

Immunization of broiler chicks deprived food and water with live Newcastle disease vaccine(LaSota strain) by drinking water

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(Received 19 May 2001, accepted in revised form 17 September 2001)

Abstract

To confirm the effect of food and water deprivation prior to Newcastle disease(ND) virus vaccination, three hundred chicks were divided into five groups with three replications. ND vaccine were sprayed to at 1-day old chicks at commercial hatchery. Secondary and third vaccination was conducted at 2-week old and 24-day old chicks by LaSota strain. Control was conventionally vaccinated without withdrawing the food and water before or after vaccination. In group 2(G2) and 3(G3), LaSota strain was vaccinated to chicks before and after fasting the food and water for 3 and 2 hours, respectively. Group 4(G4) has the same fasting time of group 2, but supplemented the skim milk in vaccine dilution water. In group 5(G5), skim milk was added into group 3. Weight gain, feed intake and feed conversion were weekly measured for 5 weeks. Blood was collected from wing vein at 24 and 35 days of age. Each serum antibody level were measured by hemagglutination inhibition(HI) test. The average weight gain, feed intake, feed conversion of all group were not significantly different. Weight gain of each groups was 1910.30(control), 1875.28(G2), 1952.88(G3), 1859.12(G4) and 1896.05(G5), respectively. Feed intake of all group was recorded at 3160.67(control), 3167.07(G2), 3189.48(G3), 3157.85(G4) and 3178.16(G5), respectively. The feed conversion of each groups was 1.655(control), 1.688(G2), 1.633(G3), 1.699(G4) and 1.676(G5), respectively. The HI titer of G4 was 5.50 ± 1.40 and significantly higher than the other groups($p < 0.05$) (control : 4.36 ± 1.87 , G2 : 5.18 ± 2.14 , G3 : 4.51 ± 2.19 , G5 : 5.28 ± 1.58) at 35 days old. The results of this experiment indicated that two or three hours of fasting time before or after vaccination would be able to show the higher antibody level against ND virus.

Key words : Newcastle disease (ND) virus, Hemagglutination inhibition (HI) test, Weight gain, Feed intake, Feed conversion

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Introduction

Although mass immunization against Newcastle disease(ND) has been practiced by spray, drinking water and oil emulsion injection to broiler chicks and laying hens, ND has been annually reported in this country. As the results, weight gain, feed conversion, and egg production was poor. Infectivity and mortality has also been increased.

ND virus was influenced in high temperature, chlorination, litter, feed, fecal contamination etc.. Especially, hard water, salty water and iron contaminated water were affected on vaccine activity^{1,2)}.

Since Calnek et al³⁾ reported that drinking water vaccination against avian encephalomyelitis, many poultry flocks has been used by drinking water vaccine. However, when antibody level of chicks vaccinated with drinking water was monitored in commercial poultry flocks by our institution, it was not elevated in our experimental laboratory. Therefore, we thought that the method of vaccination was not compatible in poultry field. Spalatin et al⁴⁾ reported that food and water deprivation prior to vaccination was influenced on antibody level against ND virus. This experiment was only conducted from five to seven weeks. Broiler chicks were only raised for five weeks in this country.

Thus, this study was conducted to stimulate high antibody level against ND virus by fasting without water before or after vaccination. Vaccine dilution water with 0.5% skim milk to preserve the vaccine activity were tested against harmful agents through antibody titer of chicks vaccinated with drinking water vaccine.

Materials and Methods

Feeding trial

Three hundred of one day old chicks(Cobb × Cobb) were grouped into five groups with three replications for 5 weeks. Commercial diet were fed to all chicks. Water and light were provided for 24 hours. Weight gain, feed intake and feed conversion were weekly measured for 5 weeks.

Preparation of vaccine

The LaSota strain for water vaccine was purchased from Co. Green Cross. In the control to treatment 3(G3) chicks, the vaccine strain was diluted in 3,000 ml D.W., respectively. In the group 4(G4) to group 5 (G5) chicks, the vaccine strain was diluted in 3,000ml D.W. adding 0.5% skim milk, respectively.

Vaccine administration

ND vaccine were sprayed at 1-day-old broiler chicks, obtained from a commercial hatchery in Iksan. Secondary and third vaccination was conducted at two weeks old and twenty four days old chicks by LaSota strain. Control was conventionally vaccinated without withdrawing the food and water before or after vaccination. In group 2(G2) and 3(G3), LaSota was vaccinated to chicks before and after fasting the food and water for 3 and 2 hours, respectively. Group 4(G4) has the same fasting time of group 2, but supplemented the skim milk in vaccine dilution water. In group 5(G5), skim milk was added into group 3(G3).

Hemagglutination inhibition(HI) test

Blood was collected from wing vein at 22 and 35 days of age and then incubated at

4°C for 20 hours. Sera was centrifuged at 2,000 rpm for 10 min and then treated at 5 6°C for half of hour. HI test was perform as described to Allen et al⁵⁾.

