

# Analysis of Biosecurity Application in Broiler Chicken Farms in North Sumatra

*Ma'ruf Tafsin, Nevy Diana Hanafi\*, Achmad Sadeli, and Tuty Elvi Farida*

*Department of Animal Husbandry, Faculty of Agriculture, Universitas Sumatera Utara, Indonesia*

**Abstract.** Biosecurity is very important in broiler chicken farming. The right biosecurity application will create optimal performance. This research was conducted in three districts of North Sumatra province, namely Deli Serdang, Serdang Bedagai and Simalungun with purposive sampling methods. Number of samples used by 104 respondents. This research was conducted to find out the level of application of biosecurity and health conditions in the maintenance of modern broiler chickens. The data used in the study used primary data obtained from filling out questionnaires and discussions with farmers. The parameters used use the Likert scale with integers of 1, 2, 3, 4, and 5 for each answer. There are three categories in the application of biosecurity, namely pre of entry, point of entry and post of entry. Disease conditions that often appear during the maintenance of broiler chickens related to the performance obtained by respondents. The results of the statistical analysis illustrate that the level of application of pre-entry biosecurity ( $P < 0.05$ ) describes 67% of the significant results of 6 questions, the point of entry ( $P < 0.05$ ) shows 100% insignificant results from 6 questions and post of entry ( $P < 0.05$ ) shows 43% significant results from 7 questions on closed house and open house systems. The results of data obtained from cases of diseases that are often a problem in broiler chickens more cases of enteritis (digestive) disease by 27.9% and CRD by 25% of the total respondents.

**Keywords:** broiler chickens, biosecurity, diseases, immunity

Received 21 April 2022 | Revised 04 September 2023 | Accepted 09 September 2023

## 1. Introduction

Broiler chicken farming at this time is quite developed in the world, especially in Indonesia. The market demand for broiler chickens is very rapid. Broiler chickens produce meat, which is one source of animal protein needed by humans at a price that can be affordable to the community economy. The increase in broiler chicken meat production is strongly supported by the government and society in general. The increase in broiler chicken population affects the location of broiler chicken livestock spread in Indonesia. The population of broiler chickens in 2020 in Indonesia will be 2,970,493,660 [1]. This appears to have decreased by around 6.2% compared to the broiler chicken population in 2019 of 3,169,805,127. For the province of North Sumatra, the population of broiler chickens in 2020, according to BPS, was 128,841,803 birds. It can be

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\*Corresponding author at: Department of Animal Husbandry, Faculty of Agriculture, Universitas Sumatera Utara, Jl. Prof. Sofyan No. 3 Kampus USU Medan-20155, Medan, Indonesia

E-mail address: [nevydiana@usu.ac.id](mailto:nevydiana@usu.ac.id)

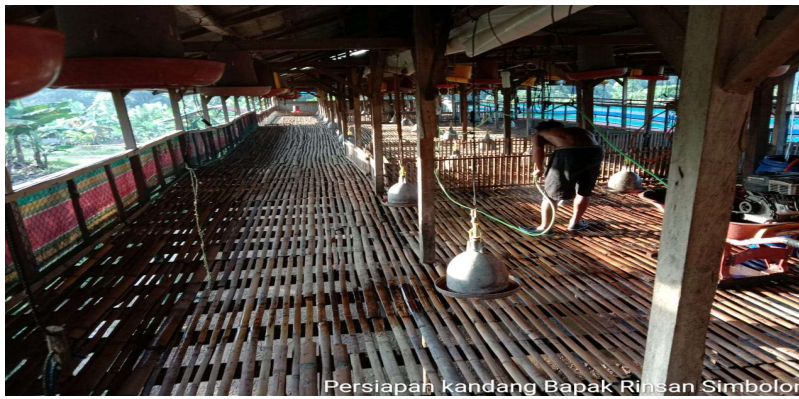
seen from statistical data that the province of North Sumatra contributed 4.3% in Indonesia. This also affects the SOP (Operating System Procedure) that must be applied to broiler chicken farms, namely the correct biosecurity application. Biosecurity in broiler chicken farming is defined as an effort to prevent disease germs from entering the broiler chicken farm area so that broiler chickens remain healthy and produce products that are safe, healthy, whole and halal [2]. Research results of [3] state that biosecurity has a meaning as an effort to reduce the spread of disease organisms by blocking direct contact between animals and microorganisms. The Covid 19 pandemic in humans and ASF in pig livestock that occurred requires us to maintain cleanliness and health protocols so that disease germs do not spread and infect the human body and pig herds. Therefore biosecurity is very important to prevent the entry of disease germs. Commercial poultry farms are at high risk for disease outbreaks and can result in significant economic losses to farmers and integration [4]. So the key to future success by expanding through disease elimination and control and implementing biosecurity programs [5]. Research results of [6] state that many variations for external and internal biosecurity among participating broiler chicken farms show that many improvements can be made. External biosecurity tends to score lower than internal biosecurity. This is seen from the lowest scores on farms that participate in the category of "visitors and staff". This is supported by the education of broiler chicken farmers and officers regarding good biosecurity procedures and their implementation remains very important.

## **2. Method**

The implementation procedure uses a questionnaire with three stages of questions about biosecurity, namely pre of entry, point of entry and post of entry using the Likert scale. Analyze the results using IBM SPSS 20 tools with descriptive analysis and comparison tests. According to [7] the Likert scale is a scale used to measure the attitudes, opinions and perceptions of a person or group of people about social phenomena.

