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EFFECT OF THE BY-PRODUCT OF PENICILLIN *CHRYSOGENIUM* ON GROWTH AND FOOD CONVERSION FOR GROWING CHICKS

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One hundred and fivty day-old male Dokky 4 chicks were used. Five treatments were involved i.e. control of a practical diet, 0.5 percent terramycin 7+7, 0.5, 1.0 and 2.0 percent local penicillin by-product (mycelium). A highly statistical difference (P = 0.01) was obtained between treatments for the 7-week average live-weight. The dietary 2.0 percent mycelium showed super or results for growth and food conversion. than for other treatments. The present study may sugges that about 0.75 percent of mycelium could give similar growth reponst as 0.5 percent Terramycin 7+7 in the diet for growing chicks.

The precise way in which the antibiotics expert their benificial effects on growth and food utilization is still debatable. Some results were obtained by Eyssan and Somer, 1963, who claimed that the growth stimulating effect of antibiotics is most likely due to suppression of Gram-positive intestinal bacteria which interfere with the absorption of nutrients. Other basteria are benificial because they produce nutrients e.g. vitamins and for unidentified growth factors that are not present in the food in sufficient quantity.

Titus, 1961, claimed that several antibiotics, when added to the food of growing chickens, increase the rate of growth or improve the efficiency of food utilization or do both under certain conditions. Saxena *et al.* (1953) reported that continuous supplementation of diamine penicillin at a level of 3 p.p.m. in the mash, during the starting and developing periods, significantly improved the body weight of turkey at 24 weeks. A greater response was obtained in males than in females.

To the knowledge of the authors, no information is available concerning the use of the local penicillin, by-product of mycelium in the livestock

The precise way in which the antibiotics expert their benificial effects and poultry feeding in the U.A.R. It was, therefore, desirable to carry out the present work to study the effect of dietary mycelium, as compared with a commercial source of terramycine, on growth and food conversion for ckicks.

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Experimental

The experiment was conducted at Dokky Poultry Farm, Animal Production Department, Ministry of Agriculture.

Birds and their allocation :

150 day-old male Dokky 4 chicks were used. The chicks were fed a practical diet (table 1) from hatching up to the first week of age to give chance for the absorption of the yolk from the abdominal cavity. The 7-day old wing banded chicks were, then, divided into 10 equal groups of 15 chicks each. Every two groups (replicates) were assigned for each treatment. The chicks were randomly allocated and reared up to 7 weeks of age in a commercial battery electrically heated. The room, in which the battery was kept, was naturally ventilated and provided with two bulbs of 100 watt each to give a light source over-night during the experimental period.

Food and additives :

Local penicillin by-product, called mycelium was added to the basal practical diet (Table 1) at the levels of 0.5, 1.0 and 2.0 percent, while no mycelium was added to the control diet. The mycelium was provided by Nasr Pharamaceutical Chemicals Company, and claimed to contain the percentages of moisture 7.65, crude protein 21.94, ether-extract 5.87, crude fibre 5.48, carbohydrate 22.64, ash 36.42, total sugar 4, reduced sugar 0.8, phosphorous 0.17 and pH of 5. The amount of Penicillin units in the test material was not available from the producers. The supplied fresh mycelium material was dired in the laboratory by a vaccum oven at 70°C, then finely ground before added to the diet.

A refernce diet contained 0.5 percent terramycine 7 + 7 (7 g. oxytetracycline Hc 1 + 7 mg. vilamin B_{12} per kg.) provided by Pfizer company, Cairo, was used.

Food and water were offered *adlib.* The scatted food was collected every 3 to 4 days and weighed to sort out the weekly food consumption.

Eye-drops of New-castle vaccin were used for the experimental chicks on the sixth days of hatching. No mortality occurred during the experiment.

The basal diet and mycelium material were chemically analysed as recommended by the A.O.A.C. methods, 1950, Digestibl crude protein for mycelium was determined by Wedemeyer method (1899), as modified by Barnett, 1954.

Analysis of variance of the final average live weight, according to Snedecor (1956) was made .

