

Effect of Using Jackfruit Leaf (*Artocarpus Heterophyllus*) as Disinfectant on Decreasing Number and Genus of Fungi in Poultry Incubator

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ABSTRACT

The purpose of this study was to determine the effect of jackfruit leaf juice as a disinfectant to decrease the number and type of fungus in poultry incubator. The method used in this study was laboratory experiments using a complete randomized design with three treatments and six replications. Three treatments used were: P1 = juice jackfruit leaf with concentration 25%; P2 = juice jackfruit leaf with concentration 50%; P3 = juice jackfruit leaf with concentration 75%. Data were analyzed by variance analysis and Duncan test was used to know the difference of treatment. The results showed that the jackfruit leaf juice contains flavonoid compounds, saponins and tannins which are antimicrobial substrates. The use of jackfruit leaf juice extract with 25-75% concentration reduces the number of fungi by 68.27 - 74.77% and the identified fungi genus are *Aspergillus terreus*, *Aspergillus glaucus*, *Aspergillus. versicolor* and *Mucor sp.*

Keywords: Jackfruit leaf, Fungi, Poultry incubator

INTRODUCTION

Duck Hatching Eggs in Lemah Gede - Sangiang Village, Rancaekek District - Bandung, the success rate only reached 40%. The success of hatching is influenced by egg quality and environmental sanitation factors. Contamination of microorganisms (bacteria, fungi) on the incubator can interfere with the process of hatching duck eggs. To establish hygienic environmental sanitation in incubator natural disinfectant jackfruit juice (*Artocarpus heterophyllus*) can be utilized. Active substances contained in jackfruit leaves are flavonoids, saponins and tannin. Flavanoid can inhibit the growth of mycelium fungus, Tanin can damage the cell wall of the fungus, Saponin can inhibit the growth of *Candida albicans*.

Aspergillosis is an infectious disease caused by infection by fungi of the genus *Aspergillus*. Diagnostic results in the field found *Aspergillus fumigatus*, *A. flavus*, *A. niger*, *Monilia sp*, *Mucor sp*. The fungi can contaminate the incubator. Fungi spores are carried by the wind and inhaled by day-old chicken, and cause death in DOC. (Ghotib, 2008). *Aspergillus* will contaminate the eggs through the pores and will kill the embryo, moreover the successfully hatched DOD has lungs infection resulting in Booderpnemunia, and the mortality rate 5- 10% even reaching 30%. It is necessary to fumigate the incubator before the hatching process so that the number of fungi and type of fungi contamination can be decreased.

MATERIALS AND METHODS

Test Solution

The test solution was made from the jackfruit juice utilizing blender, filtered using Whatman 41 filter paper and obtained the jackfruit juice. The obtained liquids are categorized as 100% jackfruit juice concentration. The jackfruit juice was diluted with sterile aquadest (V/V), ie P1 = the jackfruit juice extract diluted by 75% aquadest (25% concentration), P2 = the jackfruit juice extract diluted by 50% aquadest (50% concentration), P3 = the jackfruit juice extract diluted by 25% aquadest (75% concentration).

Media Plate Count Agar

Potato Dextrose Agar (PDA) is made with a ratio of 39 grams in 1 liter of aquadest, then sterilized with autoclave at 121 ° C for 15 minutes, then poured into petridish.

Calculation of Total Fungi on Incubator

The PDA in petridish is attached for 30 minutes on the surface of the incubator which has been stroked with sterile cotton (before spraying with the jackfruit juice) and after spraying with the jackfruit juice according to the treatment. This treatment is repeated at several places on the inside of the incubator and incubated for 48-72 hours. Fungi colonies formed then observed.

