

Effect of Low Level Feeding of Tylosin and Zinc Bacitracin on the Weight Gain and Immunity of Broiler Chicks Vaccinated Against Newcastle Disease Virus

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Abstract: Present study was initiated to evaluate the effect of Tylosin and Zinc Bacitracin (at low level) on weight gain and immune response of vaccinated and non-vaccinated Broiler Chicks. For this purpose a 240-day-old chicks were divided into 3 groups, A (fed on Tylan Premix), B (fed on Albac) while C was non-medicated and non-vaccinated control group. These were further subdivided into two groups on the basis of vaccination against NDV. Results of this project revealed that low level feeding of Tylosin (Tylan Premix) and Zinc Bacitracin (Albac) did not interfere with development of the birds and their immune status.

Key words: Newcastle disease virus, immunity, tylosin and zinc bacitracin

Introduction

Some chemical used as immunopotentiating agents like Zinc Bacitracin and Biotin. Some antibiotics are also used as feed additives like TM200 and Tylan in pure form (Kobe, 1983).

Many chemicals and antibiotics being used as therapeutic agents have immunomodulatory effect. It may be beneficial or harmful (Muneer *et al.*, 1988).

Thus the initiation to evaluate this project was to:

- Observe the effect of low level feeding of Tylosin and Zinc Bacitracin on weight gain and feed conversion ratio (FCR) in the broiler chicks.
- Observe the immune response of Newcastle disease virus in broiler chicks along with the use of Tylosin and Zinc Bacitracin as feed additives.

Materials and Methods

A total of 240 day-old broiler chicks were purchased for the present project. They were randomly divided into two main units. first unit, the medicated units and the second were non-medicated (control) unit.

Identification was done through colour marking. The medicated unit was divided into two groups i.e., Tylan Premix (Tylosin) medicated and Albac (Zinc Bacitracin) medicated groups. each of three groups were further subdivided into two groups each and every chick as offered treatments as mentioned in the Table 1 (experimental design) and the medicated agent used in this project are given in Table 2 (medicated agents).

Table 1: Experimental design

Treatments	Age of bird days	Treatment sub-group					
		A		B		C	
		A1	A2	B1	B2	C1	C
Tylosin (Tylan Premix)	1-42	+	+	-	-	-	-
Zinc Bacitracin (Albac)	1-42	-	-	+	+	-	-
Non-medicated feed	1-42	-	-	-	-	+	+
NDV vaccine	7 and 21	+	-	-	-	+	-

+ = Treated - = Not treated

Table 2: Medicated agents

Agent	Manufacturer	Contents	Dose rate Tylosin
(Tylan Premix)	Animal health and cure (Pvt), Ltd, Lahore	10% Tylosin	20gm/50kg in feed
Zinc Bacitracin (Albac)	Hilton pharma (Pvt), Ltd, Lahore	10% Zinc Bacitracin	20gm/50kg in feed

The birds were fed on commercial poultry feed No. 4 for 30 days and No. 5 unto finishing of the experiment.

Newcastle disease virus vaccination

The birds were inoculated with lyophilized (Live Freed Dried) Newcastle disease virus (Mukteswar Strain) manufactured by veterinary research institute, Lahore Pakistan. Each bird received one dose of the reconstituted vaccine through ocular rout on 7th day and on 21st day subcutaneously.

Sampling

Blood samples were collected from the experimental birds from 1st day and then after weekly intervals up to 42 days of age in order to determine the pre and post vaccination antibody titer by hemagglutination inhibition (HI) test. For collection the birds on first day birds were slaughtered and approximately 1.25 to 1.50 ml of the blood was collected from each major group. The samples of blood on days 7, 14, 21, 28, 35 and 42 were collected either by cardiac puncture or from the subclavian vein of the bird (Approximately) 2-3 ml of blood was collected. Then serum was separated which was then used for further testing.

Serology

In this section we performed Hemagglutination (HA and HI) testing on serum separated from blood samples of the birds by adopting the same method as described by Harold *et al.* (1975); Saeed *et al.* (1985); Khalid, (1991); King (1986) and Rizvi *et al.* (1992).

Weight gain study

Starting from the very first day up to the age of 42 days each and very bird was weighed weekly to evaluate any difference in weight gain in various treatment groups and subgroups.

