


Evaluation of cost of medication of commercial broiler production in the tropics

Evaluación del costo de medicación en la producción comercial de pollos asaderos en los trópicos

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ABSTRACT

Ninety (90), day-old Anak broiler birds were used to evaluate the cost of medication in commercial broiler production in the tropics in a study that lasted eight weeks. Three treatment groups were involved in the experiment: A control (No medication), B (routine prophylaxis) and C (routine vaccination and continuous coccidiostat). The experimental design employed was Completely Randomized Design (CRD). The birds were fed *ad libitum* and freely provided with drinking water. Daily feed intake and weekly body weight were recorded. Results showed that significant ($P<0.05$) differences existed in weight gain, feed intake and feed conversion efficiency. Treatment C had better production indices than treatments A and B. With respect to economic indices evaluated vis-à-vis cost of production/bird, relative cost/bird, total sales, mortality rate and gross margin; treatment C that recorded the highest cost of production/bird and relative cost/bird gave better total sales, mortality and gross margin among other treatments. It is therefore concluded that cost of prophylaxis did not adversely affect the production cost and it is necessary so as to safeguard against any sporadic or enzootic diseases that might by chance attack the flock and cause unprecedented loss of cash and meat.

Keywords: Broiler birds, cost, losses, prophylaxis, vaccination

RESUMEN

Noventa (90) pollos asaderos Anak de un día se utilizaron para evaluar el costo de medicación en la producción comercial de pollos asaderos en los trópicos en un estudio que duró ocho semanas. Tres grupos de tratamiento estuvieron involucrados en el experimento: un control (sin medicación), B (profilaxis de rutina) y C (vacunación de rutina y coccidiostáticos continuos). El diseño experimental empleado fue un diseño completamente aleatorizado (DCA). Las aves se alimentaron *ad libitum* y libremente provistas con agua potable. Se registraron el consumo diario de alimento y el peso corporal por semana. Los resultados mostraron que existieron diferencias significativas ($P<0,05$) en la ganancia de peso, consumo de alimento y la eficiencia de conversión alimenticia. El tratamiento C tuvo mejores índices de producción que los tratamientos A y B. Con respecto a los índices económicos evaluados vis-a-vis costo de producción/ave, costo relativo/ave, ventas totales, tasa de mortalidad y margen bruto; el tratamiento C que registró el mayor costo de producción/ave y costo relativo/ave dio las mejores ventas totales, tasa de mortalidad y margen bruto entre los otros tratamientos. Por lo tanto, se concluyó que el costo de la profilaxis no afectó adversamente el costo de producción y es necesaria a fin de prevenir en contra de cualquiera de las enfermedades esporádicas o enzoóticas que puedan por chance atacar la manada y causar pérdidas sin precedentes de dinero en efectivo y carne.

Palabras clave: aves asaderas, costos, pérdidas, profilaxis, vacunación

INTRODUCTION

Poultry diseases represent a significant restraint to the efficiency of production and hence profitability. From a global perspective basically the same range of poultry pathogens are responsible for losses in livability, egg production, growth rate and feed efficiency worldwide (Shane, 2004). A poultry farmer who wants top performance from his/her broilers flock must satisfy the birds requirement

through a carefully controlled management programme which includes proper housing, lighting, nutrition, disease control and egg handling (Goodell, 1981). Catastrophic disease such as Newcastle disease (NCD) and highly pathogenic avian influenza (HPAI) have become endemic in many countries in the world where commercial poultry industries are severely impacted by their occurrence (Shane, 2004). Most infections with the potential for extensive pathogenicity are controlled in established poultry

industries by combinations of vaccination, biosecurity or preventive medication.

The intensification of production with eradication or suppression of the major primary diseases of chickens has contributed to the increase in the cost of production inputs. This study was therefore designed to evaluate the cost of medication in broiler production in the tropics.

MATERIALS AND METHODS

The study was carried out at the poultry section of Rivers State University of Science and Technology, Port Harcourt, Nigeria. Prior to the arrival of the birds, the pens were scrubbed, washed, disinfected with a broad spectrum disinfectant and allowed to dry. When dried, wood shaving were evenly spread on the floor to about 2.5cm thickness.

