

تأثير اضافة المضادات الحيوية الى علائق دجاج التربية على انتاج البيض ونسبتي الخصب والفقس

دكتور / عبد الله موسى الجمال

قسم الانتاج الحيواني - كلية الزراعة - جامعة أسيوط

الملخص العربي

استخدمت في هذا البحث ٢٠٠ دجاجة دقي ٤ مضي على نضجها الجنسي حوالي ٣ شهور وذلك لدراسة تأثير المضاد الحيوى أوكسى تتراسيكلين (٥٠ جزء في المليون) على محصول البيض ونسبتي الخصب والفقس تحت ظروف الوجه القبلي (حيث درجة الحرارة الجوية أكثر ارتفاعا عنه في مصر العليا وهذا يؤثر في معدل الاستفادة من بعض العناصر الغذائية) - وكانت نتيجة هذه الدراسة :

١ - زاد معدل انتاج البيض وكذا وزن البيضة في المجموعة التي أضيفت الى علائقها المضاد الحيوى وتمثل هذه الزيادة حوالي ١٠% من مجموعة الكونترول - وكانت الزيادة أكثر وضوحا في الأشهور المرتفعة الحرارة .

٢ - لم تتأثر نسبة الخصب وكذا نسبة البيض الناقر بالمعاملة بالمضاد الحيوى ولكن قلت نسبة النفوق الجنيني بصفة عامة مما ترتب عليه زيادة نسبة الفقس بيجوالى ٩%

٣ - كان متوسط وزن الكتكوت عند الفقس في المجموعة المعاملة بالمضاد الحيوى أكبر منه في المجموعة الغير معاملة .

INCLUSION OF ANTIBIOTIC IN THE BREEDER RATIONS AND ITS EFFECT ON EGG PRODUCTION AND HATCHABILITY UNDER UPPER EGYPT CONDITIONS

(With three tables)

By

A. M. El-Gammal

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SUMMARY

200 Dokki-4 laying pullets commencing laying for about three months were used to study the effect of oxytetracycline supplementation on egg production and hatchability under Upper Egypt conditions the results obtained could be summarized as follow:

- 1—The incorporation of oxytetracycline in the breeder rations under Upper Egypt conditions resulted in an increase in both laying rate and egg weight. This increase represent about 10% of total egg production of the control pullets. The increase was more pronounced during hot months.
- 2—The antibiotic seems not to affect the fertility or the percentages of both pipped eggs and dead chicks at hatch. However, it lowered the embryonic mortality and abnormal chicks at hatch. In general, the use of oxytetracycline improved hatchability by about 9%.
- 3—The chick weight at hatch was superior in the group supplemented with oxytetracycline.

INTRODUCTION

The effect of antibiotic supplementation on egg production was studied extensively but the results were contradictory. Some workers showed a beneficial effect (REID ET AL., 1951; ATKINSON AND COUCH, 1951; PETERSEN ET AL., 1952 AND ELAM ET AL 1953). However, others showed no beneficial effect (CARVER AND MCJINNIS, 1951; LILLIE AND BIRD, 1952; AND BROWN ET AL., 1953). The same was true with respect to hatchability, some reports have indicated no beneficial effect (LILLIE AND BIRD, 1953) while the other have shown a beneficial effect (CARISON ET AL, 1952 AND SIZEMORE ET AL., 1953). These contradictions may be due to the differences in the breed or antibiotic used or the differences in the prevailing temperature or disease level or other environmental factors. Accordingly, it seems to be of great importance to study the effect of oxytetracycline inclusion in breeder ration on egg production and hatchability under upper Egypt conditions.

MATERIAL AND METHODS

This study was carried out at Poultry Farm, Faculty of Agriculture, Assiut University using 200 Dokki-4 laying pullets commencing laying for about three months. The pullets were divided into two equal groups, the first was fed the control diet (Table 1) while the second received the same diet but supplemented with 50 ppm of oxytetracycline (This level was found to be suitable in hot weather according to Heywarg, 1954). The pullets of the two groups were kept in pens with open yards under similar conditions and were pullorm free. The experimental period extended for six months (from the first of January to the last of June 1974). During this period both egg production and egg weight (using tripod single balance) were recorded. Two successive sets of eggs (each of 400 eggs) were incubated during March and April using a draft air incubator under recommended temperature and moisture levels. (Clear-eggs, dead embryos during different ages, pipped eggs and abnormal chicks such as weak chicks or chicks which have defects in limbs, beak and head or chicks with rough navels) were recorded. The chicks were weighed at hatch. The fertility and hatchability were calculated as percentages.