In the same manner feed conversion ratio (FCR) was also recorded on weekly basis from day 7 up to 42nd day.

Statistical analysis was done through least significant difference (LSD) test at 5% level of probability (Steel and Torrie, 1982).

Results and Discussion

Body weight analysis

The comparison of the mean body weight of birds in various treatment groups and subgroups is presented in Table 3 and 4.

It was observed that birds which received Tylosin and Zinc Bacitracin in feed had higher body weights than those who received non-medicated ration. Moreover the mean body weights of birds in control group which were vaccinated against NDV was also higher than the NDV non-vaccinated birds in their respective groups.

This study further revealed that the birds vaccinated against NDV had higher weight gain at day 42 as compared to those which were not vaccinated against NDV. Among the vaccinated birds, that received Tylosin and Zinc Bacitracin in feed. Among the control group the vaccinated birds had higher mean body weights than those were non-vaccinated.

Farooq (1994) also reported the same results with two coccidiostats i.e., Clopidol and Avatic. But these findings does not match the findings of Muneer *et al.* (1988).

This difference may be attributed to a difference in drug, feed and experimental environment.

Antibody analysis

Geometric mean HI titers of birds in various groups and subgroups are compared in Table 5 and 6.

The highest geometric mean HI titers (1:168.9) was observed in the sera of birds which were treated with Zinc Bacitracin and vaccinated ND and lowest GMT (1:0) was observed in the sera of birds fed on non-medicated feed and which were non-vaccinated.

There were significant difference amongst the antibody titre of the Tylosin fed vaccinated, Zinc Bacitracin fed vaccinated and non-medicated non-vaccinated birds. The antibody titers of birds in non-vaccinated subgroups were either extremely low or negligible as compared to the vaccinated birds which were kept on Tylosin or Zinc Bacitracin medicated feed. These observations leads to such results that Tylosin and Zinc Bacitracin did not effect the antibody formation in chicken. In fact their administration had beneficial effect on the antibody production in chicken the findings were in agreement with the observations of Kulkarni *et al.* (1981) and Constantinescu *et al.* (1981).

Response of birds to Newcastle disease vaccination

The post vaccination serum samples from the birds in various treatment subgroups were collected on day 14, 21, 35 and 42 and analyzed using haagglutination inhibition (HI) test.

A significant difference among the mean HI titres in various treatment groups and subgroups was observed.

Table 3: Comparison of mean body weights of chickens in various treatment groups at days 1 and 7

Groups	Sample	Treatment	Mean body weight (gms)	
			Day 1	Day 7
A	10	Tylosin medicated feed	40.45±0.44 ^a	97.61±0.57 ^a
B	10	Zinc Bacitracin medicated feed	41.27±0.44 ^a	99.12±0.69 ^a
C	10	Non-medicated fed (control)	41.90±0.44 ^a	93.67±0.51 ^a

(M±SE) Mean ± Standard Error

a Any 2 mean carrying the same superscript are not significant different from each other at 5% probability level using LSD test

Table 4: Comparison of mean body weights of chickens in various treatment sub-groups of days 14, 21, 28, 35 and 42

Sub-group	Sample size	Treatment	Mean body weights (grams)				
			Day 14	Day 21	Day 28	Day 35	Day 42
A1	10	Tylosin+NDV Vaccinated	229.7±3.03 ^{ab}	421.1±3.21 ^{abc}	720.5±4.26 ^{bc}	1084.1±7.69 ^{bc}	1300.8±10.92 ^{bc}
A2	10	Tylosin+Non-vaccinated	224.23.13 ^{abcd}	419.4±2.76 ^{abc}	715.3±5.15 ^{bcd}	1028.6±7.62 ^{de}	1229.0±12.73 ^c
B1	10	Zinc Bacitracin + NDV Vaccinated	235.8±1.63 ^a	435.9±4.12 ^a	765.1±6.98 ^a	1138.4±8.41	1427.8±12.39 ^a
B2	10	Zinc Bacitracin + Non-Vaccinated	223.0±1.89 ^{abcde}	434.7±2.24 ^{ab}	740.1 ±5.72 ^{ab}	1123.4 ±8.72 ^b	1328.4±15.09 ^b
C1	10	Non-Medicated NDV Vaccinated	226.3±1.35 ^{abc}	403.9±4.69 ^{bcd}	719.0±4.24 ^{cde}	1048.0±7.39 ^a	1293.8±12.21 ^{bcd}
C2	10	Non-Medicated Non-Vaccinated	218.2±2.17 ^{def}	398.9±3.84 ^{cdef}	711.7±4.73 ^{cdef}	1027.5±5.11 ^{def}	1228.113.16 ^{def}

