



## The Effect of Combination of Fermentation and Commercial Feed on The Immunity of Super Native Chicken

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### Abstract

This study aims to determine the effect of providing a combination of commercial fermented feed on the resistance of super native chicken. The study was conducted from October to December 2019 in the Popalia village Tanggetada Kolaka district. The material used is 60 super native chicken DOC. The study was arranged in a completely randomized design 4 treatments and 3 replication P1 (40% fermented feed + 60% commercial feed), P2 (50% fermented feed + 50% commercial feed), P3 (60% fermented feed + 40% commercial feed), P4 (70% ferment and feed + 30% commercial feed). The parameter observed included Fabricius, thymus, and spleen exchanges. The provision of fermented and commercial feed in non-significant feed has a significant percentage of the body weight of primary lymphoid organs (Fabricius thymus exchanges) and the percentage of secondary lymphoid organs (spleen).

**Keywords:** super native chicken, Fabricius exchange, thymus, and spleen

### A. Introduction

Native chicken is a type of poultry that has become popular in the community and is spread throughout the archipelago. For the people of Indonesia, native chicken is no stranger. The term "native chicken" was originally the opposite of the term "breed chicken", and this term refers to chickens found roaming freely around the village. However, since the purification,

breeding, and establishment of several local chickens, several superior native chicken strains are currently known or known as superior local chickens. Super native chicken has a taste and aroma similar to local native chicken, but its growth is like that of purebred chicken. The growth of super native chickens is relatively fast, so the cultivation process is also fast, in two months it can reach 1 kg (Suryana & Hasbianto, 2008).

Super native chicken has a low mortality rate, disease resistance, easier maintenance, noise resistance, stable selling price, and easy to market (Krista & Harianto, 2013). Admittedly or not, consumers' appetite for native chicken is very high. This can be seen from the population growth and demand for native chicken which is increasing from year to year (Bakrie, 2003). Where in 2001 - 2005 there was an increase of 4.5% and in 2005 - 2009 consumption of native chicken from 1.49 million tons increased to 1.52 million tonnes. The low productivity of native chickens is influenced by several factors including age and feed. The feed commonly used in the maintenance of super native chickens is commercial feed, because it is necessary to look for feed ingredients that contain sufficient nutrients and do not compete with human needs, and are relatively inexpensive (Pagala et al., 2015).

Because commercial feed has met the standard requirements for food substances that have been set. The commercial feed used is generally a mixture of several types of raw materials such as energy sources, fats, vitamins, minerals, antibiotics, and protein, besides the price is relatively expensive (Tillman, 1989). The use of antibiotics can be bad because they can cause antibiotic residues in the meat. Residual hazard can be a serious problem, especially if it enters the consumer's (human) body. Antibiotic residues themselves can have carcinogenic effects and in the long term can be fatal. Therefore, it is necessary to look for feed ingredients that contain sufficient nutrients and do not compete with humans (Anggorodi, 1994).

One of the agricultural wastes that can be used as an alternative is tofu dregs. Tofu dregs have high nutritional content and nutritional value. Improve nutritional quality, and reduce or eliminate the negative effects of feed ingredients, this can be done by using microorganisms through a fermentation process (Winarno, 2000). The fermentation process can maintain livestock feed without having to reduce the number of nutrients and can help improve appetite so that the growth of livestock will be maximized and not easily get sick because animal feed that has been fermented can maintain immunity and increase body resistance.

## B. Methodology

### 1. Materials of Research

The equipment used in this study consisted of 12 units of litter cages equipped with feed and drinking containers, 40 Watt incandescent lamps as heaters and lights, digital scales, scissors, and knives. The materials used in the study consisted of 60 super native chickens, commercial feed substituted with concentrate, bran, yellow corn, tofu dregs, clean water, vaccine, tapioca flour, granulated sugar, EM4, and medicines.

### 2. Design of Research

The research was arranged based on a Completely Randomized Design (CRD). Consists of 4 treatments 3 repetitions for each treatment ratio. The treatment is:

P1 = Chickens are given 40% fermented feed + 60% commercial ration

P2 = Chickens are given 50% fermented feed + 50% commercial ration

P3 = Chickens fed 60% fermented feed + 40% commercial ration

P4 = Chickens fed 70% fermented feed + 30% commercial ration.

### 3. Methode of Research

#### a) Manufacture of Tofu Dregs Fermented Feed

The percentage of making tofu dregs is based on 28 kg

**Table 1. Percentage of Fermented Feed**

No	Type of Material	Percentage (%)	Unit (Kg)
1	Dregs of Tofu	67,5	28
2	Yellow Corn	14	5,7
3	Bran	14	5,7
4	Sugar	1,5	0,6
5	Tapioca flour	3	1,2

**Source: Primary Data**

The fermented feed used comes from a mixture of tofu dregs, corn, and fine bran. Tofu dregs are steamed for 30 minutes. Furthermore, it is cooled and mixed with bran, yellow corn, granulated sugar, and starch, and the mixture is added with 2% *Aspergillus niger* inoculum, and ripened for 5 days at 50°C. Then ground to form pellets. After that, it is dried for 1-2 hours and stored for use according to treatment.

#### b) Maintenance Process

Super native chickens were reared from DOC to 3 months old and randomly placed in cages. Maintenance is divided into two stages, namely the first stage of feeding habituation at the age of 1-7 days and the second stage of giving treatment, namely at the age of 8-60 days. Feeding is divided into 3 times a day at 07.00, 12.00, and 17.00 WITA with 4 levels of commercial feeding that have been made, namely 0%, 40%, 50%, and 60%, of the standard while drinking water will be given ad libitum.

