|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| [Livestock Research for Rural Development 32 (10) 2020](http://www.lrrd.org/lrrd32/10/cont3210.html) | [LRRD Search](https://www.lrrd.net/search) | [LRRD Misssion](http://www.lrrd.org/lrrd32/10/LRRDmission.html) | [Guide for preparation of papers](http://www.lrrd.org/lrrd32/10/notestoauthors.html) | [LRRD Newsletter](http://www.lrrd.org/lrrd32/10/news3210.htm) | Citation of this paper |

**Effect of sprouted rough rice on growth performance of local crossbred chickens**

**Nguyen Thuy Linh, Budi Guntoro1, Nguyen Hoang Qui1 and Nguyen Thi Anh Thu**

*Tra Vinh University, No. 126 Nguyen Thien Thanh Street, Ward 5, Tra Vinh City, Tra Vinh Province, Viet Nam.*[*thuylinh80@tvu.edu.vn*](mailto:thuylinh80@tvu.edu.vn) *1 Department of Livestock Social Economics, Faculty of Animal Science, Universitas Gadjah Mada, Indonesia*

**Abstract**

In this study 120 crossbred chickens from 5-week-old were allocated to four treatments with three repetitions. The treatments were: levels of sprouted rough rice (0, 2.5, 5.0 and 7.5%) in the diet. The birds were fed *ad libitum* in all of the treatments. There were linear improvements in daily weight gain and feed conversion as the level of sprouted rough rice in the feed was increased from 0 to 7.5%.

***Key words:****feed conversion, rural area, small scale farmers, Vietnam*

**Introduction**

Livestock contributes a large proportion of the economy of Tra Vinh province in Vietnam; and, within the poultry sector, local chickens contribute high profit for farmers in rural area, as shown by Afolabi (2013).

Crossbred chickens between Noi and Binh Dinh ecotypes are common in Vietnam. The chickens have the same rustic characteristics as Noi chickens but the growth performance is better. Khoa et al (2018) showed that Noi chickens have a potential to be ulitlized for sustainable poultry production systems in Vietnam. The breed has a good adaption to the environment and can be raised in many ways such as backyard, semi-intensive farm, semi-scavenging, for or commercial purpose or household consumption (Khoa et al2018).

|  |
| --- |
|  |
| **Photo 1.** Local crossbred chicken |

Sprouted rough rice is not a common ingredients for poultry nutrition, but it has a component as a supplement to increase the nutritional value of feed, thereby improving the growth of poultry. Amal et al (2007), Agu et al (2012) and Sharif et al (2013) debated that nutrients are increased after germination of grain, particularly after 4-5 days (Agu et al 2012). The sprouted grain is increased in components such as protein, amino acids and bioactive components such as α-tocopherol, γ-oryzanol, thiamine, niacin and pyridoxine (Moongngarm and Saetung 2010).

|  |
| --- |
|  |
| **Photo 2.**Sprouted rough rice |

The sprouted rough rice helped poultry increase the weight gain but had no effect on feed intake according to Sharif et al (2013). Sprouted grains are reported to have benefical effects on the intestinal villus parameters of chickens which can lead to the improvement of the microflora, and the reduction of harmful bacteria in the gut (Afsharmanesh et al 2012).

The aim of this study was to determine the effect of sprouted rough rice on growth performance of local crossbred chickens and to identify the most suitable level of sprouted rough rice in the diet.

**Materials and methods**

**Location**

The experiment was implemented at the experimental farm of the School of Agriculture and Aquaculture, Tra Vinh University from February to June, 2020.

**Preparation of sprouted rough rice**

Rough rice was soaked in water with the temperature of 25-300C for 2 days. After that, the sprouted rice was dried in sunlight for a day. After germination, the sprouted rice was spred in a tray for 3 days more to get the highest level of nutrients and amino acids following the report of Agu et al (2012). The sprouted rice was ground to facilitate mixing with other feed components. Rice that did not germinate was not selected.

**Experimental design**

One-hundred and twenty, 5-week-old crossbred chickens were allotted to four treatments and three replicates per treatment (10 chickens per replicate and balanced numbers of males and females in each replicate) using a completely randomized design. The treatments were levels of sprouted rice of 0, 2.5, 5 and 7.5% of the diet. The birds in each replicate were kept in pens 5 m2 in area. Balasa bio-yeast and rice husk were used to cover the floor.

The chickens were crossbreds between Noi chickens and chickens from Binh Dinh province. They had free access to feed (Table 1) and water given*ad libitum* and were weighed weekly.

**Feed analysis**

Proximate analysis of diet ingrediens was done according to AOAC (1990).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1.** Composition of diets (% air dry basis) | | | | |
|  | **Level of sprouted rice** | | | |
|  | **0** | **2.5** | **5** | **7.5** |
|  | | | | |
| Maize | 25 | 22.5 | 20 | 17.5 |
| Sprouted rough rice | 0 | 2.5 | 5 | 7.5 |
| Broken rice | 17 | 19 | 22 | 26 |
| Rice bran | 36.7 | 34.7 | 31.5 | 27.2 |
| Soya bean meal | 12.00 | 12.00 | 12.00 | 12.00 |
| Fish meal | 8.5 | 8.5 | 8.7 | 9 |
| Dicalcium phosphate | 0.50 | 0.50 | 0.50 | 0.50 |
| Vit-min premix# | 0.30 | 0.30 | 0.30 | 0.30 |
| **Analysis, %** | | | | |
| Crude protein | 19.0 | 19.0 | 19.0 | 19.0 |
| Ether extract | 8.3 | 8.2 | 7.9 | 7.6 |
| Ca | 0.9 | 0.9 | 0.9 | 1.0 |
| P | 1.0 | 1.0 | 1.0 | 1.0 |
| *#Vitamin A: 2,500,000 UI; Vitamin D3: 600,000 UI; Vitamin E: 4,000 mg; Vitamin K3: 400 mg; Folic acid: 80 mg; Choline: 100,000 mg; Mangan: 14 g; Zn: 40 g; Fe: 32 g; Cu: 48 g; Iodine: 0.5 g; Co: 0.28 g; Se: 0.04 g* | | | | |