TABLE 1.—The composition of the control diet.

Intgredient	%	Ingredient	%
White corn	55.0	Wheat bran (coarse)	11.0
Rice bran	14.5	Blood meal	5.0
Decorticated cotton		Lime stone	5.0
Seed meal	9.0	Sodium chloride	0.5
** Digested protein.	12.6	* Calories in kilograms (M.E.)	2690

* Calculated according to HEUSER, (1955) AND EWING, (1963).

** Calculated according to GHONEIM, (1957) & (1964).

RESULTS AND DISCUSSION

1. Effect of antibiotic supplementation on egg production :

The data of egg production are represented in Table 2. In general, the group supplemented with oxytetracycline had higher laying rate than unsupplemented group. The average laying rate throughout the experimental period was 51.7 % in supplemented group as compared with 48.3% in the control one. This observation agreed with RYAN ET AL (1961) using chlortetracycline, he obtained a difference 3.65% in the laying rate between treated and untreated group. Also, it was

noticed that the average egg weight of the supplemented group exceeded that of the supplemented one by 3 grams. The increase in both laying rate and egg weight resulted in an increase in egg production about 420 grams throughout the experimental period. This increase represent about 10% of the egg production of the control group. Similar findings were reported by PETERSEN ET AL., 1952; ELAM ET AL. 1953 AND JACOB ET AL., 1955. ABOUL-SEoud AND SELIM AT GIZA (EGYPT) showed that the terramycin had no effect on egg production of the Fayoumi and Rhode Island Red but increased the egg weight slightly in the first and pronouncedly in the latter. The higher egg production of the supplemented group could be explained through the sparing effect of antibiotic for some nutrients, or by other meaning, the antibiotic reduced the requirement of some nutrients such as protein (MCGINNIS, 1951 AND MACHLIN ET AL., 1952); vitamin A (BUREGSS ET AL., 1950), vitamin D (ROSS AND YACOWITZ 1952) Manganese (PEPPER ET AL., 1951) and calcium and phosphorus (LINDBLAND ET AL., 1952). However, SLINGER ET AL (1952) reported that the antibiotic did not lower the protein or energy requirements but enhanced their utilization. In general these nutrients were known to be important for adequate egg production (HEUSER, 1955; EWING, 1963 and others). The role of antibiotics in reducing the requirements of such nutrients could be explained though its effect on the type of microflora in the intestinal tract by increasing or maintaining the types which synthesize essential nutrients or by destruction of the microflora which compete with the host for the available supply of essential nutrients in the diet. This theory was supported by GROSCHKE AND EVANS, (1950) and others.

TABLE 2.—Effect of antibiotic supplementation on egg production.

Month	Control group			Supplemented group		
	Laying rate (%)	Av. egg Wt. (g)	Av. egg production (g)	Laying rate (%)	Av. egg Wt. (g)	Av. egg production (g)
January	47.2	48.5	708	48.1	48.1	715
February	54.1	49.1	742	56.7	50.2	797
March	58.3	49.3	886	60.2	50.7	946
April	50.2	47.6	717	54.8	49.1	827
May	44.1	47.3	643	49.2	48.8	744
June	35.7	46.2	494	41.1	47.1	581
Total	289.0	288.6	4190	310.1	294.2	4610
Average	48.3	46.0	698.3	51.7	49.0	768.3

Looking again to Table 2, it is interesting to note that the increase in egg production of the supplemented group was slight at the beginning of the experimental period where the prevailing temperature was relatively low (11.65°C), then became more pronounced by the increase in the prevailing temperature (7, 55, 60 grams during January, February, and March as compared with 87, 99 and 90 grams during April (24.26°C)* May (25.48°C)* and June (28.29°C)* respectively). Consequently, it could be concluded that the antibiotic supplementation may act as antistress factor of high prevailing temperature. HEYWANGE (1954) reported that, during 100 days of hot weather, the egg production of white Leghorn pullets was increased by supplementing their ration with 50 or 100 grams aureomycin per ton.