#### c) Cutting Method

The Islamic method of cutting is by cutting 3 channels: jugular vein, esophagus, and esophagus. After the chickens are slaughtered, the blood is removed by hanging the cattle to make the bleeding process easier.

### 4. Parameters of Research

Parameters measured in this study were bursa Fabricius, thymus, and lymph.

### 5. Data Analysis

Experimental data will be analyzed by analysis of variance according to a Completely Randomized Design (CRD), with a mathematical model (Steel & Torrie, 1991) as follows:

$$Y_{ij} = \mu + P_i + e_{ij}$$

Information:

i = 1, 2, 3, 4, p

j = 1, 2, 3, u

$Y_{ij}$  = Observation of the ith treatment and jth repetition

$\mu$  = General Average

$P_i$  = The effect of the i-th treatment and

$e_{ij}$  = Error of the 1st treatment and j-th replication

To determine the effect of the treatment on the measured change, the data obtained were analyzed using statistical variance. If the treatment shows a significant effect, it is continued with the least significant difference test (Steel & Torrie, 1991).

## C. Result and Discussion

Based on the results of the research analysis on the combination of fermented and commercial feed on the immunity of super native chickens (Bursa Fabricius, Timus, and Spleen) can be seen in Table 7.

**Table 1. The Average Percentage Value of Bursa Fabricius Lymphoid Organs, Thymus, and Spleen % Given Fermented and Commercial Feed Against the Immunity of Super Kampung Chicken.**

Parameters	Treatments				Sig
	P1	P2	P3	P4	
<i>Bursa Fabricius</i>	0,30±0,06	0,41±0,01	0,41±0,07	0,53±0,24	0,286
<i>Thymus</i>	0,32±0,05	0,42±0,02	0,37±0,04	0,52±0,24	0,348
<i>Lymph</i>	0,42±0,15	0,43±0,12	0,58±0,24	0,95±0,42	0,119

**Description: The same superscript on the same row indicates no difference between treatments ( $P > 0.05$ ).**

#### 1. Fabricius Exchange Percentage

Based on the results of the analysis of variance showed that the combination of fermented feed and commercial feed in the super native chicken feed had no significant effect ( $P > 0.05$ ). The average percentage of fabrication exchange ranges from 0.30-0.53%. The use of fermented feed and commercial feed with levels of 40%, 50%, 60%, and 70% in the ration did not affect the super native chicken fabric process. This is because there is no difference between

fermented feed and commercial feed given to super-native chickens. The factors that influence the high percentage of the fabric bursa's weight are the fabric bursa's age and growth stages. So even though being given fermented feed and commercial feed does not increase the percentage of fabrication bursa Tizard (1988) fabrication bursa will grow fast in the first 3 weeks of age of the chicken. In the study, the percentage of bursa Fabricius in treatments P1, P2, and P3 (0.30-0.41%) was lower than the percentage of the spleen (0.42-0.58%) which means that in this study fermented feed can provide humoral immunity which will only react when there is a bacterial infection. According to Leeson & Summer (2000), if the size of the bursa Fabricius is the same or smaller than the spleen in the first 5 weeks of age, it indicates that immunosuppression has occurred. Leeson & Summer (2000) added that humoral immunity (bursa) is the main defense against bacteria, while cellular immunity performs its function against viruses.

### 2. Thymus Percentage of Live Weight

Based on the results of the analysis of variance, it was shown that the use of fermented feed in the feed had no significant effect ( $P > 0.05$ ) on the percentage of live weight of super native chicken thymus. The average percentage of thymus weight is 0.32-0.52%. Feeding super-native chickens starting from 40% -70% does not affect the thymus weight of super-native chickens. This is inversely proportional to the opinion of Toghyani et al. (2010), who stated that the percentage of thymus weight was 0.48%. The size of the thymus varies relatively, relatively large sizes are found in newborn animals while the absolute size is greatest when after adulthood the thymus undergoes atrophy in its parenchyma and cortex is replaced by fatty tissue (Fawcett, 2002). The factors that influence the low weight of the thymus are stress. This is the opinion of Tizard (1998) who states that a thymus that experiences atrophy/shrinkage quickly reacts to stress so animals that die after suffering from a long illness have a very small thymus.

### 3. Spleen Percentage

Based on the results of the F test (Table 7) shows that the feeding of fermented and commercial feed in the P1 (0.95 gram) and P2 (0.42 gram) treatments was significantly different ( $P < 0.05$ ) with the P3 treatment (0.43 gram) and P4 (0.95 gram) on the percentage of super native chicken spleens. However, research by Merryana et al. (2007) that normal spleen weight is much higher than (0.42% -0.95%) in super native chickens. This has indicated that there has been abundant enlargement. The factors that affect the enlargement of the spleen are stress and infection or foreign bodies. According to research by Schmidt et al. (2003). Whereas the diseases that often attack the spleen of poultry are Avian Polyomavirus, Herpesvirus, and Avipoxvirus. These agents cause spleen enlargement or splenomegaly in poultry. Merryana et al. (2007) state that the enlarged spleen is infected with bacteria because the spleen indirectly plays a role in immune function by producing lymphocytes. Ressang (1984) states that spleen activity can cause the spleen to enlarge or even shrink because the spleen is attacked by disease or a foreign body because the spleen is tasked with taking antigens from the blood that are associated with lymphocytes. If the size of the large spleen means that it accommodates more and more antigens, the result is that the free lymphocytes in the blood decrease, which increases the ratio of heterophytes and lymphocytes.

## D. Conclusion

Based on the results of this study it can be concluded that the provision of fermented and commercial feeds in the diet did not significantly affect the percentage of primary lymphoid organ weight (Bursa Fabricius and thymus) and the percentage of secondary lymphoid organs (lymph).

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