Addition of Turmeric Flour in Ration on The Growth of Super-Native Chickens Aged 11-18 Weeks
Ni Ketut Etty Suwitari¹, Luh Suariani²*, Ni Made Yudiastari³, Agung Pamuji⁴, Adi Wiratama⁵
Warmadewa University
Corresponding Author: Luh Suariani aniekwidiarsa@ymail.com

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ABSTRACT
The main components in turmeric are essential oils and curcuminoids, which are yellow color substances in turmeric, essential oils, and Curcuminoids can increase the digestibility of dry matter and protein, increase digestive enzymes so that feed digestibility increases and results in the digestive tract emptying faster, and ultimately provide consumption increases. The design used is a completely randomized design (CRD) with 5 (five) treatments and 3 (three) replicates. The experimental treatments are designated as follows: P0 represents the control group without the addition of turmeric flour, P1 represents the group with 1% turmeric flour, P2 represents the group with 2% turmeric flour, P3 represents the group with 3% turmeric flour, and P4 represents the group with 4% turmeric flour. This study’s variables recorded and analyzed included initial body weight, final body weight, weight gain, ration consumption, and feed conversion ratio. The findings of this investigation demonstrated that the incorporation of turmeric flour showed a statistically significant effect (P <0.05) on Final Body Weight, Weight Gain, and Feed Consumption Ratio. However, it was shown that the variables under investigation did not significantly impact ration consumption (P>0.05). Giving turmeric flour up to 2% can provide the best results.
INTRODUCTION

In realizing the livestock development program operationally, the livestock subsector begins with forming or arranging areas through a system approach that cannot be separated from the livestock business, namely increasing income and community welfare (Nurzaman, 2002).

The cultivation of super-native chicken presents a highly profitable emerging commercial prospect. The consumer demand for super-native chicken meat has experienced a substantial surge. Super native chickens, also known as superior local broilers, result from a breeding process involving native and purebred chickens. These hybrid chicks exhibit accelerated development rates compared to local chicken breeds, earning the moniker "super native chickens." Triswi (2016) stated that super native chickens grow faster than local native chickens.

To provide proper nutrition, the preservation of Super-native chicken necessitates the provision of high-quality feed. Achieving optimal outcomes can be facilitated by providing a well-balanced diet with a harmonious combination of essential nutrients. Today's reality is that commercial feed prices are costly (Saputra, 2021). Commercial feed is feed designed to produce optimal development, growth, health, and appearance because it has been compiled based on the value of the nutritional needs of livestock from complete dietary content. To achieve rapid chicken growth and maximize output, it is essential to provide sufficient quality and quantity of feed containing all necessary nutritional ingredients. Including critical food components, namely carbs, protein, fat, minerals, and vitamins, is crucial within the dietary composition. Rations are the most significant cost component of about 60 - 80% of all production costs in poultry livestock (Saputra, 2021).

Turmeric flour is one of the additives that need to be known to positively affect the digestibility of feed ingredients. It is mixing turmeric flour in the ration because turmeric contains curcumin that can increase digestion, improve fat metabolism, prevent disease, and increase appetite (Darwis et al., 1991).

Using turmeric flour in the ration does not significantly affect ration consumption and conversion. Still, it substantially affects broiler chicken’s body weight gain, namely, using turmeric flour as much as 0.3% and 0.4% (Hendriana et al. 2018). Based on the research, a mortality rate of 0% was obtained. The mortality rate in this study was relatively low due to the addition of turmeric flour with feed and drinking methods and relatively high doses, causing the mortality rate of chickens to be quiet. In turmeric rhizomes, curcumin compounds contain anti-bacteria that can increase the immunity of chickens (Rahmawati and Megaaprilla 2017).
LITERATURE REVIEW

The research was conducted for six weeks at Kesiman Village, Denpasar City, Bali. The study was performed using the Completely Randomized Design (CRD) method with 5 (five) treatments and 3 (three) replications. The treatments are as follows:

P0 (Control) = Ration without the addition of turmeric flour
P1 = Ration containing 1% turmeric flour
P2 = Ration containing 2% turmeric flour
P3 = Ration containing 3% turmeric flour
P4 = Ration containing 4% turmeric flour

Super-Native Chicken

The chickens utilized in this study were super-native chicks between 11 and 18 weeks. The participants were chosen based on their relatively consistent body weight and were not classified according to their gender (unsexed). The experimental enclosure employed in this investigation is a battery cage with 15 compartments. The section is within a specific structure, with 50 x 50 x 47 (length x width x height) centimeters to accommodate each property. Cage equipment for feed and drinking places uses long pipes, and the bottom of the cage is filled with sacks to accommodate chicken droppings, making it easy to clean the cage.

