Economical Efficiency of Poultry Projects for Chicken Meat Production

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INTRODUCTION

IN chicken projects for meat production, the two most important factors involved in the achievement of maximum recovery of capital are feeding cost and finishing time.

Feeding cost stands for more than two thirds of all the expenses (Ewing, 1963) while finishing time is entirely dependent upon the limiting growth unit (Scott *et al.* 1969). Accordingly, the economical efficiency of the product could be calculated from the input-output analysis based upon the differences in both growth rates and feeding cost. The other items included are of less importance.

The present survey therefore, was collected from data obtained for foreign, local and cross strains of chicks when the last two strains are fed relatively cheaper rations or finished at different final weights in order to achieve the maximum economical efficiency.

Experimental

The strains of chicks included in this study were the foreign strain Nichols, the local strain Fayoumi and the cross strain Dokki 4 (Fayoumi × Plymouth Rock). An adequate number of day-old chicks from each of the strains Dokki 4 and Fayoumi vaccinated against Newcastle were distributed by the Ministry of Agriculture among poultry farms. An equal number of Nichols, produced and reared by the poultry Organisation, Cairo, were taken as standard for comparison.

Three feeding rations containing the optimal requirements for Nichols, Dokki 4 and Fayoumi, respectively were formulated as given in table 1 (Shamma, 1973). Ration 1 contained 40 gross protein value units (G.P.V.Us) and 2200 Kcaloric of productive energy (P.E.) per Kg. ration, while rations 2 and 3 contained 35:2000 and 30:1800 per Kg. for the two values, respectively. The protein units were calculated by the method of Anwar (1967), while the productive energy contents were obtained from the tables of Anwar (1973) for local ingredients. The differences in the calorie protein ratio caused the price of ration to differ accordingly, due to the incorporation of more protein supplements (table 1). The price per ton was 65, 40 and 35 L.E.* for the three

* L.E. = 1 pound Egyptian currency = 100 piastres.

TABLE 1: The experimental rations used in the feeding trials containing different levels of protein quality and calorific values.

	Rations 1	2	3
Ingredients (g./Kg.)			
Corn	600	550	500
Wheat Bran	—	50	70
Rice Bran	—	50	100
Soyabean Meal +(DL±) Methionine	200	—	—
Cottonseed Meal	—	175	200
Fish Meal	70	50	25
Meat Meal	30	75	55
Bone Meal	20	10	10
Clover Meal	—	20	—
Vit. Mix.	10	5	5
Min. Mix.	10	5	5
Tallow	40	—	—
Salt	10	10	10
Calcium Carbonate	10	—	—
Total (g.)	1000	1000	1000
Crude protein%	23	22	20
G.P.V.Us./kg.	40	35	30
P.E.Kcal./kg.	2200	2000	1800
Price/Ton L.E. (100 PT.)	65	40	35

rations, respectively. The rations were fed to chicks, each to the corresponding strain, from day-old up to 1 kg of live weight.

The Input-Output analysis was done using the method of Heady and Jensen (1954) taking the economical efficiency of Nichols as standard with which those for Dokki 4 and Fayoumi were compared. The values of economical efficiency were calculated as the net revenue per unit of total cost per year of production.

A farm scale of L.E. 5,000 capital was used in the analysis with the capacities of 10,000, 12,500 and 15,000 birds of Nichols, Dokki 4 and Fayoumi respectively. The data obtained were tabulated, as given in table 2, at six weeks when Nichols reached the marketing weight of 1 Kg. and each 2 weeks then after for the other two strains. Dokki 4 reached the weight of 1 Kg at 10 weeks and Fayoumi at 12 weeks of age.

Results and Discussion

Since the meat strain Nichols which was taken as standard for comparison succeeded to reach the marketing weight of 1·083 Kg. at 6 weeks of age seven turns of production per year were achieved giving a total yield of 75·74 tons of live weight (table 2). The input-output analysis for this strain (table 3) showed the yearly total cost of L.E. 19,064 and the total revenue of L.E. 30,296 producing the net revenue of L.E. 11,232. Therefore, the economical efficiency for this strain calculated as the part of the total cost that is recovered was 0·59 (table 4).

TABLE 2: Cumulative data per year for farm scales of L.E. 5000 for the different strains of chicks.