The number of fungi is calculated by formula below:

$$\left[\frac{\text{number of fungi}}{100 \text{ cm}^2} \right] = \left[\frac{\text{Javerage number of coloni}}{\text{petridish}} \right] \times \left[\frac{100}{\text{extensive media contact (cm}^2\text{)}} \right]$$

The decrease in the number of fungi in a incubator is calculated by following formula:

$$\frac{\text{The initial number of fungi} - \text{the final number of fungi}}{\text{The initial number of fungi}} \times 100\%$$

Identification of Fungi on Incubator

Prepare slide culture media from fungi culture grown on PDA media derived from incubator. Slide culture of each fungal colony found was incubated for 48-72 hours at 37°C. Observations to identify the type of fungus were made macroscopically and microscopically.

Data Analysis

The data obtained were tabulated using One Way Anova and Duncan's Multiple Range Test (DMRT) utilized SPSS 19 software (SPSS Inc., 2014).

RESULTS AND DISCUSSION

The degree of sanitation in the incubator and the environment is illustrated by the growing number of fungal colonies. Spraying jackfruit leaf juice on the incubator causes decrease in the number of fungal colonies grow, this illustrates the quality of jackfruit leaf juice as a disinfectant. Identification and decreasing number of fungal colonies grow after treatment with the use of jackfruit leaf juice can be seen in Table 1.

Table 1. Identification and decreasing number of fungal colonies grow after treatment with the use of jackfruit leaf juice.

Treatment	T1	T2	T3
Observation result	%.....	
Decreasing number of Fungal Colonies	68.27a	72.74a	74.77a
Identification of Fungi type	<i>A. terreus</i> <i>A. glaucus</i>	<i>A. terreus</i> <i>Mucor sp</i>	<i>A. versicolor</i> <i>Mucor sp</i>

The number of fungal colonies in P1 = 25% jackfruit leaf juice decreased by 68.27%, P2 = 50% jackfruit leaf juice decreased by 72.74% and P3 = 75% jackfruit leaf juice decreased by 74.77%. The result of statistic test showed that spraying jackfruit leaf solution on incubator gave a significant effect on decreasing the number of fungal colonies however there was no significant effect between treatments. Spraying jackfruit leaf juice on incubator with 25-75% concentration resulted in a decrease in the number of fungi by 68.27 to 74.77%. Disinfecting activity was influenced by microbial population, antimicrobial agent concentration, time exposure, and temperature.

The disinfecting properties of jackfruit leaf juice were indicated by the decreasing number of growing fungi, this is due to the presence of anti-microbial substances. Flavonoids inhibit the growth of mycelium while tannin damages the cell wall of the fungi. This is in line with the opinion of Jayasinghe and Padmini (2004); Trindade and Lopes (2006); Aliza Bhuiyan et al (2016); who stated that jackfruit leaf juice contained flavonoid, saponins and tannins which are anti-microbial substances.

The results of the identification of growing fungi include *A. terreus*, *A. glaucus* on P1 = 25% jackfruit leaf juice; *A. terreus*, *Mucor sp* on P2 = 50% jackfruit leaf juice; *A. versicolor*, *Mucor sp* on P3 = 75% jackfruit leaf juice. This is in line with the opinion of Ghotib (2008); Ivanov (2008); Agnieszka Gniadek (2012), Kuldeep Dhama, et al. (2013); Lobna, Salem and Abdel Fatah (2014), Deke et al (2014) who stated that *Aspergillus fumigatus*, *A. flafus* *Aspergillus terreus*, *Aspergillus glaucus*, *Aspergillus nidulan*, and *A. niger* were found in field. These fungi can be found in the environment and often contaminate the incubator and cause the death of hatching eggs. *Aspergillus terreus* usually lives on the ground and causes pathogens in humans and animals, *Aspergillus glaucus* is similar to *Aspergillus terreus*, *Aspergillus nidulan*, *Aspergillus flavus* that produces mycotoxins and mixes with other harmful substances in the air and causing lung disease while breathed in. *Aspergillus versicolor* produces sterigmatocystin which causes lung disease.

CONCLUSIONS

1. Jackfruit leaf juice is effective as a disinfectant in incubator
2. The fungi identified are *A. terreus*, *A. glaucus*, *A. versicolor*, *Mucor sp*

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