Ration

The rations used in this study were local feed ingredients in the Bali area, including fish meal, yellow corn, coconut meal, soybean meal, coconut oil, salt, chicken premix, and turmeric flour. The ration was prepared according to the nutrient requirements for super native chickens, using allocations with a metabolic energy content of 2709.40 - 2833.36 Kcal/kg, with a crude protein content of 19%.

The instruments utilized in this study are:

a. Electric/digital weigher with a capacity of 5000 grams and a sensitivity of 0.1 grams: used to weigh the feed and chicken ingredients used in the study.

b. Bucket: used to store the treatment feed that is being weighed.

c. Label paper: used to mark each treatment feed that has been weighed.

d. Stationery: recorded every amount of feed used daily during the study.
METHODOLOGY

Rations are mixed and labeled according to the type of ration.

The rearing of native chickens involved the provision of feeds based on specific treatment protocols. Feed is given ad libitum

Weighing is carried out every week, and the remaining ration is also weighed every week

Calculate data from observations and perform statistical analysis to obtain research results.

Figure 1. Course of Research

Research Parameters
The variables that were observed in this investigation are as follows:
1. Initial Body Weight is the weight of the chicken at 11 weeks of age.
2. Determining weight increase involves subtracting the beginning body weight from the final body weight.
3. Final Body Weight is the weight obtained at the end of the study at the age of 18 weeks.
4. Ration consumption can be achieved by decreasing the quantity of ration provided in conjunction with the leftover ration.
5. Ration conversion refers to the ratio between the quantity of ration ingested and the subsequent increase in body weight.

Statistical Analysis
The data acquired from this investigation's findings were analyzed using variance analysis. If the accepted results demonstrated a statistically significant effect (P < 0.05), the researchers proceeded to conduct Duncan's least important difference test (Stell and Torrie, 1993) to assess the impact of variations between the different treatments.
RESULTS AND DISCUSSIONS

From the research results conducted with the title of the addition of turmeric flour in the ration of native chickens to the growth of native chickens aged 11-18 weeks, the following results were obtained, as listed in Table 1.

Table 1. The Impact of Including Turmeric Into the Dietary Regimen on the Growth Patterns of Super Native Chickens Aged 11 to 18 Weeks

<table>
<thead>
<tr>
<th>Variables</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial body weight (g/head)</td>
<td>842,975&lt;sup&gt;a&lt;/sup&gt;</td>
<td>845,334&lt;sup&gt;a&lt;/sup&gt;</td>
<td>846,922&lt;sup&gt;a&lt;/sup&gt;</td>
<td>877,305&lt;sup&gt;a&lt;/sup&gt;</td>
<td>846,850&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Final body weight (g/head)</td>
<td>1.861,231&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.061,867&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.952,211&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.875,622&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.845,167&lt;sup&gt;b&lt;/sup&gt;</td>
<td>59,541</td>
</tr>
<tr>
<td>Weight Gain (g/head)</td>
<td>918,256&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.216,533&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.105,289&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.026,789&lt;sup&gt;b&lt;/sup&gt;</td>
<td>998,317&lt;sup&gt;b&lt;/sup&gt;</td>
<td>60,143</td>
</tr>
<tr>
<td>Ration Consumption (g/head)</td>
<td>4.262,543&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.228,628&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.365,780&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.354,540&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.463,070&lt;sup&gt;a&lt;/sup&gt;</td>
<td>77,249</td>
</tr>
<tr>
<td>FCR</td>
<td>4.64&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.47&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.94&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.24&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>4.47&lt;sup&gt;ac&lt;/sup&gt;</td>
<td>0.253</td>
</tr>
</tbody>
</table>

Description: Different letters in the same row indicate significantly different (P, >0.05)

Final Weight

The statistical analysis results indicate that including turmeric flour in the diet had a statistically significant impact (P <0.01) on the ultimate body weight of super-native chickens at 18 weeks of age. Including 1% turmeric flour in P1 resulted in a higher final body weight of 2,061.87 grams per tail in native chickens aged 18 weeks, compared to the control group P0, which did not contain turmeric flour. The observed difference was found to be the observed results were found to be statistically significant at a significance level of 0.05. The experimental treatments P2 (2% turmeric flour), P3 (3% turmeric flour), and P4 (4% turmeric flour) exhibited considerably higher outcomes compared to P0, with statistical significance at a significance level of P<0.05.

