

Area of specialization: Monogastric Production and Nutrition

LAYING PERFORMANCE OF EGG-TYPE CHICKENS FED DIFFERENT FEED FORMS CONTAINING OYSTER MUSHROOM (*PLEUROTUS OSTREATUS*)

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Abstract

Three hundred and twenty (320) Harco black 5-weeks old chicks were raised to determine the laying performance of egg-type chickens fed different feed forms containing oyster mushroom (*Pleurotus ostreatus*). The birds were acclimatised for a week before randomly distributed on the basis of feed forms (mash and pellet) and Oyster mushroom inclusion (with or without) into four treatments for an experiment which lasted till birds were 43 weeks of age. Eighty (80) birds were allotted per treatment. Each treatment was further sub-divided into 8 replicates of 10 birds per replicate. Parameters for laying performance were recorded from 20th to 43rd week of age and data obtained were arranged in a 2 × 2 factorial experimental layout and subjected to Analysis of Variance in a Completely Randomized Design. Results showed oyster mushroom inclusion had no significant ($P>0.05$) influence on all observed parameters. However, birds weight at first egg was significantly ($P<0.05$) higher (1398.80 g) in birds fed pelletized feed than 1115 g recorded in birds fed mash. Similarly, significantly ($P<0.05$) higher (1385 and 1412.5 g) weights at first lay were observed in birds fed pelletized feed with and without oyster mushroom inclusion, respectively, when compared to those on mash feed with and without oyster mushroom inclusion (1100 and 1130 g, respectively). Therefore, optimal weight at first lay can be achieved via feeding egg-type chicken with pelletized form of feed with Oyster mushroom inclusion.

Keywords: egg-type chickens; pellet; mash, oyster mushroom, laying performance

Description of Problem

Mash, crumbles and pellets are the three major forms of commercial poultry feed and earlier studies (Nir *et al.*, 1994; Mousavi *et al.*, 2016) revealed feeding pellets reduces ingredient segregation and feed wastage as well as improving digestibility, growth rate and meat yield of broiler chickens when compared to mash. However, feed form remains an obscure and undervalued area in the nutrition of laying chickens, as mash is commonly fed in practice (Ege *et al.*, 2019). In addition, alternative to antibiotic growth promoters are receiving much attention globally with previous reports (Guo *et*

al., 2003; Giannenas *et al.*, 2010; Sogunle *et al.*, 2019) providing great insight on the immune-modulating and antioxidant effects of oyster mushroom (*Pleurotus ostreatus*) as a phytobiotic capable of improving intestinal health and overall performance of poultry species. However, the incorporation of *P. ostreatus* into different feed forms for layers production is yet to be fully explored.

Therefore, this study aimed to determine the performance of egg-type chickens fed different feed forms containing oyster mushroom (*Pleurotus ostreatus*).

Materials and Methods

Experimental Site

The experiment was carried out at the Poultry Unit of the Teaching and Research Farms, Federal University of Agriculture, Abeokuta, Ogun State.

Preparation of Oyster mushroom (*Pleurotus ostreatus*)

Fresh Oyster mushrooms were procured from a reputable market in Ibadan, Oyo State. The mushrooms were cleaned with brush before drying in an electric oven at 60 °C for one hour. The dried mushrooms were grinded finely and mixed with the formulated diet as an additive at the rate of 1000 ppm (1 g/kg). After thorough mixing, the feed was divided into 2; one part was the mash feed with Oyster mushroom inclusion while the other part was pelletized using a pellet mill of 2 mm die to form the pelleted feed with Oyster mushroom inclusion.

Experimental Design and Management

Three hundred and twenty (320) Harco black 5-weeks old chicks, purchased from a reputable source in Ibadan, Oyo State were acclimatised for a week before randomly distributed on the basis of feed forms (mash and pellet) and Oyster mushroom inclusion (with or without) into four treatments for an experiment which lasted till birds were 43 weeks of age. Feed (Table 1) and water were supplied *ad-libitum* while daily and routine management practices were carried out. Eighty (80) birds were allotted per treatment. Each treatment was further sub-divided into 8 replicates of 10 birds per replicate.

Data Collection

Laying Performance (20th – 43rd week)

The following data were collected:

- **Age at first lay:** The number of days from hatch to the day the first egg was laid.
- **Body weight of hen at first lay:** This was measured as average weight of birds at first egg.
- **Weight of first egg laid:** Weight of each first egg laid per group was measured with the use of a balanced sensitivity of 0.01g.

