Productive Performance of Philippine Native Chicken (*Gallus gallus domesticus*) Supplemented with Dried Seaweeds and Azolla

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Abstract

The study aims to determine the productive performance of native chicken supplemented with green seaweed, azolla, and a combination of seaweed and azolla in three different levels, namely, 2%, 4%, and 6% of the total feed ration. One hundred fifty heads of 45-day-old native chicken were distributed into different treatment combinations. The results revealed that seaweeds at 6% had the highest average consumption. Parameters were recorded for a 12-week feeding trial. The productive performance of native chicken was found to be significant (0.05). Average feed consumption was highest on birds given 6% seaweeds, and 6% of the inclusion in the diet had significantly improved the gain in weight and the feed conversion ratio. The inclusion of seaweed and azolla improved the consumption of native chicken, gain in weight, and feed conversion ratio. The levels, on the other hand, do not pose a threat to the health of the native chicken.

Keywords: *Feed consumption, Feed conversion ratio, gain weight, guso*

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Introduction

Feed is the primary input, and its cost poses a significant constraint; however, it is also a key factor in managing production expenses and ensuring the profitability of the enterprise. A substantial amount of cereals and edible oilseed meals are included in poultry feed, leading to direct competition with human food consumption. As a result, the availability of feed resources could become a significant limitation for poultry production in the future, especially since opportunities for expanding cultivated land are nearly depleted. Thus, to maintain the poultry industry's competitiveness, careful strategies should focus on lowering production costs, producing safe and high-quality products to satisfy consumer demands, and ensuring the welfare of the birds to meet consumer expectations (Thirumalaisamy et al., 2016).

Due to the ongoing rise in the demand for raw feed materials needed by animal growers, there has been a call for a thorough investigation into the use of affordable and high-quality alternative feed sources derived from local plant species. Developing these potential indigenous plants as sources of animal feed may not only lessen the feed industry's reliance on costly imported ingredients but also lower production costs, enhancing the economic efficiency of animal growers (Paguia et.al, 2014).

The vital contribution of native chickens to the Philippine economy is not primarily measured by its impact on the gross national income, but rather by its provision of a consistent and dependable source of protein for rural communities and its direct support for their immediate requirements. In addition to this, native chickens, which are typically raised in rural areas, possess the ability to adapt, thrive, and reproduce even in challenging conditions with minimal care and low production inputs (Lambio, 2000 as cited by Lopez Jr., et al., 2014).

The native chicken of the Philippines (*Gallus gallus domesticus*) is commonly kept by Filipinos in their yards. With an estimated population of approximately 22.6 million, these chickens primarily roam freely and are resilient, thriving in the extreme temperatures of the tropics and showing resistance to common chicken diseases (Morales, 2012).

The seaweed known as "guso," as locally called in Bisaya, is a kind of seaweed that is edible and commonly consumed in the Philippines. These are rich in iodine, calcium, antioxidants, vitamins, and natural fiber called alginate. The green seaweed (Eucheuma spinosum) is usually harvested for local consumption, with a crusty texture, and is naturally salty. According to Garima, et al.(2021), the inclusion of seaweed in the layer diet improved the efficiency due to the increase in beneficial bacteria. Feeding seaweed also has increased growth rate and nutrient uptake in chickens and ducks (El-Deek & Mervat Brikaa, 2009).

The Azolla has been documented as a good source of protein with almost all essential amino acids required for animals. It also contains macronutrients like calcium, magnesium, potassium, and vitamins like A and B12 (Joysowal et al., 2018). Azolla is very easy to cultivate, has high productivity, and has good nutritional value. It is used as a beneficial fodder supplement (Prabha & Kumar, 2010).

The study aims to determine the productive performance of native chicken supplemented with green seaweed, Azolla, and a combination of seaweed and Azolla in three different levels, namely, 2%, 4%, and 6% of the total feed ration in terms of feed consumption, gain in weight and feed conversion ratio.

Materials and Methods

The materials used in the study include the following: 150 heads of hardened native chicken, seaweeds, Azolla, commercial grower feeds, a feeding and watering trough, a digital weighing scale, a strainer, a datasheet, and a camera Experimental birds were randomly assigned to treatments and replication. Each group is composed of five (5) birds of the same age and source.

The study used a 3x3 factorial design arranged in CRD, with one group for the control. Factor 1 is a supplement (A1-seaweeds, A2-Azolla, and A3-mixed seaweeds and Azolla). Factor 2 - are the levels of supplements (2%, 4%, and 6%). The data gathered were as follows: feed consumption was determined by subtracting the total feeds from the leftovers. The gain in weight was determined by subtracting the final weight from the initial weight. The feed conversion ratio was determined by dividing the feed consumed by the gain in weight. Data were collected, arranged, and analyzed using ANOVA. Differences between treatment means were compared using DMRT and LSD.