Including turmeric flour in the diet had a statistically significant impact (P<0.05) on the ultimate body weight of Super-native chickens within the age range of 11-18 weeks. The best results were obtained in the perpetrator P1 (addition of 1% turmeric flour), which amounted to 2.061, 867 g / tail when viewed from the control treatment (P0). Providing turmeric flour in the ration can increase chickens' growth and body weight. Thus, turmeric flour can be used as an additional feed because it has good protein and energy. Pratikno (2010) believes that the inclusion of turmeric in the diet has been found to have potential benefits such as promoting weight gain, improving feed efficiency, and decreasing adipose tissue deposition. According to Yuniusta et al. (2007),
Turmeric has been found to facilitate the enzymatic metabolic processes within the avian organism due to the presence of curcuminoid chemicals and essential oils. When viewed from the provision of turmeric with a level of 2.34%, there is a decrease in body weight from P1 (1%), thus meaning that the optimal condition of turmeric flour is with the addition of 1%.

**Weight Gain**

From the statistical analysis results, the incorporation of turmeric flour had a substantial effect (P <0.01) on the final weight gain of 18-week-old super-native chickens. Including turmeric flour at a concentration of 1% (P1) led to a notable increase in body weight, with a mean gain of 1,216.53 grams per individual. The observed increase demonstrated statistical significance (P<0.01) in comparison to the control therapy (P0), where turmeric flour was not added, resulting in a mean weight gain of 918.26 grams per individual. In treatment P2, which used 2% turmeric flour, the observed data demonstrated a statistically significant distinction (P<0.05) compared to treatment P0. However, treatments P3 (3% turmeric flour) and P4 (4% turmeric flour) did not demonstrate a significant difference (P>0.05) in comparison to P0.

The body weight gain of super native chickens between the ages of 11 and 18 weeks was found to be significantly affected (P<0.05) by the inclusion of turmeric in their diet. The treatment group P1 (1% turmeric inclusion) yielded the highest results, with an average weight gain of 1,216,533 grams per bird. This is because turmeric can increase the appetite of chickens and optimize the function of the body organs of super-native chickens. This is by Mengaaprilia’s research (2017), which states that the provision of turmeric extract significantly affects the body weight gain of broiler chickens. The appropriate quantity and quality of feed significantly impact the rate of body weight gain. The correlation between the proportion of food items in the feed and the resultant body weight is a significant factor to consider (Handayani, 2017). Chicken weight gain is the increase in the value of the difference in body weight versus the length of time of maintenance. Controlled body weight gain in the P0 treatment (without turmeric flour) The higher the administration level up to 4%, the lower the body weight gain. In addition, Sabrin et al. (2021) explained that the addition of turmeric flour. Up to 4% in super-native chicken rations can increase body weight gain and reduce the value of Ration Conversion and fixed ration consumption.

According to Pratikno (2010), the increase in chicken body weight illustrates the efficient utilization of feed through metabolism assisted by turmeric extract given through feed to produce greater body weight. Turmeric flour contains several nutrients that can play a role in the growth of native chickens, including:

1. **Curcumin** is an active turmeric compound with anti-inflammatory and antioxidant properties. Curcumin can help increase the appetite of native chickens and speed up the process of emptying stomach contents, thereby increasing feed consumption and growth of native chickens.

2. **Protein**: Turmeric flour contains protein that can help repair and build body tissues in native chickens.
3. Fat: Turmeric flour contains fat that can help increase the energy and growth of native chickens.
4. Carbohydrates: Turmeric flour contains carbohydrates that can provide a source of energy for native chickens.
5. Minerals: Turmeric flour contains calcium, magnesium, and potassium, which can help strengthen the bones and muscles of native chickens. In addition, according to Sabrina (2021), giving turmeric flour to supernative chickens provides benefits.
   - Increase the appetite of native chickens
   - Increase body weight gain of native chickens
   - Optimizing feed conversion (FCR value)
   - Increase the body resistance of native chickens
   - Improves carcass quality and yolk color
   - Anti-bacterial
   - Lower fat content in native chickens
   - Improving the efficacy of the concluding phase super native chickens (Sabrin Muhamad et al., 2021)

Ration Consumption
Incorporating turmeric flour into the diet did not provide statistically significant outcomes (P>0.05) regarding the feed intake of 18-week-old supernative chickens. The lowest ration consumption was 4.228,63 grams/head in P1 (1% turmeric flour). Adding turmeric flour increased the ration consumption of super-native chickens aged 11-18 weeks. The quantity of ration consumption in treatment P0 was recorded as 4,262.54 grams, treatment P2 as 4,365.78 grams, treatment P3 as 4,353.54 grams, and treatment P4 as 4,463.70 grams. Nevertheless, the statistical analysis failed to provide a lack of statistical significance between the variables, as indicated by a P-value over 0.05.