TABLE 1.—PERCENTAGE COMPOSITION AND PROXIMATE ANALYSIS OF THE EXPERIMENTAL DIET AND MYCELIUM

Ingredient	Percent	Ingredient	Percent
Yellow maize (ground)	25	Shrimb meal	6
Dec. cotton seed meal	25	Oyster shells (pulverized)	1
Sesame meal	6	Bone meal	1
Wheat flour	10	Calcium carbonate	1
Wheat bran	10	Sodium Chloride	0.5
Corn gluten meal	5	Miniral mixture	0.5*
Rice bran (defated)	7	Other additives	**
Meat meal	2		

Proximate Analysis

Diet	%	*Mycelium*	%
Moisture	10.31		
Crude protein	22.12		19.4
Ether-extract	4.52		
Crude fibre	6.44		
Dig. crude protein			14.1
Met. Energy (calculated)*			
Kcal/g. diet	2.24		

* Each 100 g. mineral mixture contains in grams : Bone meal 60, calcium hydroxide 19.5, Sodium chloride 17, ferric oxide 1.6, sulfur 0.5, magnesium sulphate 0.5, manganese sulphate 0.5, copper sulphate 0.29, cobalt sulphate 0.07, potassium iodide 0.04.

** Each Kg. diet was supplemented with : vit. A 8750 i.u., vit. D_3 2763 i.u., vit. B_1 0.125 mg., vit. B_2 6.775 mg., vit. B_6 0.063 mg., vit. B_{12} 0.0005 mg., niacin 38.31 mg., vit. E 0.313 i.u., vit. K_3 0.250 mg., choline chloride 164.7 mg., Pantothenic acid 6.93 mg. and proc. penicillin 1.0 mg.

* Calculated from various sources.

Results and Discussion

It is worth noting that the level of 2 percent mycelium in the present study was obtained from preliminary investigations carried out in the same Department. Preliminary studies using levels of mycelium ranged from zero to ten percent in the diet showed that 2 percent mycelium gave the record average live-weight of Fayoumi at 6-week old.

Terramycin 7 + 7 which was used in commercial diets was included in a refernce diet to evaluate the mycelium response. The terramycin 7 + 7 was claimed to contain 7 g. oxyteracyline plus 7 mg. vitamin B^{12} per kg. material. The level of 0.5 percent of that compound in the diet, was suggested by the producer.

Table 2 shows the average live-weight of the experimental chicks being fed 0.5, 1.0 and 2.0 percent mycelium and 0.5 percent terramycin 7 + 7, while the practical diet free of these additions was a control, treatment A. As long as the practical diet was commercially prepared, a trace of procaine penicillin accounting for 1.0 mg. per kg. diet (1.0 g./ton), as shown in footnote of Table 1., was incorporated in the experimental diet. However, Titus, 1961 reported that typical usage of the antibiotics, for the stimulation of growth is about 4 g. of procaine penicillin per ton of food.

It could be seen from Table 2, that the average live-weight increased with the increase of antibiotics in the diet reaching the maximum for the 2.0 percent mycelium, (treatment E), followed by the 1.0 percent mycelium (treatment D). It could, also, be seen that the average live-weight values for the 0.5 percent terramycin, treatment B, were, in general, lower than those for the mycelium treatments. The final average live-weight, at 7-week old, for treatment E was 489 g. being the highest than for treatments A and B which were 424 and 470 g. respectively. The final average live-weight values for 0.5 percent mycelium (treatment C and 1.0 percent mycelium (treatment D) were 262 and 477 g. respectively.

The average increase in live-weight gain at 4-week old, of treatment E, than the control was valued for 47 g. corresponding to about 24 percent. The average increase for the same treatment (E) at 7-week old than the control was valued for 65 g. corresponding to about 15 percent. while the increase for treatment B than the control was 37 g. and 46 g. or about 19 and 11 percent at 4 and 7 weeks old correspondingly and respectively. In this respect Mac Gregor *et al.* (1952) with growing poults, reported as high as 60 percent stimulus to penicillin supplementation at 4 weeks. He reported also that the response was gradually reduced to 6 percent at 20 weeks of age. However, Ghoneim *et al*, (1963), with turkeys fed procaine pencillin at different levels, failed to assure any significant increase in live-weight between the supplemented and unsupplemented diets.

Analysis of variance for the average final live-weight showed a highly significant difference ($P = 0.01$) between treatments but no significant difference ($P = 0.05$) was shown within replicates. L.S.D. (least significant difference) showed that the difference between treatment A and B was significant ($P = 0.05$) while, the differences between treatments A and D, A and E were highly significant ($P = 0.1$). Although a marked difference was noted between treatments A and C. they failed to prove significance at 0.05 probability level.