Irrespective of treatment, the egg production and egg weight increased gradually to reach their maximum during March and then decreased to the end of the experimental period. The same trend was noticed by many workers (GHANY ET AL., 1963; HASSAN ET AL., 1973 AND EL-GAMMAL, 1975).

2-Effect of antibiotic supplementation on fertility and hatchability :

The date of fertility and hatchability as affected by oxytetracycline supplementation are presented in Table 3. The antibiotic seems not to affect the fertility of Dokki-4 eggs (89 % in the supplemented group as compared with 88.6 in the control). The embryonic mortality throughout the experimental period of the supplemented group was about two thirds as that of the control

TABLE 3.—Effect of antibiotic supplementation on the hatching results.

Items	Control group	Supplemented group
Clear eggs %	11.4	10.9
Dead embryos % :		
1. Before 7 days	3.7	2.0
2. From 7-18 days	7.8	5.7
3. After 18 days	8.8	6.1
Pipped eggs %	3.2	3.0
Abnormal chicks %	2.8	1.9
Dead chicks %	0.9	0.9
Normal chicks %	61.4	69.4
Hatch weight (grams)	29.8	31.1
Fertility %	88.6	89.0
Hatchability %	69	78.1

* The average of day and night temperature.

(13.8% as compared with 20.2%). These results show that the oxytetracycline supplementation decreased the rate of embryonic mortality. Similar findings were reported by SLINGER ET AL., 1952; And SIZEMORE ET AL., 1953. The percentages of pipped eggs as well as dead chicks at hatch were nearly the same. However, the percentages of abnormal chicks at hatch were lower in the supplemented group. In general, the use of oxytetracycline improved hatchability by about 9%. As already has been discussed, this improvement could be explained through the sparing effect of antibiotic for some nutrients such as vitamins (A, D, B₁ and B₂) and minerals (calcium, phosphorus and manganese). Such nutrients were found to be deficient in the common Egyptian rations. The necessity of these nutrients for embryonic development was emphasized by BEARSE AND MILLER, (1937) on vitamin A; BRANION AND SMITH, (1932) on vitamin D; TITUS ET AL., (1937) on calcium and phosphorus and O'ROURKE ET AL., (1953) on Phosphorus.

The chick weight at hatch was superior in the group supplemented with oxytetracycline. This superiority could be attributed to the higher egg weight (DER, 1954) as it has been already reported here, that the egg weight of the supplemented group exceeded that of the unsupplemented one by about 3 grams. The increase in the rate of nutrient utilization during embryonic development may be another reason. For the superiority of the chick weight of the supplemented group.

REFERENCES

- Aboul-Seoud, A.A. and Selim, A.D. (1963). The effect of terramycin on laying hens. Proceeding of the second Anim. Prod. conf. Published by NIDOC, Cairo, A.R.E.
- Atkinson, R.L. and Couch, J.R. (1951). The effect of vitamin B₁₂, APF concentrate, aureomycin, streptomycin, liver "L" and fish meal on egg production and hatchability of broad breasted Bronze turkey. Poul. Sc., **30** : 905.
- Bearse, F.E. and Miller, M.W. (1937). The effect of varying levels of vitamin A content in the hen ration on vitamin A content of the egg on both hatchability and chick viability. Poul. Sci., **32** : 124.
- Branion H.D. and Smith, J.B. (1932). The influence of vitamin D on hatchability and egg production. Poul. Sci., **11** : 261.
- Brown, J.A., Robblee A.R. and Clandinin; D.R. (1953). The use of penicillin in breeding ration, Poul. Sci., **32** : 576.
- Burgess, G.B. and Laughland, (1950). Arch. Biochen. Biophys. **33** : 339 (Cited by Ewing; 1963).
- Carison, C.W., Wilcox, R.A. Eyper W.K. and Jones, D.G. (1953). The effect of penicillin and streptomycin in diets for breeding hens. Poul. Sci., **32** : 176.
- Carver, J.S. and McGinnis, J. (1951). The effect of antibiotic supplements on egg production. Poul. Sci., **30** : 909.
- Elam, J.F., Jacobs R.L., and Couch, J.R., (1953). The effect of prolonged feeding of antibiotics upon the performance of laying hens. Poul. Sci., **32** : 762.
- El-Gammal, A.M. (in press) : Effect of carophyll-10 supplementation on the egg production, fertility and hatchability of the indigenous strains of chickens.
- Ewing, W.R., (1963). Poultry Nutrition. The Ray Ewing Company Publisher, Pasadena California.
- Ghany, M.A., Badreldin A.L. and Obeidah A.M.A. (1963). Seasonal egg production as basis for selection under Egyptian environmental conditions. Proceeding of 2nd Anim. Prod. Conf. Cairo, A.R.E.

