77,38±3,55), P2 (75,71±4,61), P3 (75,00±2,67). The result of statistical analysis showed that F-count was smaller than F-table (P<0.05). It showed that teak leaf extract addition provided insignificant effects.

Hen day production P0 had a high average value as control then continued by P3 treatment with 1,6% teak leaf extract addition. Flavonoid is a compound inside teak leaf extract with the highest antibacterial activity to hamper bacterial [7]. Flavonoid would disturb enzyme and decrease bacterial pathogen activity [17].

Egg Mass

The effects of teak leaf extract on feed toward egg mass displayed in Table 3 egg mass values while researching the highest to the lowest were P0 (8,22±0,62), P1 (8,14±0,33), P2 (8,11±0,58), P3 (8,04±00,47). The result of statistical analysis showed that F-count was smaller than F-table (P<0.05). Active compound content was flavonoid and antioxidant in teak leaf extract could not affect the quail egg's mass value. Egg mass value was affected by the amount of protein consumed by identical quail. Consequently, it did not affect to the production of the egg mass.

Egg mass was the product of egg weight and HDP. Protein, carbohydrates, vitamins, minerals, and water should be available in sufficient quantities. According to [18], deficiency of one of those nutrients would disturb health and reduce productivity. [19] added that protein and amino acid on feed could affect egg weight, protein deficiency, and amino acid could decreased egg weight.

Feed Conversion

Feed conversion is feed amount value consumed by livestock then divided with the average weight of produced egg [20]. High and low feed conversion value affected provided feed efficiency. The lower value of quail feed conversion showed provided feed efficiency would increase.

The effects of teak leaf extract addition on feed toward feed consumption displayed in Table 3. The consumption values researching the highest to the lowest were P3 (2,51±0,16), P2 (2,50±0,17), P2 (2,50±0,09), P0 (2,46±0,20). The result of statistical analysis showed that F-count was smaller than F-table (P<0.05). According to [21], the lower feed conversion value would be the higher the efficiency level of using the feed and vice versa. The lower feed conversion value would be, the higher the efficiency level of using the feed. Feed

conversion numbers were influenced by three factors, such as feed quality, technique of providing feed, and mortality numbers [18].

Income Over Feed Cost

Income over feed cost is the difference between livestock business income over feed cost. IOFC, the quail, is affected by feed price, egg price, egg production, and quail consumption. According to [21] stated that IOFC value showed the amount of revenue from the sale of quail egg production was reduced by the cost of feed consumed by the quail.

The effects of teak leaf extract addition on feed towards IOFC values displayed in Table 3 IOFC values while researching the highest to the lowest were P0 (117,49±18,02^{c}), P1 (70,41±8,51^{b}), P2 (49,71±16,16^{a}), P3 (26,31±15,27^{a}). The result of statistical analysis showed that F-count was smaller than F-table (P<0.05). IOFC value of quail decreased numerically along using the level of teak leaf extract on feed. It was related to the price of teak leaf extract, which was expensive, around Rp266,666/liter. Consequently, it influenced to feed price in each treatment P0 Rp6000/kg; P1 Rp8,133/kg; P2 Rp9,200/kg; dan P3 Rp10,266/kg. IOFC value showed the amount of revenue from the sale of quail egg production is reduced by the cost of feed consumed by the quail. IOFC was affected by several factors: feed price, egg price, egg production, and quail feed consumption.

IV. CONCLUSION

The teak leaf extract can be used in laying quail feed until 1,2%, without any negative effect on quail production performance (consumption, HDP, Egg Mass, and feed conversion).

REFERENCE

[1]. Badan Pusat Statistik Jakarta Pusat, 2010. Statistik Indonesia Tahun 2010. Jakarta Pusat: Badan Pusat Statistik.

[2]. Direktorat Jenderal Peternakan Dan Kesehatan Hewan. 2018. Statistik Peternakan Dan Kesehatan Hewan 2018. Direktorat Jenderal Peternakan Dan Kesehatan Hewan Kementrian Pertanian, Jakarta.

[3]. Setyawan, C., D., Wahyuni, Al-Kurnia, D. 2020. *Pengaruh pemberian tepung ulat kandang* (*Alphitobiusdiaperinus*) *pada pakan terhadap perfoma produksi puyuh petelur*. Journal Animal Science. (2): 41-48.

[4]. Haryuni, N., E. Widodo, and E. Sudjarwo. 2017. *Efek penambahan jus daun sirih* (*Piper bettlelinn*) *sebagai aditif pakan terhadap performa ayam petelur*. Jurnal riset dan konseptual. 2 (4): 429-433.

