



Effect of the Use of Noni Leaf Extract as a Natural Disinfectant on the Percentage of Hatchability and Day Old Quail (DOQ) Hatching

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Abstract

This study aims to determine the effect of noni leaf (*Morinda citrifolia lignosae*) extract as a natural disinfectant on the percentage of hatchability and the hatchability weight of quail (*Coturnix-coturnix japonica*). This study used 1,500 quail hatch eggs with a male and female parent ratio of 1: 4. This study used a Completely Randomized Design (CRD) method, with five treatments and three replications each repetition consisting of 100 quail eggs with 10-gram weight. The treatments used were: T0 (control treatment), T1 (commercial disinfectant), T2 (noni leaf extract 10%), T3 (noni leaf extract 20%) and T4 (noni leaf extract 30%). The results of variance showed the average percentage of hatchability produced during the study, namely T0 (85%), T1 (83%), T2 (86%), T3 (84%), and T4 (93%). Furthermore, the average weight of hatchability produced, namely T0 (6.67 grams), T1 (6.76 grams), T2 (6.89 grams), T3 (6.84 grams) and T4 (6.89 grams). Overall administration of noni leaf extract had no significant effect ($P > 0.05$) on the percentage of hatchability and DOQ hatching weight of the quail.

Keywords: quail, hatchability, Noni leaf, and hatching eggs

A. Introduction

The increasing need and human awareness of livestock products as a source of animal protein affect the demand for livestock products so that it is directly proportional to the

development of the industry in the livestock sector to meet the needs of livestock products. The livestock industry in meeting human needs certainly requires technological innovation to encourage quality and quantity of production, and humans must always think of creating changes by using technology such as the use of hatching machines to hatch poultry eggs.

Quail is a type of poultry that has the potential to be developed because it is one of the cattle that is quite easy in the process of cultivation. In addition to quail meat, eggs produced can also be consumed by humans, and its maintenance does not require extensive land because the quail farming business is currently in high demand by the community, and one of the business opportunities in the livestock sector is in the form of quail breeding.

Poultry egg hatching technology using a machine is capable of hatching eggs in large quantities, depending on the capacity of the hatching machine. The hatching machine provides a suitable environment for the development of the embryo (prospective child), which mimics the natural properties of the parent incubating the egg, i.e., adjusting the temperature, humidity, and turning the incubated egg. The application of egg incubation technology in the quail breeding business is expected to increase quail livestock populations in a relatively fast time and ensure continuity of seed availability (Subiharta & Yuwanta, 2012).

Things that need to be considered in hatching eggs using a hatching machine are eggshell hygiene because the shell is the outermost part that is very easily contaminated by several microorganisms mainly from quail excreta so that it has the potential as a source of pathogenic bacteria such as *Staphylococcus aureus* and *Salmonella* sp. which can damage the quality eggs that interfere with the development of quail embryos (Alkhakim, Huda, Fitri, Ambarwati, & Tistiana, 2016). Previously Ohl & Miller (2001) states that *Salmonella typhimurium* is one of the bacteria that often attack birds and can contaminate the product to be harmful to humans who consume them. Livestock that infected with *Salmonella typhimurium* can spread the disease through eggs.

Quail eggs have thin shells compared to other types of birds, and this needs to be a significant concern because thin eggshells will be more easily contaminated by various kinds of microorganisms that can attack the embryo, so egg cleanliness is a significant part in the hatching process.

Chemical disinfectant is currently a method that is still often used to reduce microorganism contamination in hatching eggs, but the use of chemical disinfectants can sometimes cause the death of an embryo, thereby decreasing the hatchability of eggs. Inappropriate use of disinfectants (improper application of doses and procedures) and some of the types of disinfectants are toxic, have an unpleasant odor, and can cause irritation. Types of disinfectants that are often used in sanitation processes generally use formaldehyde gas (Mahfudz, 2006).

Natural disinfectant is one of the solutions that can be used to kill microorganisms in the sanitation process of quail hatch eggs. Active substances in noni leaves include anthraquinone, which is a substance that can minimize the growth of bacterial and fungal cells, as well as the discovery of other materials such as aloin, emodin, barbaloin, saponin, tannin, and sterols that synergize with anthraquinone substances making these substances analgesic, antiseptic, anti-inflammatory, antibacterial and antifungal properties which are useful in healing various diseases (Setyawaty, Ismunandar, & Nurul, 2014). Based on the description mentioned above, research is needed to determine the effect of the use of noni leaf extract as a natural disinfectant on the percentage of hatchability and hatching weight of Day Old Quail (DOQ).