TABLE 2.—THE AVERAGE LIVE-WEIGHT (G.) OF EXPERIMENTAL CHICKS.

Age in weeks	Live-weight (g.) for treatments				
	A Control	B Terramycin7+7 0.5%	C Mycelium 0.5%	D Mycelium 1.0%	E Mycelium 2.0%
1	38	40	39	40	41
2	74	97	92	95	95
3	132	149	150	155	155
4	195	232	278	238	242
5	256	288	293	298	318
6	335	378	378	392	403
7	424	470	462	477	489
±S.E.*	±15	±13	±18	±14	±14

* S.E. = Standard Error.

L.S.D. between treatments is 50.9 at $P < 0.01$ and 38.8 at $P < 0.05$.

Table 3 shows the food conversion and the average weekly food intake per chick up to 7-week old. The mean values, over the experimental period, were also recorded.

The average weekly food intakes, in general, were higher by adding terramycin and mycelium than in the control. The food consumption increased with the increase of the live-weight. Silinger *et al.* (1953), claimed that penicillin caused a significant increase in weight with chicks having free access tofeed but no increase when feed intake was restricted. Biely *et al.* (1952), with growing chicks, concluded that the climax of growth stimulating properties of antibiotics was achieved when a high energy and well amino acid balanced diet was used.

Food conversion (units food per unit gain) was calculated and shown in Table 3. Better efficiency was shown in the earliest age and decreased with the advanced age. The better efficiency was also, recorded by adding terramycin or mycelium than in the control. The food sconversion values were 2.92, 2.95 and 3.18 for treatments E, B and A respectively. Similarly, Davies and Briggs, (1951), with growing chicks and poults, Slinger *et al.* (1952), with poults reported that antibiotics had improved feed efficiency at early stages of growth.

It may be concluded that dietary 2.0 percent mycelium gave superior result than other treatments. The present data may suggest that about 0.75 percent of mycelium could give the same growth response as 0.5 percent terramycin 7 + 7. The mycelium products need further detailed studies at various levels particularly, with high energy and well balanced amino acid diets.

TABLE 3.—Food conversion and average weekly food intake per chick in grams.

Interval	Treatment									
	A Control		B Terramycin 7+7 0.5%		C Mycelium 0.5%		D Mycelium 1.0%		E Mycelium 2.0%	
	Food	F/gain	Food	F/gain	Food	F/gain	Food	F/gain	Food	F/gain
1-2	102	2.81	117	2.04	100	1.88	117	2.11	118	2.20
2-3	162	2.76	154	2.94	146	2.57	175	2.92	153	2.54
3-4	201	3.24	195	2.26	199	2.54	187	2.27	217	2.49
4-5	232	3.85	227	4.02	232	3.60	255	3.87	240	2.16
5-6	253	3.14	274	3.03	283	3.28	285	3.05	289	3.38
6-7	276	3.16	300	3.33	268	3 21	304	3.59	239	3.41
Mean	205	3.18	212	2.95	205	2.91	217	2.99	218	2.9

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تأثير مخلفات صناعة البنسلين (كريزوجينم) على النمو والاستفادة الغذائية فى الكتاكيت

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الملخص

احتاجت هذه الدراسة الى ١٠٩ كتكوت ذكر دقى ٤ قسمت الى خمس معاملات وهى عليقة المقارنة ، ٥ر٠ج تيراميسين ٧ + ٧ ، ٥ر٠٪ ، ١٪ ، ٢٪ مخلفات البنسلين (ميسليوم) . وجدت فروق احصائية معنوية عالية على مستوى ١ر٠ بالنسبة للوزن الحى عند عمر ٧ أسابيع بين المعاملات وقد أوضحت النتائج تفوق معاملة ٢٪ ميسليوم فى العليقة من حيث النمو والاستفادة الغذائية عن باقى المعاملات . وبالحساب تبين أن نسبة ٧٥ر٠٪ ميسليوم فى العليقة يمكن أن تعطى نتائج متقاربة مع تلك التى يضاف اليها نسبة ٥ر٠٪ تيراميسين ٧ + ٧

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