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A Study on the Effect of Meniran (*Phyllanthus Niruri* Linn) Extract to Improve Infundibulum and Egg Production of Laying Chicken Infected with *Escherichia Coli*

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Abstract

The aims of the research work was to determine the meniran extract potential to improve infundibulum and egg production of layer chicken infected with *Escherichia coli*. Twenty five layer chicken were divided 5 groups: infected with *Escherichia coli*, without meniran extract (C+), not infected with *Escherichia coli*, without meniran extract (C-), T1, T2, T3 were infected with *Escherichia coli* and given meniran extract 10, 20, 30% respectively. The results indicated that meniran extract were effective in elimination of *Escherichia coli* infection. Furthermore, the infundibulum improved and the egg production of laying chicken has increased.

Key words: Meniran, *Escherichia coli*, infundibulum, egg production, laying chicken

Colibacillosis is an infectious disease caused by *Escherichia coli* an avian pathogen. Currently *Escherichia coli* is resistant to almost

all antibiotics (Hidanah *et al.* 2018). Meniran extract has antibacterial effect on *Escherichia coli* (Hidanah *et al.*, 2019) and can inhibit or kill the *Escherichia coli* because of the substances in these plants function as antibactericidal actions of alkaloids, tannins, saponins, and flavonoids (Gunawan *et al.*, 2008) present in there plants.

Materials and Methods

Twenty five laying hen aged 26 weeks were divided into 5 groups: infected with *Escherichia coli*, without meniran extract (C+), not infected with *Escherichia coli*, without meniran extract (C-), T1, T2, T3 were infected with *Escherichia coli* and given meniran extract, 10, 20, 30% respectively during 2 weeks. The source, isolation, identification, dosage, route infection of *Escherichia coli*, preparation of meniran extract, in vitro studies on bactericidal effect and necropsy for sample collection and processing, record of egg production were done as per Hidanah *et al.* (*loc. cit*). Laying hens was infected with 1 mL/kg BW of *Escherichia coli* (10^8 cells/mL) and

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Table I. Median Value of Infundibulum Inflammation and Congestion Score and Egg Weight of Laying Chickens

Treatment Groups	Inflammation Score Median Value	Congestion Score Median Value	Egg weight (g) (layer/week)
C -	1.00 ^a ± 0.50	1.00 ^a ± 0.35	400.4 ^b ± 9.12
C+	4.00 ^b ± 0.65	3.00 ^a ± 0.45	365.4 ^a ± 9.12
T1	1.00 ^b ± 0.45	1.00 ^a ± 0.30	400.4 ^b ± 9.12
T2	1.00 ^{bc} ± 0.40	1.00 ^a ± 0.30	406 ^b ± 11.06
T3	0 ^a ± 0.00	0 ^b ± 0.00	408.8 ^b ± 12.71

^{a,b,c,d} Different superscripts in the same column show significant differences (p <0.05)

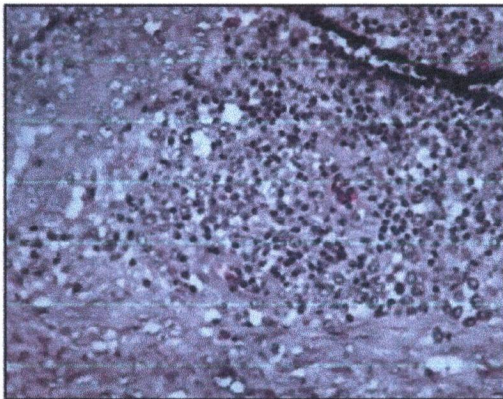


Fig 1. The infundibulum of laying hens red arrow as cell inflammation; with tubular gland cell nucleus (H.E; 400x).