Statistical analysis

All data was analyzed by SAS(1994)

Results

Weight gain, feed intake and feed conversion

The average weight gain, feed intake and feed conversion of all groups were not significantly different. Weight gain of each groups was 1910.30(Control), 1875.28(G2), 1952.88(G3), 1859.12(G4) and 1896.05(G5), respectively. Feed intake of all treatments was recorded at 3160.67(Control), 3167.07 (G2), 3189.48(G3), 3157.85(G4) and 3178.16 (G5), respectively. The feed conversion of each groups was 1.655(Control), 1.688(G2), 1.633(G3), 1.699(G4) and 1.676(G5), respectively.

Antibody level

The HI titer of control was 4.13 ± 1.92 and higher than the other treatments($p < 0.05$) (G

2 : 3.10 ± 1.93 , G3 : 2.80 ± 1.49 , G4 : 2.85 ± 2.08 , G5 : 4.00 ± 1.57) at 22 days old. At 14 days old, chicks which has been fasting and without feed before or after vaccination, did not stimulated in antibody level, because they did not intake vaccine. however, The chicks of control were active and continuously intake vaccine. This result indicated that this method did not adapt young chicks(less 14 days old).

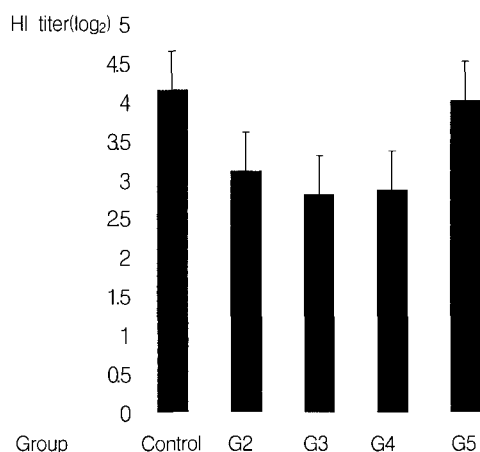


Fig 1. Antibody level of chicks sera vaccinated with secondary drinking water vaccine.

Table 1. The weight gain, feed intake, feed conversion of all groups on performance of broiler chicks

Groups	Weight gain			Feed intake			Feed conversion		
	3 wks	5 wks	Total	3 wks	5 wks	Total	3 wks	5 wks	Total
Control	836.61	1073.69	1910.30	1158.42	2002.25	3160.67	1.385	1.865	1.655
G2	818.61	1057.68	1875.28	1170.61	1996.46	3167.07	1.379	1.888	1.688
G3	853.28	1099.60	1952.88	1176.78	2012.70	3189.48	1.379	1.830	1.633
G4	818.38	1040.73	1859.12	1154.75	2003.10	3157.85	1.411	1.925	1.699
G5	831.50	1064.54	1896.05	1163.19	2014.97	3178.16	1.399	1.893	1.676
Mean	831.68	1067.25	1898.93	1164.75	2005.89	3170.64	1.877	1.877	1.557
PSE	6.10	10.39	15.28	9.68	13.77	21.66	0.012	0.012	0.008
Probability	0.37	0.53	0.38	0.96	0.99	0.99	0.220	0.220	0.157

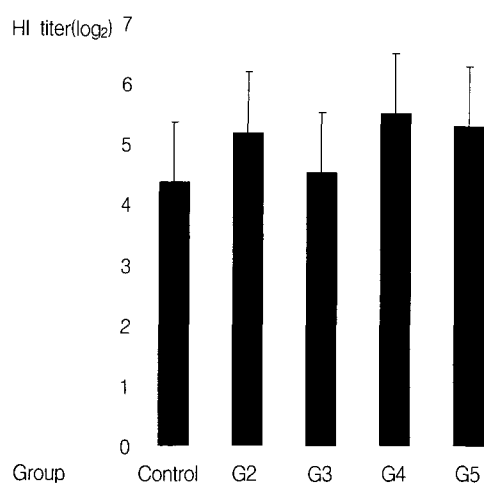


Fig 2. Antibody level of chicks sera vaccinated with third drinking water vaccine.

The HI titer of G4 was 5.50 ± 1.40 and significantly higher than the other groups ($p < 0.05$) (Control : 4.36 ± 1.87 , G2 : 5.18 ± 2.14 , G3 : 4.51 ± 2.19 , G5 : 5.28 ± 1.58) at 34 days old. All groups chicks took vaccine within 20 min, sprightly.

Discussion

When suspended in drinking water, the most diluted preparation of virus (1:10,000) lost titer more rapidly (10^4 to 10^1 in 6 hours). To successful oral vaccination, chicks administrated take a vaccine for short term and also a much of vaccine. The results of this experiment indicated that 1) two or three hours of fasting time before or after vaccination would not be influence on weight gain, feed intake, and feed conversion. 2) and that two or three hours of fasting time before or after vaccination would be able to show the higher antibody level against ND

virus at 34 days old. 3) However, less 15 days old chicks did not adapt this method. 4) One time of one dose were more effective than two times of one dose, 5) and also it was more effective to add 0.5% skim milk in diluted water.

Acknowledgement

This study was financially supported in part by a research grant from Bio-Safety research institute, Chonbuk National University in 2001 (CNU-BSRI No. 2001-04).

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