## **3. Results and Discussion**

Biosecurity affects the health condition of broiler chickens starting from the preparation of the cage until the end of the broiler chicken harvest. The results of the study describe three levels of application of biosecurity. This is supported by disease conditions that often appear during the maintenance of broiler chickens ranging from chicks to harvest. Diseases that are a problem in broiler chickens often attack the respiratory and digestive tract organs. The causative factor is one of the less than optimal level of cage management so that chicken performance results can be disrupted. Types of diseases that often infect broiler chickens are *E. coli*, CRD (*Chronic Respiratory Disease*), *Enteritis*, *Necrotic enteritis*, *Coccidiosis*, *Mycotoxins* etc.



**Figure 1.** Cleaning of Empty Cages with Disinfectant

Before entering, the chicks are carried out the ballast of the cage and its equipment with detergents and disinfectants to eradicate bacterial, viral, parasitic, and fungal germs. Some questions at each level of application of biosecurity can be seen in Tables 1, 2, and 3.

**Table 1.** Pre-entry Stage Biosecurity Analysis

Pre-entry	t	P-Value
There is a fence at the site of the cage	-4,288	0,000*
There is a door on the fence	-3,728	0,000*
There is a doorman	-4,381	0,000*
There is a prohibition sign at the gate	-2,682	0,009*
Animal can pass through fences	0,319	0,750**
There are vehicle spray devices and visitors	-1,587	0,116**

Average a significant level of 95% (P<0,05)

\*Significant; \*\*no significant

The results of the biosecurity analysis of the pre-entry stage (P<0.05) showed a real significant level between closed house and open house system breeders in the environmental conditions of the cage in the procurement of fence doors, door guards, and prohibition signs on fence doors. For animals that pass through the fence and the procurement of spray tools is not significant between the opinions of closed house and open house breeders this is due to a lack of education on the importance of the impact of transmission from other animals / livestock that enter the cage area.

**Table 2.** Point of Entry Stage Biosecurity Analysis

Point of Entry	t	P-Value
There is an office on the farm	-0,966	0,336**
Hand and foot washing available	1,451	0,150**
There are other cattle in the cage	0,035	0,972**
Separate feed shed with cage	1,231	0,221**
There is a sanitary room to enter the cage	0,486	0,628**
Booth shoe replacement available	-0,979	0,330**

Average a significant level of 95% (P<0,05)

\*Significant; \*\*no significant

The results of the point of entry stage analysis ( $P < 0.05$ ) showed insignificant results between closed house and open house breeder respondents. Still need education on biosecurity at this point of entry stage. Disease transmission factors can be affected by contamination, such as the presence of fly vectors, mosquitoes, birds etc. The transmission factor of the disease can also be from environmental pollution brought by visitors who enter the livestock area through clothing, shoes and vehicles. Regular and disciplined spraying greatly helps reduce the impact of the entry of the disease. As seen in Figure 2, there are flies, mosquitoes, frogs, etc., that enter the cage environment.



**Figure 2.** Insects Around the Broiler Chicken Farm

**Table 3.** Post-entry Stage Biosecurity Analysis

Post of Entry	t	P-Value
The cage has doors and padlocks	-2,388	0,019*
There is no sign on the door	-2,173	0,032*
Footbath contains disinfectant at the door	-1,001	0,319**
There is a spray containing disinfectant at the door	-1,643	0,104**
There are insects or frenky in the cage area	-1,045	0,299**
There are rats in the cage	-1,804	0,074**
There are other cats/cattle in the cage	-2,173	0,032*

Average a significant level of 95% ( $P < 0,05$ )

\*Significant; \*\*no significant

The post of entry stage ( $P < 0.05$ ) showed significant results at the question stage the cage had doors and padlocks, there was no sign on the door and there were other cats/livestock in the cage. In the three stages of biosecurity analysis shows that respondents' attention to biosecurity SOPs has not been maximally implemented, this can be influenced by farmers' knowledge of the importance of biosecurity is still not optimal. According to research [8]. The average biosecurity score of broiler chicken farms with traditional/conventional cages is 7.8% lower than that of closed house/modern cages. Every year there is a 0.2% decrease in biosecurity scores in broiler

chicken farms. According to [9] in his research showed that the level of application of biosecurity in partnership broiler chicken farms in Selanbawak village of Tabanan regency was better at Pre Entry ( $P < 0.05$ ) than in The Kaja Village of Gianyar Regency. While at point of entry and post of entry is the same in both districts.

**Table 4.** Disease Analysis in the Maintenance of Broiler Chickens

Types of Diseases	Frequency	Percent
CRD	26	25.0
CRD & Enteritis	4	3.8
CRD & Koksidirosis	1	1.0
CRD & Enteritis	1	1.0
CRD Complex & Enteritis	1	1.0
CRD Complex	11	10.6
CRD, Coli	2	1.9
CRD, Enteritis	2	1.9
CRD/Snot	2	1.9
enteritis	29	27.9
Heat stress, CRD	1	1.0
Heat stress	1	1.0
Heat Stress	4	3.8
Heat stress & Enteriti	1	1.0
Heat Stress & CRD	1	1.0
Heat Stress & Enteritis	1	1.0
Snot	2	1.9
None	14	13.5
Total	104	100.0

The results of the analysis of disease data that are often a problem in the maintenance of broiler chickens more cases of enteritis (digestive) disease by 27.9% and CRD by 25% of the total respondents.



**Figure 3.** The Chickens is Paralyzed Due to Disease

#### 4. Conclusion and Recommendation

Biosecurity is necessary for maintaining broilers' health and suppressing the transmission of dangerous diseases such as viruses, bacteria, parasites, etc. This must be supported by education and proper application of SOPs to biosecurity applications.

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