The statistical research on including turmeric flour in the diet revealed no statistically significant impact (P>0.05) on the feed intake of super-native chickens between the ages of 11 and 18 weeks. This is to the research of Jihadulhalah (2016) that adding turmeric flour up to 2% in ducks does not significantly affect ration consumption.

The findings derived from the investigation acquired ration consumption. In the context of therapeutic interventions, P2 (2%), P3 (3%), and P4 (4%) were higher than in the treatment of P1 and P0. This is because the provision of turmeric flour can increase appetite, thereby increasing the consumption of super-native chicken rations, where turmeric flour contains curcumin, which has properties that can affect appetite. Dahrut (2017) states that the content of curcumin and atsiri oil can accelerate gastric emptying; thus, hunger and thirst will arise. Furthermore, Alfian and Munir (2015) state that turmeric is an herbal plant with anti-bacterial properties and reduces pathogenic bacteria so that it can increase the consumption and health of the chicken digestive tract.

The level of ration consumption in native hens can be influenced by the type of feed provided. Feed quality, feed digestibility, the crude fiber content in the feed, and feed palatability are some factors that can affect the level of ration consumption in native chickens. Furthermore, the ration's morphology, the
proportion's magnitude, the arrangement, and how the quota is fulfilled can also influence the consumption of rations in indigenous chicken populations. Therefore, in native chicken farming, focusing on the type of feed given is vital to achieve optimal ration consumption rates and increase production efficiency (Eriko et al., 2016).

**FCR (Ration Conversion)**

The impact of incorporating turmeric flour into the chicken feed was found to have statistically significant effects (P<0.05) on the conversion efficiency of the ration. In the P1 treatment (1% turmeric flour), the allocation showed minor ration conversion results (3.47), significantly lower than P0 (0% turmeric flour), which amounted to 4.64 and was statistically quite different (P<0.05). Adding turmeric flour at all levels resulted in lower values than the P0 treatment.

From the statistical analysis of the provision of turmeric flour in the ration, there is a natural effect (P<0.05) on the FCR value of general super-native chicken at 11-18 weeks. The treatment with 1% turmeric flour (P1) yielded the most favorable outcomes, which was 3.491. This is because the ratio consumption in the P1 treatment is the lowest while the body weight gain is the highest, so the FCR in the P1 treatment is the most efficient.

The feed conversion ratio (FCR) calculation involves comparing the value of ration consumption to the amount of body weight growth. Compared with the treatment without turmeric (P0) provision, it is still better than the FCR-given turmeric flour. This means that giving turmeric can improve FCR.

Sinta (2002) stated that providing turmeric flour as much as 2 grams in one gram of ration can give the best results on ration conversion and body weight gain. Furthermore, Nuraini (2009) explained that the better the ration quality, the smaller the ration conversion value. A low conversion rate indicates that The quantity of feed utilized in producing one kilogram of meat is getting less.

Feed conversion is one of the benchmarks for assessing the efficiency level of feed use. The feed conversion value displayed is high, indicating a low feed utilization efficiency. On the contrary, when the feed conversion value is low, it shows high efficiency in feed utilization. Similarly, a more significant ration conversion rate suggests a lower level of efficiency in ration utilization; otherwise, a more down the ration conversion rate means a higher level of efficiency (Sintya T et al., 2020)

**CONCLUSIONS**

Based on the study's findings, it can be deduced that incorporating turmeric flour into the diet of indigenous chickens has a noteworthy impact (P<0.01) on the ultimate body weight and weight gain of super-native chickens within the age range of 11-18 weeks. The best results were obtained in treatment P1 (1% turmeric flour). The lowest FCR value obtained by adding 1% turmeric flour (P1) was significantly lower than the control treatment (P0). The findings about ration consumption yielded comparable outcomes, with a P-value greater than 0.05 either given additional turmeric flour or not given extra turmeric flour.
RECOMMENDATIONS
From the study results, using as much as 2% turmeric flour can be recommended to obtain optimal growth results. In addition to helping in the growth of livestock, turmeric also plays a role in preventing diseases in ungags.

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