B. Methodology

1. Research Design

This study used a Completely Randomized Design (CRD) with three treatments and three replications, each consisting of 100 quail eggs so that the total quail eggs used were 900 eggs. The treatments carried out in this study are as follows:

T0: Maintenance Control

T1: Commercial disinfectant = 8 mL / 1000 mL water

T2: 10% concentration = 10 mL Noni leaf extract + 90 mL distilled water

T3: 20% concentration = 10 mL Noni leaf extract + 90 mL distilled water

T4: 30% concentration = 10 mL Noni leaf extract + 90 mL distilled water

2. Research Procedures

Preparation of the hatching machine includes cleaning the hatching machine from germs/germs attached to the hatching machine utilizing fumigation by spraying formalin solution into the hatching machine and then being able to ignite the hatching machine for 2 hours to get a stable temperature before the hatching eggs are hatched on the hatchery machine.

a. Making noni leaf extract

Noni leaf extraction procedure starts from adult noni leaf taken in Lemoa Village, Gowa Regency. Mature leaves that have been chosen as much as 2 kg are withered for 3-4 days, then in the oven for 36 hours at 60°C. Dry leaves are cut into small pieces and mashed using a blender to produce ± 500 grams of noni leaf flour. The flour-shaped sample is then mixed with a 90% methanol solvent in a ratio of 1: 5 (500 grams of noni leaf flour with 2,500 ml of methanol solvent). The mixture is macerated using a container that has been closed with aluminum foil, let stand for 24 hours, and placed at room temperature protected from direct sun exposure while occasionally stirring and then filtered to separate the pulp and filtrate (Wati, 2009). The results of the filter in the form of noni leaf extract (*Morinda citrifolia lignosae*) were evaporated using a rotary evaporator at a temperature of 50°C at a speed of 80 rpm for ± 5 hours until the methanol contained in the mixture evaporated. Furthermore, the extract obtained is then taken according to the concentration of 10%, 20%, and 30%.

b. Preparation of hatching eggs

The hatching eggs used in this study came from productive quails that were kept intensively in the Dijon Quail Makassar farm. Quail broodstock used is five months old, and before hatching, the first selection of hatching eggs will be used, such as the selection of fresh hatching eggs, smooth and flat egg surface, oval-shaped with the standard size of 10-11 grams/grain, egg storage a maximum of 7 days. Weighing of eggs is carried out to get uniform hatching eggs weighing so that it will get an average yield of Day Old Quail (DOQ) hatches of uniform quail

c. Cleaning hatching eggs

Quail eggs to be hatched are cleaned using cotton that has been moistened with Commercial disinfectants and *Morinda citrifolia lignosae* extracts as natural disinfectants with concentrations of 10%, 20%, and 30% and then aerated for ± 24 hours (Septiyani, Prakoso, & Warnoto, 2016).

d. Incubating hatching eggs

This study uses three incubators, each equipped with four lamps with a voltage of 15 watts as a heater, thermostat, and thermometer humidity indicator. Previously, the temperature of the hatching machine was set at ± 38.5°C, with a humidity of 70-80%. Quail hatching eggs, each of which has been given further treatment, is put into a hatching machine equipped with a tray filled with water, then laying the eggs with the position of the spine is below and blunt the top, and the first egg reversal is carried out at the age of 5 days incubation with The 45° slope is then reversed four times a day, at 08.00 am, 12.00 noon, 4.00 pm and 8.00 pm, reversal is stopped on the 15th day

e. Percentage of hatchability and the weight of the hatching quail

The eggs that hatch on the 18th day are removed from the hatching machine, then the rate of hatchability and the importance of the hatching quail (*Coturnix-coturnix japonica*) are measured (North & Bell, 1990)

3. Research Parameters

The parameters of this research were the percentage of hatchability (%) and Hatchability weight (g).

4. The technique of Data Analysis

The data obtained in this study were processed statistically using a Completely Randomized Design (CRD), which is three treatments and three repetitions, each of which consists of 100 eggs and if it has a significant effect, the lowest real difference test (LSD) will be conducted for see differences in the observed variables (Gazpersz, 1994).

B. Results and Discussion

1. Results

The results of calculating hatchability percentage and quail hatching weight after 55 days of research were presented in Table 1.

Table 1. The results of the calculation of the average of the percentage of hatchability and weight of hatchability quail (*Coturnix-coturnix japonica*) in each treatment.

