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Estimation of Optimum Fattening Period in Broilers

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Abstract

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The optimum fattening period in broilers was estimated by a mathematical function using weight gain and feed intake data of a previous study conducted on 910 day-old chicks at IPC Livestock Barneveld Collage, The Netherlands. Forty one day fattening period has been recommended to be optimum fattening period. But calculated optimum fattening period can vary according to chicken meat and feed prices. When feed price is low and chicken meat price is high, fattening period can increase.

Key words: Broiler, performance traits, mathematical function, fattening period

Introduction

Feed is the major cost in broiler production. Hence, one of the main opportunities for increasing profit is to lower feed costs per unit of gain. It is very important to determine the fattening period of broiler that is being feed in a short period of time. There is a linear relation between chicken meat producer's price and broiler supply (Dağdemir et al., 2004). The objective of this study was to determine the optimum fattening period in broilers using a mathematical function.

Material and Methods

Data on weekly gain, feed intake, sale price of broilers and purchase price of feed of a total of 910 Cobb 500 day old broiler chicks was obtained from broiler farm of IPC Livestock Barneveld College, International Training Centre on Animal Husbandry and Milling Technology, The Netherlands. The chicks were reared there following standard management and hygienic conditions. Starter (0-2 weeks, 22% CP, 2852 k cal ME/Kg feed): finisher (3-6 weeks, 20.4 % CP, 3070 kcal ME/Kg feed) and delivery (last 2 days, 20.1 % CP, 3071 kcal ME/Kg feed) feeds as well as water were provided *ad lib*. Broiler chick cost was $ 0.36/chick, feed price was $ 0.32/kg and broiler meat price was $ 1.60/kg.

Optimum fattening period was estimated by quadratic function ($y= a + bx - cx^2$). In this model, net income (y) and period (x) were used as dependent and independent variables, respectively. Then, derivative function was calculated by using this model and equalized to zero ($y'=dy/dk=0$) (Ertek, 1987). Calculated x value via derivative function is optimum fattening time. Data were analyzed by using SPSS (1989).

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Results and Discussion

Table 1. Weight gain, income, feed intake, feed cost and net income per chick for each week

Period (week)(x)	Weight gain (g/period)	Income* ($/period)	Feed intake (g/period)	Feed cost** ($/period)	Net income ($/period) (y)
1	84	0.1344	120	0.0384	0.0960
2	200	0.3200	317	0.1014	0.2186
3	320	0.5120	637	0.2038	0.3082
4	446	0.7136	810	0.2592	0.4544
5	447	0.7152	874	0.2797	0.4355
6	470	0.7520	925	0.2960	0.4560

* Weight gain x $0.0016/g; ** Feed intake x $0.00032/g

In the table 1, net income (y) and period (x) were used as dependent and independent variables, respectively. Mathematical function was calculated to determine relationship between "y" and "x" (Bowerman, at al., 1986). The mathematical function between "y" and "x" is as follows.

$$y = f(x) = -0.0794 + 0.1838x - 0.0157x^2 \qquad r^2 = 0.952$$
(SE) (0.058) (0.038) (0.005)

In the equation, if the function is derived and then equalized to zero, optimum fattening period could be calculated. That is;

$$y' = dy/dx = 0.1838 - 0.0314x = 0$$

When this function is solved, x is calculated as 5.85 week. According to this function, optimum fattening period is 40.95 day. When x value in the f(x) function is placed, net income is calculated as $0.4585/period. Table 1 showed that net income for 6th week is maximum.

Calculated optimum fattening period can show a change according to prices of feed and chicken meat. When feed price is low and chicken meat price is high, fattening period can be increased. When it is contrary, fattening period can decrease. Further studies need to be performed to confirm the evidence found in present study that calculated optimum fattening period may be applied for broilers in practice.

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