**Statistical analysis**

The data were analyzed by the General Linear Model procedure in the ANOVA programe of the Minitab 16.0 software (Minitab 2010).

**Results**

**Growth performance**

The supplements of sprouted rough rice did not affect the feed inake (Table 2) but improved the growth rate and feed conversion of the chickens with curvilinear trends (Figures 1 and 2).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 2.** Mean values for growth performance of the chickens supplemented with sprouted rough rice | | | | | | |
|  | **% sprouted rough rice in the diet** | | | | **SEM** | ***p*** |
|  | **0** | **2.5** | **5** | **7.5** |
|  | | | | | | | |
| Live weight | | | | | | |  |
| Initial, g | 347 | 345 | 349 | 348 | 5.754 | 0.957 |  |
| Final, g | 1461b | 1497b | 1514ab | 1523a | 10.87 | 0.016 |  |
| Daily gain, g | 15.9b | 16.6b | 16.9ab | 17a | 0.198 | 0.016 |  |
| Feed intake, g/d | 60.7 | 60.8 | 60.5 | 58.8 | 0.799 | 0.302 |  |
| Feed conversion# | 3,82a | 3,67ab | 3,58bc | 3,45c | 0.046 | 0.003 |  |
| *ab: Means in the same row without common letter are different at p<0.05 #Feed intake/live weight gain* | | | | | | |  |

|  |  |
| --- | --- |
|  |  |
| **Figure 1.** The relationship between sprouted rough rice supplementation and daily weight gain | **Figure 2.** The relationship between sprouted rough rice supplementation and feed conversion |

**Discussion**

The beneficial effects of sprouted rough rice on final weight, weight gain and feed conversion are supported by the reports of Afsharmanesh et al (2012), Sharif et al (2013) and Ali et al (2019). During germination, enzymes are produced, the nutrients are changed and enriched (Amal et al 2007; Moongngarm and Saetung 2010; Agu et al 2012; Sharif et al 2013). The process of germination may also have improved the balance of the intestinal microflora as indicated by the research of Afsharmanesh et al (2012).

**Conclusion**

* There were linear improvements in daily weight gain and feed conversion as the level of sprouted rough rice in the feed was incresed from 0 to 7.5%.

**References**

**Afolabi K D 2013** Local or Indigenous Chicken Production: A Key to Food Security, Poverty Alleviation, Disease Mitigation and Socio-Cultural Fulfilment in Africa. In *Sustainable Food Security in the Era of Local and Global Environmental Change*, 1st ed, 217-229. Springer Netherlands

**Afsharmanesh M, Paghaleh A S and Kheirandish R 2012** Effects of sprouted and nonsprouted wheat and barley with and without enzyme on intestinal morphometry of broiler chickens.*Comparative Clinical Pathology* 22(5): 993–998.

**Agu R C, Chiba Y, Goodfellow V, MacKinlay J, Brosnan J M, Bringhurst T A, Jack F R, Harrison S Y and Pearson Bryce J H 2012** Effect of Germination Temperatures on Proteolysis of the Gluten-Free Grains Rice and Buckwheat during Malting and Mashing. Journal of Agricultural and Food Chemistry 60(40): 10147–10154

**Ali H, Miah A, Sabuz S, Asaduzzaman M and Salma U 2019** Dietary effects of hydroponic wheat sprouted fodder on growth performance of turkey. *Research in Agriculture Livestock and Fisheries* 6(1): 101-110.

**Amal B K, Aurang Z, Nizakat B, Shahid A K and Mohammad S K 2007** Influence of germination techniques on phytic acid and polyphenols content of chickpea (*Cicer arietinum L.*) sprouts. *Food Chemistry* 104(3): 1074-1079.

**AOAC 1990** Official methods of analysis.15th ed. AOAC, Washington, D.C (935-955)

**Khoa D V A, Hong T N T, Thao N N, Dieu T N T, Shin O, Kataro K and Takeshi S 2018**Some quantitative genetic traits in Vietnamese indigenous Noi chicken from 0 to 28 days old. *Biotechnology in Animal Husbandry* 35(2): 141-151

**Minitab 2010** Minitab reference manual release 16.20. Minitab Inc.

**Moongngarm A and Saetung N 2010** Comparison of chemical compositions and bioactive compounds of germinated rough rice and brown rice. *Food Chemistry* 122(3): 782–788.

**Sharif M, Hussain A and Subhani M 2013**Use of sprouted grains in the diets of poultry and ruminants. *Indian Journal of Research* 2(10): 4-7.

Received 30 July 2020; Accepted 30 July 2020; Published 1 October 2020