[5]. Ramiah, S. K., Zulkifli, I., Rahim, N. A. A., Ebrahimi, M., & Meng, G. Y. 2014. *Effects of Two Herbal Extracts and Virginiamycin Supplementation on Growth Performance, Intestinal Microflora Population and Fatty Acid Composition in Broiler Chickens*. Asian-Australasian Journal of Animal Sciences. 27(3): 375-382.

[6]. Ati, N. H., Puji, R., Soenarto, N. and Leenawati L. 2006. *The Composition and The Content of Pigment Some Dyeing Plant for Ikat Weaving in Timoresse Regency, East Nusa Tenggara*. Indo. J. Chem. 6(3): 325 – 331.

[7]. Afiyah, D. N. 2013. *Sifat Mikrobiologis Sosis Daging Sapi Dengan Penambahan Ekstrak Daun Jati* (*Tectona grandis*) *Selama Penyimpanan Dingin*. Skripsi. Bogor: Institut Pertanian Bogor.

[8]. Khera, N., and Bhargava, S. 2013. *Phytochemical and Pharmacological Evaluation of Tectona grandis* Linn. Journal of Pharmachy And Pharmaceutical Sciences. 5(3): 923-927.

[9]. Ahmadi, S.E.T. 2015. *Penambahan Tepung & Ekstrak Daun Jati* (*Tectona grandis* Linn. F) *Pada Puyuh Coturnix japonica*. Tesis. Institut Pertanian Bogor. Sekolah Pascasarjana Program Studi Nutrisi & Pakan.

[10]. Kushwah, A. S. 2013. *In-Vitro Antioxidant Potential & Phytochemical Screening of Tectona grandis* Linn. Leaves. In Vitro, 10(11): 12.

[11]. Ghareeb, M.A., Shoeb, H.A., Madkour, H.M.F., Refaey, L.A., Mohamed, M.A., Saad, A.M., 2014, *Antioxidant and Cytotoxic Activities of Tectona grandis* Linn Leaves, International Journal of Phytopharmacology.5 (2): 143-157.

[12]. Edi, D. N., Natsir, M. H., Djunaidi, I. 2018. *Pengaruh Penambahan Ekstrak Daun Jati* (*Tectona grandis* Linn. *F*) *Dalam Pakan Terhadap Performa Ayam Petelur*. Jurnal Nutrisi Ternak Tropis. 1(1): 34-44.

[13]. Sudarmadji, S., B. Haryono and Suharji. 1997. *Prosedur Analisis untuk Bahan Makanan dan Pertanian*. Penerbit Liberti, Yogyakarta.

[14]. Magdalena, S., Natadiputri, G. H., Nailufar, F., and Purwadaria, T. 2014. *Utilization of natural products as functional feed*. Wartazoa. Indonesian Bulletin of Animal & Veterinary Sciences. 23(1):31–40.

[15]. Maknun, L., S. Kismiatidan I. Mangisah. 2015. *Performa Produksi Burung Burung Puyuh* (*Coturnix-coturnix japonica*) *dengan Perlakuan Tepung Limbah Penetasan Telur Burung Puyuh.* Jurnal Ilmu-Ilmu Peternakan. 25(3): 53-58.

[16]. Suprijatna, E. Atmomarsono, U. Kartasudjana, Ruhyat. 2005. *Ilmu Dasar Ternak Unggas*. Penebar Swadaya. Jakarta.

[17]. Widigdyo, A., and Adiguna, W. S. U. 2020. *Efek penambahan ekstrak kayu secang* (*Caesalphiniasappan* L.) *dan minyak ikan lemuru dalam ransum pakan terhadap hen day production, konversi pakan dan mortalitas puyuh petelur*. Aves: jurnal ilmu peternakan. 14(2):1-8.

[18]. Amrullah, I.K. 2003. *Nutrisi Ayam Petelur*. Lembaga Satu Gunung Budi. Bogor.

[19]. Istinganah, L. 2013. *Penggunaan Berbagai Jenis Probiotik dalam Ransum Terhadap Produksi dan Bobot Telur Ayam Arab*. Jurnal Ilmiah Peternakan 1(1) :338-346

[20]. Sudrajat, et al. 2014. *Performa produksi telur burung puyuh yang diberi ransum mengandung kromium organik*. JITV 19(4): 257-262.

[21]. Kurniawan, D, E. Widodo, and M. Natsir. 2014. *Efek Penggunaan Tepung Tomat Sebagai Bahan Pakan Terhadap Penampilan Produksi Burung Puyuh*. J. Ternak Tropika 15(1): 74-79.