- Ghoneim, A. (1957). "Feeding Poultry." 3th ed., El-Oloom Lib., Cairo, A.R.E. (In Arabic)
- Ghoneim, A. (1964). "Animal Nutrition, Part I Principals and Forages" Englo-Egyptian Lib., Cairo, A R E (In Arabic).
- Groschke, A.C. and Evans, R.J. (1950). Effect of antibiotic, synthetic vitamins. Vitamin B₂ and APF supplement on chicks growth *Poul. Sci.* **29** : 616.
- Hassan, G.M., Khattab M.S. and El-Gammal, A.M. (1973). Phenotypic correlations between several measures of egg production in the Fayoumi and Dandarawi chickens. *Alex. J. of Agric. Res.*, **21** No. 3 : 367.
- Heuser, G.F., (1955). "Feeding Poultry" John Wiley & Sons, Inc. New York.
- Heywang, B.W. (1954). High levels of antibiotics in the diets of laying chickens. *Poul. Sci.* **33** : 1059.
- Jacobs, R.L., Elam J.F. and Couch, J.R. (1955). Effect of administering antibiotics upon egg production, growth and antibiotic-persistent microorganisms. *Poul. Sci.*, **34** : 1232.
- Lillie, R.J. any Bird, H.R. (1952). Effect of antibiotic supplements upon hatchability and growth and viability of progeny. *Poul. Sci.* **31** : 513.
- Lindbland, G.S., Slinger, S.J. Anderson G.W. and Motzok, I. (1952). Effect of aureomycin on the calcium and phosphorus requirements of chicks. *Poul. Sci.* **31** : 923.
- Machlin, L.J., Denton, C.A. Kellogg W.L. and Bird, H.R. (1952). Effect of dietary antibiotic upon feed efficiency and protein requirement of growing chickens. *Poul. Sci.* **31** : 106.
- McGannis, J., (1951). The effect of antibiotics on nutritional requirement of turkeys and chicks. *Poul. Sci.* **30** : 924.
- O'Rourke, W.F., Bird, H.R. Phillips P.H. and Cravens, W.W. (1953). The hatchability effect of low phosphorus rations. *Poul. Sci.* **32** : 919.
- Pepper, W.F., Slinger S.J. and Motzok, I. (1951). The effect of aureomycin on the inter-relationship between mangansse and salt in chicks. *Poul. Sci.* **30** : 926.
- Peterson, C.F., Wiese, A.G. Dahlstrom H.V. and Lampman, C.R. (1952). Influence of vitamin B₁₂ and antibiotics on hatchability. *Poul. Sci.* **31** : 129.
- Reid, B.L., Quisenberry J.H. and Couch J.R. (1951). Aure omyoin, vitamin B₁₂, methionine and level of protein in mature fowl nutrition. *Poul. Sci.* **30** : 935.
- Ross, E. and Yacowitz, H. (1952). The effect of penicillin on vitamin D requirements for growth and bone calcification. *Poul. Sci.* **31** : 933.
- Ryan, F.A., Potter L.M. Singsen E.P. and Matterson L.D. (1961) : The continuous feeding of on antibiatic to laying hens. *Poul. Sci.*, **40** : 1142.
- Sizemore, J.R., Lillie, R.J. Denten G.A. and Bird, H.R. (1953). influence of aureomycin in the chick diet upon subsequent reproductive performance of laying hens. *Poul. Sci.* **3** : 618.
- Slinger, S.J., Pepper, W.F. Hill D.E. and Branion H.D. (1952). Effect of penicillin on the growth and feed efficiency of chicks fed urea. *Poul. Sci.* **31** : 1106.
- Titus, H.W.-Byerly T.C. Ellis N.R. and Nestler R.S. (1937). Effect of the calcium and phosphorus content of the diet of chickens on egg production and hatchability. *Poul. Sci.* **16** : 118.

Author's address: A.M. El-Gammal, Assoc. Prof. Dept. of Anim. Prod., Fac. of Agric., Assiut Univ., Assiut, A.R.E.