Strain	Age Weeks	Body Weight Kg./ bird	Feed Intake Kg./ bird	No. of Birds per turn	No. of turns per year	No. of Birds per year	Total Yield Tons/ Year	Total Feed Intake Ton/Year	No. of hrs/turn	Labour hrs/year*
Nichols	6	1·082	2·337	10,000	7	70,000	75·74	163·59	4,500	31,500
Dokki 4	6	0·745	2·093	12,500	7	87,500	65·19	183·14	5,625	39,375
	8	0·880	2·596	12,500	6	75,000	66·00	194·70	7,500	45,000
	10	0·997	3·196	12,500	5	62,500	62·31	199·75	9,375	46,875
Fayoumi	6	0·606	1·885	15,000	7	105,000	63·63	197·93	6,750	47,250
	8	0·750	2·406	15,000	6	90,000	67·50	216·54	9,000	54,000
	10	0·881	2·934	15,000	5	75,000	66·08	220·05	11,250	56,250
	12	1·003	3·460	15,000	4	60,000	60·18	207·60	13,500	54,000

*100 labour hrs. per 10,000 chicks per day (Heady and Jensen, 1954).

TABLE 3: Input-Output analysis per year for farm scales of L.E. 5,000 for the three strains used.

Strain	Age Weeks	Fixed Cost (1) Chick	(2) Captial	Variable cost (3) Feed	(4) Labour	Total Cost L.E.	Total (5) Revenue L.E.	Net Revenue L.E.
Nichols	6	7,000	250	10,633	1,181	19,064	30,296	11,232
Dokki 4	6	6,125	250	7,326	1,467	15,178	26,076	10,897
	8	5,250	250	7,788	1,688	14,976	26,400	11,424
	10	4,375	250	7,990	1,758	14,373	25,924	10,551
Fayoumi	6	5,250	250	6,928	1,772	14,200	25,452	11,252
	8	4 500	250	7,579	2,025	14,354	27,000	12,646
	10	3,750	250	7,702	2,109	13,811	26,432	12,621
	12	3,000	250	7,266	2,025	12,541	24,072	11,531

(1) Initial price/chick: 10 for Nichols, 7 for Dokki 4 and 5PT. for Fayoumi, respectively (L.E. = 100 PT.)
(2) Depreciation rate of 5% per year.
(3) L.E. 65, 40 and 35/Ton ration for Nichols, Dokki 4 and Fayoumi, respectively.
(4) 100 hours of Labour L.E. 3·75.
(5) L.E. 400/Ton of chicks (live weight).

TABLE 4: Economical efficiency (E.E.) per ton per year for farm scales of L.E. 5,000 for the different strains used.

Strain	Age Weeks	Yield Ton/Year Total	Relative	Total Cost per Ton L.E.	Net Revenue per Ton L.E.	(1) E.E. per Ton	(2) Relative E.E.
Nichols	6	75·74	100	251·70	148·30	0·590	100
Dokki 4	6	65·19	86	232·83	167·16	0·718	120
	8	66·00	87	226·91	173·09	0·760	129
	10	62·31	82	230·67	169·33	0·730	123
Fayoumi	6	63·63	83	223·17	176·83	0·792	134
	8	67·50	89	212·66	187·35	0·880	147
	10	66·08	87	209·00	191·00	0·910	154
	12	60·18	80	208·39	191·61	0·920	156

(1) Net revenue per unit cost/year.
(2) Percentage to that for Nichols.

When the same input-output analysis was applied to Dokki 4 chicks the marketing weight of 0·997 Kg. was achieved at 10 weeks of age (table 2). Accordingly only 5 turns per year were practised giving the total yield of 62·500 tons of live weight. The yearly total cost was L.E. 4,373 and the total revenue was L.E. 24,924 giving the net revenue of L.E. 10,551 (table 3). The economical efficiency (E.E.) of this cross strain when marketed at 1 Kg. of live weight was 0·73 (table 4). These results show that despite that the total yearly production of Dokki 4 was only 82% of that of Nichols yet its economical efficiency was higher (123%) as given in table 4. The reason for making the better performance of Nichols was the relatively higher total cost which was mainly due to the expensive ration used. However when this comparative study was applied to Dokki 4 at the same marketing time as that of Nichols (6 weeks) the total yearly production was 65·19 tons (table 2) giving the E.E. of 0·718 (table 4). The relative values for these two figures to those for Nichols were 86 and 120% (table 4). At 8 weeks of age (6 turns) the total yield increased to 66·00 tons of chicken live weight giving the E.E. of 0·76 with the relative values of 87 and 129% to those for Nichols. It seems that the cross strain Dokki 4 gives its best yearly production with the maximum E.E. when marketed at 8 weeks of age.

In the case of Fayoumi chicks, they reached the live weight of 1·003 kg. at the age of 12 weeks with only 4 turns of production pet year (table 2). The total yield was 60·18 tons of chicken live weight with the total cost of L.E. 12,541 and the total revenue of L.E. 24,072 having the difference of L.E. 11,531 as net revenue. This value was very near to that for Nichols, but the economical efficiency was 0·92 instead of 0·59 for Nichols. These findings prove that despite the fact that Fayoumi chicks took twice as much time as that of Nichols to achieve the same marketing weight, yet on total cost basis the performance of this strain was very profitable since its feeding requirements are practically fulfilled by the lowest feeding cost (table 1). The relatively yearly production from Fayoumi was 80% while the E.E. was 156% for the two relevant values for Nichols, respectively (table 4).