Results and Discussions

Average feed consumption

Table 1 shows the average consumption of native chicken supplemented with seaweeds and Azolla. It shows that there is a significant difference among birds supplemented with different types of supplementation. Significant differences were also noted in the levels of supplements. Further, birds given 6% seaweeds had the highest average feed consumption, followed by birds given 6% mixed seaweeds and Azolla, followed by birds given 4% seaweed and 4% mixed seaweeds and Azolla, which are statistically different. On the other hand, birds given 6%, 4%, 2% azolla, and 2% seaweeds have comparable average feed consumption. The control group had the least feed consumption. An interaction was observed between the type and the levels of supplements.

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Table 1. Average feed consumption of native chicken supplemented with seaweeds and Azolla

Type of Supplement	Level of Supplement	Replication			Total	Mean
		1	2	3		
A1	2%	6, 149.00	6, 147.40	6, 160.40	18,456.80	6,152. 27e
	4%	6,218.20	6, 223.40	6, 236.60	18,678.20	6,226.07c
	6%	6,285.60	6, 262.80	6, 288.20	18, 816.60	6,272.20a
A2	2%	6,135.00	6, 133.40	6, 158.40	18, 426.80	6, 142.27e
	2%	6,123.60	6, 163.80	6, 161.40	18, 448.80	6,149.60e
	2%	6,160.00	6, 158.00	6, 163.40	18, 481.40	6,160.47e
A3	2%	6,115.20	6, 142.00	6, 115.80	18, 373.20	6,124.40f
	4%	6,219.20	6, 217.80	6, 193.40	18, 630.40	6, 210.13d
	6%	6,223.20	6, 241.40	6, 240.80	18, 705.40	6,235.13b
Control	0%	6,110.07	6, 121.00	6, 140.87	18,371.93	6,123.98g

Table 1.1 Analysis of Variance (ANOVA) in a Completely Randomized Design (CRD) with 3 replications on the feed

					Tabular F	
Source of Variation	SS	df	MS	F	5%	1%
Type of supplements	19863.2563	2	9931.628	57.70326	3.55	6.01
Levels	32167.70074	2	16083.85	93.44798	3.55	6.01
Type *Levels	10531.20593	4	2632.801	15.29671	2.93	4.58
Error	3098.08	18	172.1156			
Total	65660.24296	26				

Table 1.2 Average Feed Consumption of Native Chicken as affected by the Type and Level of Supplements

Type of Supplements	Levels			Mean**
	2%	4%	6%	
Seaweed	6152.27	6226.07	6272.20	6216.84a
Azolla	6142.27	6149.60	6160.47	6.016150.78b
Mixed	6124.40	6210.13	6235.13	6189.89b
Mean**	6139.64a	6195.27b	6222.60a	

** significant at the 5% level; means followed by a common letter are not significantly different at the 5% level by LSD.*

NS- not significant

Average gain in weight

Table 2 shows the average gain in weight of native chicken supplemented with seaweed and Azolla. The analysis of variance shows no significant difference in the gain in weight of birds; however, significant differences were noted in the levels of supplements. It further shows that birds with 6% mixed seaweeds and Azolla had the highest gain in weight compared with another group of birds. On the other hand, the mean gain in weight of the control bird group was comparable to birds given 2% and 4% supplements

Table 2. Average gain in weight of native chicken supplemented with seaweeds and Azolla

Types of Supplement	Level of Supplement	Replication			Total	Mean
		1	2	3		
Seaweeds	2%	968	960	1080	3,008.00	1002.67
	4%	1123	1061	1116	3,300.00	1100.00
	6%	1332	1156	1154	3, 642.00	1214.00
Azolla	2%	1117	1077	1010	3, 204.00	1068.00
	4%	1081	991	1108	3, 180.00	1060.00
	6%	1383	1158	992	3,533.00	1177.67
Mixed	2%	1060	971	1047	3, 078.00	1026.00
	4%	1117	1023	1022	3,162.00	1054.00
	6%	1218	1305	1044	3,567.00	1189.00
Control	0%	1002	1068	1026	3, 096.00	1032.00

Table 2.1 Analysis of Variance (ANOVA) in a Completely Randomized Design (CRD) with 3 replications on the gain in weight (g) of native chicken supplemented with with seaweeds and azolla

Source of Variation	SS	df	MS	F	Tabular F	
					5%	1%
Type of Supplements	1245.852	2	622.9259	0.066557	3.55	6.01
Levels	127489.2	2	63744.59	6.810832	3.55	6.01
Type * Levels	11156.59	4	2789.148	0.298008	2.93	4.58
Error	168467.3	18	9359.296			
Total	308359	26				

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Table 2.2 Average gain in weight (g) of native chicken as affected by the type and level of supplements

Type of Supplement	Levels			Mean NS
	2%	4%	6%	
Seaweed	1002.67	1100.00	1214.00	1105.56
Azolla	1068.00	1060.00	1177.67	1101.89
Mixed	1026.00	1054.00	1189.00	1089.67
Mean**	1032.22b	1071.33b	1193.56a	

***- significant at 1% level; means followed by a common letter are not significantly different at the 5% level by LSD*
NS- not significant

Average feed conversion ratio

Table 3 shows the average feed conversion ratio of native chicken-supplemented seaweeds and Azolla. No significant difference was observed in terms of feed conversion ratio among birds supplemented with different types of supplements (seaweed, Azolla, and Mixed); however, a significant difference was noted in the levels of the supplement. It shows that 6% of the mixed seaweeds and Azolla had efficient feed conversion compared to birds with 2% and 6% of the supplements. Likewise no interaction between the type of supplements and the levels in terms of feed conversion ratio.