Ninety (90) day old chicks of Anak breed with an initial average weight of 40 g were purchased from ECWA Rural Development Project, Ibadan. They were randomly assigned to three treatment groups designated A, B and C of thirty (30) birds per group and further replicated thrice with 10 birds per replicate in a Completely Randomized Design (CRD) trial. The treatments are as follows:

- A (control) No prophylactic medication.
- B Usual prophylactic vaccination, that is, vaccinations against Newcastle disease at weeks 1 and 2 using intra – ocular (i/o) and lasota respectively; Gumboro vaccine at week 3 and fowl pox at week 3. Routine antibiotics / vitamin given at preventive dose and coccidiostat at weeks 3 and 5 for five days each period.
- C Usual prophylactic vaccination as stated in B above except coccidiostats that was administered from day one till eight week.

The birds were fed a proprietary commercial broiler start mash from Top Feed with CP and ME of 21% and 2800 kcal for 4 weeks while broiler finisher mash from the same source with CP and ME of 19% and 2900 kcal was fed till the end of the experiment at eight weeks. Feed and water were offered *ad libitum*

on deep litter. Feed consumption was recorded daily while the chicks were weighed weekly.

Data obtained were subjected to analysis of variance (Steel and Torrie, 1980) and Duncan's multiple range test (Duncan, 1955) was applied to partition the means.

Gross margin was calculated by subtracting the total cost of production plus loss due to mortality from the total sales. The relative cost (%) of producing one bird was obtained by dividing the cost of producing one bird from each treated group (B, C) with that of the control (Treatment A) and multiplying with 100.

RESULTS

Table 1 shows the effects of prophylaxis on the production performance of broiler chicks. The mean daily weight gain was significant ($P < 0.05$) in all the three experimental treatments. This means that any difference in the performance of the experimental birds is as a result of the treatment(s). Significant differences ($P < 0.05$) also existed in the mean daily feed intake. The mean daily feed intake ranged from 105.14 to 112.92g, with treatment A (no prophylaxis) having the highest value (112.92g) and treatment B (routine prophylaxes) having the lowest value (105.14g). The feed to gain ratio shows significant ($P < 0.05$) difference among treatment means and varies from 2.91 – 2.62 with treatments A and B having the poorest values (2.90 and 2.91 respectively) and treatment C having the best value (2.62).

Table 2 shows the effects of prophylaxis on the economic production. The cost of production/bird (₦) for treatments A, B and C are ₦404.35, ₦432.82 and ₦465.66 respectively.

It was found that treatment C which had continuous administration of coccidiostat besides routine vaccination recorded the highest cost (₦465.66) followed by treatment B that had routine vaccination and staggered coccidiostat prophylaxis (₦432.82). On relative basis, the cost per unit of treatment B (routine vaccination and staggered coccidiostat) is 107.04% of cost per unit of control treatment. Treatment C (routine vaccination and continuous coccidiostat) was 115.16% of control diet. From this, the extra cost incurred in producing one broiler bird in treatments B and C were ₦7.04 and ₦15.16. This is not up to the cost of day old bird

which is ₦110 (Table 2) to have allowed for mortality due to negligence.

DISCUSSION

The higher performance shown by birds administered routine prophylactic vaccines and continuous coccidiostat throughout the experimental duration (treatment C) is because the enzootic potential pathogenic organisms did not have the

chance to attack the birds whereby performance could have been adversely affected. The better feed conversion ratio exhibited by birds fed with continuous prophylaxis is due to optimal utilization of nutrients by healthy birds. This corroborates the findings of (Foster, 1978), that antibiotics improve availability or absorption of certain nutrients, thus, leading to a positive feed conversion. The difference in feed consumption in the treatment groups could not be attributed to the energy and protein levels in the

Table 1. Effects of prophylactic medication on the production performance of broiler chickens at Port Harcourt, Nigeria.

Parameters	A	B	C
Mean initial weight gain (g)	40	40	40
Mean final weight (kg)	1.231 ^b	1.210 ^b	2.093 ^a
Mean total weight gain (kg)	1.911 ± 0.05 ^b	1.170 ± 0.11 ^c	2.053 ± 0.8 ^a
Mean daily weight gain (g)	39.00 ^b	36.13 ^c	41.90 ^a
Mean weekly weight gain (g)	273.00 ^b	252.90 ^c	293.30 ^a
Mean total feed intake (kg)	5.533 ± 0.18 ^a	5.152 ± 1.00 ^b	5.385 ± 0.09 ^b
Mean daily feed intake (g)	112.92 ± 0.12 ^a	105.14 ± 0.07 ^b	109.90 ± 0.05 ^{ab}
Mean weekly feed intake (g)	790.42 ± 1.02 ^a	736.00 ± 0.66 ^b	769.34 ± 0.5 ^{ab}
Feed conversion (g Feed/g Gain ratio)	2.90 ^b	2.91 ^b	2.62 ^a
Feed efficiency (g Gain/g Feed ratio)	0.35 ^b	0.34 ^b	0.37 ^a
Mortality (%)	6.67	0	0

^{ab} Means in the same row for each parameter with different superscripts are significantly different (P<0.05).