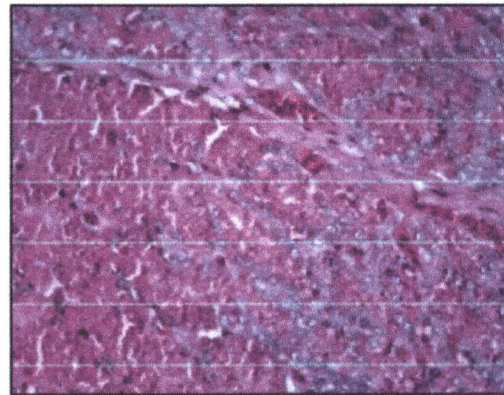


Fig 2. Infundibulum of laying hens, showing congestion in the blood vessels (arrow) (H.E 400x).

observed for 3-5 days. Histological assessment of inflammation and congestion of infundibulum with HE method (Safitri and Hariadi, 2019). Clinical signs and data on egg production and their qualities were recorded.

Results and Discussion

The extent of tissue damage was assessed in the damages in infundibulum due to inflammation (Fig 1) and congestion (Fig 2). The results of the inflammation and congestion score and Egg Weight (layer/week) was presented in Table I. Median as the mean value of the inflammatory histopathology score.

On control (C-), the infundibulum appeared normal. The control positive (C+) which was not given meniran extract (*Phyllanthus niruri* Linn) but infected with *Escherichia coli* showed pathological changes in marked infiltration with a score of 4 compared to the other groups. In the histopathology figure of infundibulum in control positive (C+), the

presence of purplish color is seen in inflammatory cell infiltration (Sugihartini and Fajri, 2016).

The treatment 10% meniran extract (T1) also showed an inflammatory cells infiltration, compared to C+ which was infected by *Escherichia coli* but not given meniran extract (*Phyllanthus niruri* Linn). The treatment 20% meniran extract (T2) was showed an inflammation score = 1. The inflammation was reduced compared to the treatment T1. The treatment 30% meniran extract (T3) has scored = 0 (indicating inflammation). The role of meniran extract (*Phyllanthus niruri* Linn) at this concentration reduced the inflammatory reaction.

T control positive C+ has shown most severe congestion with a score - 3, it appears that the microcirculation is dilated with full of erythrocytes. In groups C-, T1 and T2 there were congestion, but in lesser extent and the score obtained was 1. In treatment T3 there was no congestion, due to the role of meniran

plant extract (*Phyllanthus niruri* Linn) with a concentration of 30% that was able to reduce the congestion. Congestion and inflammation was caused by oxidative stress because of the absence of a balance between oxidant production and antioxidant defense (Febriana, 2016). Antithrombic flavonoids can form platelet plugs, so that they can close small tares in blood vessels, inhibit bacterial development by acting as enzyme inhibitors by inhibiting the production of energy and nucleic acids or proteins and can reduce blood capillary permeability, so that blood capillary damage. Tanin is efficacious as an antiseptic (preventing bacterial growth) and hemostatic (stopping bleeding) (Mathivanan *et al.*, 2006).

Based on the results of the research study, it can be seen that the meniran extract (*Phyllanthus niruri* Linn) with concentration of 10% (T1) has been able to kill the *Escherichia coli*, at the concentration of 20% there was an increase in antibacterial activity against *Escherichia coli*. At a concentration of 30% meniran extract showed high potential antibacterial effect and reduced inflammation and congestion due to *Escherichia coli* infection.

The presence of *Escherichia coli* affect the reproductive tract in laying hens, especially in the infundibulum. Tabbu (2000). Since infundibulum functions to catch the ovulated follicles; *Escherichia coli* infection in the infundibulum the egg production drops. The concentration of meniran extract (*Phyllanthus niruri* Linn) at 10%, 20%, and 30% indicated that the egg production increased due to the presence of terpenoids in meniran extract agent which act as an antibacterial. Higher amount of meniran extract, there will be a corresponding increase in

the amount of terpenoid content which has more potent in reducing the activity of the bacteria (Gunawan *et al.*, *loc. cit.*).

Summary

Meniran extract (*Phyllanthus niruri* Linn) with a concentration of 10%, 20% and 30% can improve functions of the infundibulum and increase egg production in laying chicken infected with *Escherichia coli*.

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