Table 3. Average feed conversion ration of native chicken supplemented with seaweeds and azolla

Types of supplement	Level of supplement	Replication			Total	MeanNS
		1	2	3		
Seaweeds	2%	6.35	6.40	5.70	18.46	5.68
	4%	5.54	5.87	5.59	16.99	5.62
	6%	4.72	5.42	5.43	15.57	5.61
Azolla	2%	5.49	5.69	6.10	17.28	5.68
	4%	5.66	6.22	5.56	17.45	5.66
	6%	4.45	5.32	6.21	15.98	5.62
Mixed	2%	5.77	6.33	5.84	17.94	5.71
	4%	5.57	6.08	6.06	17.71	5.60
	6%	5.11	4.78	5.98	15.87	5.29
Control	0%	5.87	6.14	5.88	17.89	5.96

Table 3.1 Analysis of Variance (ANOVA) in a Completely Randomized Design (CRD) with 3 replications on the gain in weight (g) of native chicken supplemented with seaweeds and azolla

Source of Variation	SS	df	MS	F	Tabular F	
					5%	1%
Type of supplements	0.035908	2	0.017954	0.085034	3.55	6.01
Levels	2.362715	2	1.181358	5.595121	3.55	6.01
Type * Levels	0.313272	4	0.078318	0.370928	2.93	4.58
Error	3.800532	18	0.211141			
Total	6.512428	26				

Table 3.2 Average feed conversion ration of native chicken as affected by the type and level of supplements

Type of Supplement	Levels			Mean NS
	2%	4%	6%	
Seaweed	6.15	5.66	5.19	5.67
Azolla	5.76	5.82	5.33	5.64
Mixed	5.98	5.90	5.29	5.72
Mean*	5.96b	5.79b	5.27a	

Conclusions and Recommendations

The researcher concludes and recommends the following: The productive performance of native chicken was found to be significant (0.05). Average feed consumption was highest on birds given 6% seaweeds, and 6% of the inclusion in the diet significantly improved the gain in weight and the feed conversion ratio. The inclusion of seaweeds, Azolla, and their combination enhances the feed consumption, gain in weight, and feed conversion efficiency of the native chicken.

References

El-Deek, A., & Mervat Brikaa, A. (2009). Effect of different levels of seaweed in starter and finisher diets in pellet and mash form on performance and carcass quality of ducks Int. J. Poult. Sci., 8 (2009), pp. 1014-102.

Habito, Cielito F. (2011). "Sustaining seaweeds". Philippine Daily Inquirer. Retrieved 6 March 2021.

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Joysowal, M., Aziz, A., Mondal, A., Singh, S., Siddhnath, Boda, S., Chirwatkar, B., & Chhaba, B. (2018). Effect of Azolla (Azolla pinnata) feed on the growth of broiler chicken. Journal of entomology and zoology studies, 6, 391-393.

Garima,K., Bruce, R. Glenn, S., Nikhil, T., Franklin, E. Alan, C., Jeff Hafting, Balakrishnan, P. (2014). Feed supplementation with red seaweeds, Chondrus crispus and Sarcodiotheca gaudichaudii, affects performance, egg quality, and gut microbiota of layer hens. Poultry Science. Volume 93, Issue 12. Pages 2991-3001.

Lopez Jr., R, Lambio, A., Vega,R., and De Guia,A.P.(2014). MANAGEMENT PRACTICES OF NATIVE CHICKEN (Gallus gallus domesticus Linn.) PRODUCTION IN PALAWAN, PHILIPPINES. Phillip JVet Anim Sci 2014, 40 (2): 109–120. Retrieved: https://pjvas.org/index.php/pjvas/article/view/114/105

Morales, B. (2012). Philippine Native Chicken On The Spot Light. https://www.backyardchickens.com/articles/philippine-native-chicken-on-spotlight.64045/

Prabha,B.J.andKumar,K.(2010).Dried Azolla is a nutritionally rich, cost-effective, and immuno-modulatory feed supplement for broilers. Asian J. of Anim. Sci., 5(1): 20-22.

Paguiaa, H. M., Paguiab, R.Q., Balbac,C., Flores, R.C (2013). Utilization and Evaluation of Moringa Oleifera L. As Poultry Feeds. Elsevier. APCBEE Procedia 8 (2014) 343 – 347.

Thirumalaisamy, G., Muralidharan, J., Senthilkumar,S.,Hema Sayee,R & Priyadharsini,M., (2016). COST-EFFECTIVE FEEDING OF POULTRY. International Journal of Science, Environment ISSN 2278-3687 (O) and Technology, Vol. 5, No 6, 2016, 3997 – 4005.