Conclusion and Application

Based on the findings of this study, optimal weight at first lay can be achieved via feeding egg-type chicken with pelletized form of feed with Oyster mushroom inclusion.

- **Total egg production:** The total number of eggs laid during the laying phase.
- **Hen day egg production (HDP):** This was measured as the percentage of total number of eggs laid to the number of days.

Statistical Analysis

- The experimental layout was a 2 × 2 factorial arrangement and the data generated were subjected to a Completely Randomized Design using General Linear Model Procedure as contained in Minitab® (2013) statistical package. Means with significant ($P < 0.05$) differences were separated using Tukey Test of the same package.

Results and Discussion

The main effects of feed forms and Oyster mushroom inclusion on laying performance of the egg-type chickens are depicted in Table 2. Oyster mushroom inclusion had no significant ($P > 0.05$) influence on all observed parameters. However, All parameters measured except weight of bird at first lay were not significantly ($P > 0.05$) influenced by the effect of feed form. Birds weight at first egg was significantly ($P < 0.05$) higher (1398.80 g) in birds fed pelletized feed than 1115 g recorded in birds fed mash. This observation corresponds with findings of Savory and Hetherington (1997) who reported that laying hens fed mash diets spent more time eating than those given pelletized diets. This increased feeding time has been suggested as an explanation why pelletized diets are more efficiently converted than mash diets, which may imply higher body weight for birds fed pelletized feed. Similar results was observed in the interaction between feed forms and oyster mushroom inclusion on laying performance (Table 3) where significantly ($P < 0.05$) higher (1385 and 1412.5 g) weights at first lay were observed in birds fed pelletized feed with and without oyster mushroom inclusion, respectively, when compared to those on mash feed with and without oyster mushroom inclusion (1100 and 1130 g, respectively).

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Table 1: Composition (%) of experimental diets

Ingredient	Grower		Layers	
	+OM	-OM	+OM	-OM
Maize	46.20	46.20	40.20	40.20
Soya bean meal	12.00	12.00	14.00	14.00
Wheat offal	26.00	26.00	22.00	22.00
Groundnut cake	10.00	10.00	15.00	15.00
Dicalcium phosphate	3.00	3.00	5.00	5.00
Limestone	2.00	2.00	3.00	3.00
Salt (NaCl)	0.25	0.25	0.25	0.25
Vitamin/mineral premix (grower)	0.25	0.25		
Vitamin/mineral premix (Layers)			0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methionine	0.20	0.20	0.20	0.20
Oyster mushroom	+	-	+	-
Total	100	100	100	100
Metabolizable Energy (MJ/kg)	11.05	11.05	10.65	10.65
Crude protein (%)	18.10	18.12	16.80	16.80
Crude fat (%)	4.10	4.10	4.10	4.10
Crude fibre (%)	4.20	4.20	4.10	4.10

+OM: With Oyster Mushroom, -OM: Without Oyster Mushroom

Table 2: Main Effect of feed forms and Oyster mushroom inclusion on laying performance of egg-type chicken

Parameters	Feed Form		SEM	P value	Oyster Mushroom		SEM	P value
	Mash	Pellet			+	-		
Age at first lay (days)	140.88	140.00	0.54	0.27	140.13	140.75	0.54	0.43
Weight of First egg laid (g)	39.19	39.88	1.54	0.79	39.19	39.88	1.54	0.76
Weight of Bird's at 1stlay (g)	1115.00 ^b	1398.80 ^a	24.00	0.00	1242.50	1271.30	24.00	0.41
Total Egg production	305.70	310.10	4.10	0.46	304.00	311.80	4.10	0.20
Hen Day Egg Production	68.24	69.22	0.92	0.46	67.86	69.60	0.92	0.20

^{a,b} Means in the same row with different superscripts differ significantly (P<0.05)

Table 3: Interaction effect of feed forms and Oyster mushroom inclusion on laying performance of egg-type chicken

Feed form	Mash		Pellet		SEM	P value
	+	-	+	-		
Oyster Mushroom inclusion						
Parameters						
Age at first lay (days)	140.25	141.50	140.00	140.00	0.76	0.43
Weight of First egg laid(g)	39.13	39.25	39.25	40.50	2.18	0.80
Weight of birds at 1st lay (g)	1100.00 ^b	1130.00 ^b	1385.00 ^a	1412.50 ^a	34.00	0.97
Total Egg production	299.80	311.60	308.20	312.00	5.80	0.50
Hen Day Egg Production	66.92	69.55	68.79	69.64	1.30	0.50

^{a,b} Means in the same row with different superscripts differ significantly (P<0.05)