(M±SE) = Mean ± Standard Error

NDV = Newcastle disease virus

abcdefg = Any 2 mean carrying the same superscript are not significant different from each other at 5% probability level using LSD test

Table 5: Geometric mean HI titres of chicken in various treatment group at day 1 and day 7

Group	Treatment	Geometric mean	
		Day 1 GM	Day 7 GM
A	Tylosin Medicated Feed	1 : 26	1 : 104.0
B	Zinc Bacitracin Medicated Feed	1 : 26	1 : 111.4
C	Non-Medicated Feed (Control)	1 : 26	97.0

GM = Geometric Mean HI = Hemagglutination Inhibition X = 5 (HI) titre sample size Y = 20 (HI) titre sample size

Table 6: Geometric mean HI titres of chicken in various treatment sub-groups at day 14, 21, 28, 35 and 42

Sub	Sample size	Treatment	Mean body weight (grams)				
			Day 14	Day 21	Day 28	Day 35	Day 42
A1	10	Tylosin + NDV Vaccinated	1:119.4	1:45.3	1:207.9	1:222.9	1:157.6
A2	10	Tylosin + Non-Vaccinated	1:11.3	1:2.5	1:1.4	1:1.2	1:1
B1	10	Zinc Bacitracin + NDV Vaccinated	1:128.0	1:48.5	1:222.9	1:238.9	1:168.9
B2	10	Zinc Bacitracin + Non-Vaccinated	1:12.1	1:2.8	1:1.5	1:1.3	1:1.2
C1	10	Non-Medicated + NDV Vaccinated	1:111.4	1:42.2	1:181.0	1:207.9	1:147.0
C2	10	Non-Medicated + Non-Vaccinated	1:10.6	1:2.3	1:1.8	1:1.1	1:0

GM = Geometric Mean

HI = Hemagglutination Inhibition

NDV = Newcastle disease virus

Table 7: comparison of feed conversion ratio of chicken in various treatment groups at day 7

Group	Sample size	Treatment	Feed conversion ratio at day 7
A	10	Tylosin medicated feed	1.12
B	10	Zinc Bacitracin medicated feed	1.11
C	10	Non-medicated feed (Control)	1.17

Table 8: Comparison of feed conversion ratio of chicken in various treatment subgroups at day 14, 21, 28, 35 and 42

Sub-group	Sample size	Treatment	Feed conversion ratio				
			Day 14	Day 21	Day 28	Day 35	Day 42
A1	10	Tylosin + NDV Vaccinated	1.97	1.64	1.90	2.31	2.41
A2	10	Tylosin + Non-Vaccinated	2.02	1.65	1.92	2.44	2.56
B1	10	Zinc Bacitracin + NDV Vaccinated	1.35	1.58	1.79	2.20	2.20
B2	10	Zinc Bacitracin + Non-Vaccinated	2.03	1.59	1.85	2.23	2.36
C1	10	Non-Medicated + NDV Vaccinated	2.00	1.71	1.90	2.39	2.43
C2	10	Non-medicated + Non-Vaccinated	2.08	1.73	1.92	2.44	2.55

Feed conversion ratio

The birds fed Tylosin and Zinc Bacitracin at the recommend dosage levels had higher feed conversion ratio than those fed non-medicated ration Table 7 and 8.

There is coordination among the observations of the present results and the results obtained by Shen-Jianzhong *et al.* (1995) and Onifade and Babatunde (1997). these findings are different from the observation cited by Naqvi *et al.* (1994).

This difference may be due to a difference in drugs, route of inoculation and experimental environment.

Summary

Studies indicated that Tylosin and Zinc Bacitracin when used at recommended dosage level (20mg/50kh feed and 12gm/50kg feed respectively) did not interfere with the development of birds, immune response of birds in vaccinated groups rather producing beneficial effects on weight and antibody production due to heavier weight and good health status. Moreover the weight gain in medicated birds was far higher than those of non-medicated at 42 days of age.

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