On the other hand, the yearly production of Fayoumi at 6, 8 and 10 weeks of age was 63·63, 67·50 and 66·08 as having the relative values of 83·89 and 87 % of that achieved by Nichols, respectively (table 4).

The economical efficiency at the three marketing times for Fayoumi were 0·79, 0·88 and 0·91 while the relative values to that for Nichols were 134,147 and 154%, respectively (table 4). For the achievement of maximum production from Fayoumi chicks the 8 weeks marketing time seems to be the best while for maximum economical efficiency the 12 weeks marketing time comes first. However if the two considerations were joined it seems that the 10 weeks marketing time should be practiced. It is not advisable to exceed the age to 12 weeks in order to make very slight profit (0·91–0·92) on the account of almost 6 tons of chicken live weight (table 4).

Summary

A farm scale of L.E. 5,000 and the capacity of 10,000, 12,500 and 15,000 chicks of Nichols, Dokki 4 and Fayoumi chicks, respectively was subjected to an input-output analysis for maximum economical efficiency. The optimal feeding requirements for the three strains were achieved in the relevant experimental rations which cost L.E. 65, 40 and 35, respectively. The chicks reached the live weight of 1 kg. at 6, 10 and 12 weeks of age for the three strains respectively. However on total cost basis, the results obtained for the economical efficiency were reversed. It seems that one item such as the growth rate is not enough to judge the efficiency of poultry projects but all the items concerned with the production of a unit which cost less to produce.

Resume

EFFICACITE ÉCONOMIQUE DES PROJETS AVICOLES POUR LA PRODUCTION DE VIANDE DE POULET

Des fermes à l'échelle de 5000 L.E. et d'une capacité de 10000, 12500 et 15000 poulets Nichols, Dokki 4 ou Fayoumi ont été soumises à une analyse "in put-out put" en vue d'une efficacité économique maximum. Les besoins alimentaires optimaux pour les trois lignées étaient couverts par des rations expérimentales coûtant 65, 40 et 35 L.E. respectivement. Les poulets atteignaient le poids vif de 1 kg à 6, 10 et 12 semaines d'âge respectivement pour les trois lignées. Cependant, sur la base d'un coût total, les résultats obtenus pour l'efficacité économique étaient inversés. Il semble qu'un seul critère tel que la vitesse de croissance soit insuffisant pour juger de l'efficience d'un projet avicole, mais que l'examen de l'ensemble des critères concernant la production d'une unité soit nécessaire.

Zusammenfassung

WIRTSCHAFTLICHE EFFIZIENZ VON GEFLÜGELPROJEKTEN ZUR FLEISCHERZEUGUNG.

Farmen mit einer Kapazität von 10000, 12500 und 15000 Hühnern der Rassen Nichols, Dokki 4 und Fayoumi wurden einer input-output Analyse hinsichtlich der maximalen wirtschaftlichen Effizienz unterzogen. Die optimalen Füterungsbedingungen der drei Rassen wurden mit Versuchsrationen erzielt, die 65, 40 bzw. 35 L.E. kosteten. Ein Körpergewicht von 1 kg erreichten die drei Rassen nach 6, 10 bzw. 12 Lebenswochen. Unter Zugrundelegung der Gesamtkosten ergab sich für die wirtschaftliche Effizienz der Rassen die umgekehrte Rangfolge. Es hat den Anschein als ob eine Einflußgröße wie die Wachstumsrate nicht ausreicht, um die Effizienz von Geflügelprojekten zu beurteilen, sondern die Berücksichtigung aller Einflußgrößen erfordert, die auf die Erzeugung einer Einheit kostensenkend oder erhöhend Einfluß nehmen.

References

ANWAR, A (1967). Gross protein value units in the standardisation of rations for Fayoumi chicks. *British Poultry Sci.* 8 (4): 311.

ANWAR, A. (1973). *Poultry Nutrition.* 2nd Ed. Modern Press, Cairo, Egypt.

EWING, W. R. (1963). *Poultry Nutrition.* 5th Ed. Pasedena, U.S.A.

HEADY, E. O. and H. R. JENSEN, (1954). *Farm Management Economics.* Prentice-Hall, Inc., Englewood Cliffs, N.J.

SHAMMA, T. A. (1973). Caloric: Protein ratio in the feeding of broilers. M.Sc. Thesis, Ain-Shams University, Cairo, Egypt.

SCOTT, M. L., M. C. NESHEIM and R. J. YOUNG, (1969). *Nutrition of the chicken.* 1st Ed. Ithaca, U.S.A.