Variable	Treatment					P-Value
	T0	T1	T2	T3	T4	
Hatchability (%)	85 ± 14,42	83 ± 2,64	86 ± 5,85	84 ± 4,04	93 ± 2,30	0.47
Hatchability weight (g)	6,67 ± 0,22	6,76 ± 0,06	6,89 ± 0,10	6,84 ± 0,15	6,89 ± 0,37	0.06

Information: T0: Maintenance Control, T1: Commercial disinfectant = 8 mL / 1000 mL water, T2: 10% concentration = 10 mL Noni leaf extract + 90 mL distilled water, T3: 20% concentration = 10 mL Noni leaf extract + 90 mL distilled water, T4: 30% concentration = 10 mL Noni leaf extract + 90 mL distilled water and ±: Standar Deviation.

The results of the analysis of variance showed that the treatment of noni leaves extract at a concentration of 10%, 20%, and 30% had no significant effect ($P > 0.05$) on the percentage of hatchability and hatching quail (*Coturnix-coturnix japonica*).

2. Discussion

a. Percentage of hatchability of quail eggs (*Coturnix-coturnix japonica*)

Based on the results of the study, the average calculation of each treatment showed that the treatment of 30% noni leaf extract had the highest average hatchability percentage of 93%, the noni leaf extract 10% had an average hatchability percentage of 86%, the control treatment had the average rate of hatchability of 85%, noni leaf extract 20% has an average speed of hatchability of 84%, and the results of the average rate of the lowest hatchability shown in treatment using commercial disinfectants has an average rate of hatchability of 83%.

Active compounds derived from noni leaves (*Morinda citrifolia lignosae*) with 30% noni leaf extract treatment can inhibit microorganisms in quail hatching eggshells because it has several active compounds that function as antibacterial substances. It is following the opinion of Setyawaty, Ismunandar, & Nurul (2014), which states that the noni plant (*Morinda citrifolia lignosae*) is a natural disinfectant because it contains several compounds that can kill several types of bacteria and are anti-inflammatory. Active substances in noni leaf include: anthraquinone which is a substance that can inhibit the growth of bacterial and fungal cells, as well as the discovery of other materials such as aloin, emodin, barbaloin, saponin, tannin, and sterols that synergize with anthraquinone substances making these substances analgesic, antiseptic, anti-inflammatory, antibacterial and antifungal properties which are useful in healing various diseases

The research data also showed that the higher the concentration of the noni leaf extract (*Morinda citrifolia lignosae*) used, the higher the percentage of hatchability produced. Noni leaf extract can be used as an antimicrobial, but the use of noni leaf extract up to a rate of 30% is

useful to increase the hatchability of quail eggs. According to Zamzamy, Sudjarwo, & Hamiyanti (2014), the use of the right disinfectant dose will optimize sanitation results because, in addition to pathogenic microorganisms, the use of disinfectants also affects embryo life. Meanwhile, according to Septiyani, Prakoso, & Warnoto (2016), the use of chemical disinfectants is very dangerous and can reduce egg fertility, because this disinfectant is poisonous, smells terrible, and causes irritation. Low-level sanitation programs do not kill germs, but high-level sanitation programs can kill egg embryos so that they can affect fertility and hatchability.

b. Day Old Quail (DOQ) hatching weight

Based on the results of the study showed that the treatment had no significant effect ($P > 0.05$) on the importance of Day Old Quail (DOQ) hatches. The use of 30% noni leaf extract and 10% noni leaf extract had the highest results with an average of 6.89 grams each hatching, 20% noni leaf extract had an average hatching weight of 6.84 grams, the use of commercial disinfectants had an average hatching weight of 6.76 grams and the lowest percentage hatching weight results are shown in the control treatment which has an average hatching weight of 6.67 grams.

Active compounds derived from Noni (*Morinda citrifolia lignosae*) leaves with 30% noni leaf extract treatment and 10% noni leaf extract can increase the hatching weight of the quail (*Coturnix-coturnix japonica*) treatment. It is influenced by the use of noni leaf extract (*Morinda citrifolia lignosae*) as a natural sanitary material, safely and effectively killing pathogenic bacteria that cause damage to eggs, so that embryo growth is not disrupted and cells undergo a better metabolic process, and the tissue that forms organs will be more healthy makes the organ function better will make the Day Old Quail (DOQ) body more healthy quail and has a higher hatching weight.

C. Conclusion

Based on the results of the study indicate that the use of noni leaf extract (*Morinda citrifolia lignosae*) extract has the potential as a natural disinfectant in the process of hatching quail eggs (*Coturnix-coturnix japonica*). The use of 30% Noni leaf extract gives the highest average hatching percentage (93%) and the highest hatching weight (6.89 grams).

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