A (control) No prophylactic medication.

B Usual prophylactic vaccination, that is, vaccinations against Newcastle disease at weeks 1 and 2 using intra – ocular (i/o) and lasota respectively; Gumboro vaccine at week 3 and fowl pox at week 3. Routine antibiotics / vitamin given at preventive dose and coccidiostat at weeks 3 and 5 for five days each period.

C Usual prophylactic vaccination as stated in B above except coccidiostats that was administered from day one till eight week.

Table 2. Effects of prophylactic medication on the economics of production of broiler chickens at Port Harcourt, Nigeria.

Parameters	A	B	C
Mean Weight gain (kg)	1.91	1.17	2.05
Feed efficiency	0.35	0.34	0.37
Cost of production/bird (₦)	404.35	432.82	465.66
Cost of day old chick (₦)	110	110	110
Total cost of production of 30 birds (₦)	12130.50	12984.60	1396.80
Relative cost/bird (%)	100	107.04	115.16
Mortality	2	0	0
Total sales @ ₦600/kg	34380.00	21060.00	36900.00
Loss due to mortality (₦)	229.00	0.00	0.00
Gross margin (₦)	19,957.50	8075.40	22,930.20

A (control) No prophylactic medication.

B Usual prophylactic vaccination, that is, vaccinations against Newcastle disease at weeks 1 and 2 using intra – ocular (i/o) and lasota respectively; Gumboro vaccine at week 3 and fowl pox at week 3. Routine antibiotics / vitamin given at preventive dose and coccidiostat at weeks 3 and 5 for five days each period.

C Usual prophylactic vaccination as stated in B above except coccidiostats that was administered from day one till eight week.

diets. (Parr, 1988) stated that protein and energy are by far the most important nutrients influencing feed intake of the birds due to their marked effect on voluntary feed intake. This is not applicable in the present experiment, because the birds in the different treatment groups were fed with the same proprietary feeds from the same source. The low feed intake by birds administered prophylactic treatment (treatments B and C) is in line with the findings of (Ravindram and Kornegay, 1984; Wekhe and Taylor, 1992; Wekhe and Olowo, 1994; Wekhe and Nyeche, 1998) who reported that birds fed antibiotics eat less feed. Factors that influence feed intake include the animal, environmental stress factors, quality and quantity of feed and health of the animal (Williamson and Payne, 1978).

Again increased weight gain, low feed intake and better feed conversion efficiency in treatment C might ostensibly be due to routine preventive measures and continuous coccidiostat which would have helped the birds to perform better than other birds in groups A and B. This is consistent with the findings of (Wekhe and Taylor, 1992; Wekhe and Olowo, 1994); who reported that antimicrobial drugs are used as growth promotants in broiler industry in lieu of growth hormones. Ensimnger (1987) also reported that antimicrobial drugs in feed also slightly improve carcass quality. In this experiment, the antimicrobial drugs used at preventive level had little or no effect on birds in group B, but its effect was significantly obvious in group C where they had better weight gain and feed conversion ratio. This means that the prophylactic routine in C is the preferred approach in field application.

With respect to mortality, none was recorded in the treated groups throughout the experimental duration and the two (6.67%) mortalities observed in the control were recorded in the brooding phase. The general absence of disease outbreak in all the treatment groups could be attributed to good husbandry management of the birds. According to (Oluyemi and Robert, 1979; Shane, 2004), the presence of pathogenic organism in the litter and other management related conditions such as starvation may cause mortality. This is not so in this study as the birds and litter were properly managed which contributed to no disease outbreak.

The cost return pattern is a reflection of the biological effects observed earlier. Treatment C which encouraged the best biological performance

(weight gain, feed intake and feed conversion ratio) also gave the best gross margin from sales of the broilers. Generally, routine vaccination with continuous coccidiostat (treatment C) is better when both economic and biological performances of the birds were considered.

CONCLUSION

The sole objective of any broiler producer is to make optimum profit using the most economic means. Preventive medication reduced feed intake bringing about a better feed utilization with a commensurate increase in revenue. This is not without prejudice to the fact that there was no disease outbreak throughout the experimental duration which would have impacted on the treatment where prophylaxis was not used which otherwise would lead to loss of cash and meat due to morbidity and/or mortality. It is therefore concluded that prophylaxis be employed in broiler production in the humid tropical environment.

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