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Serum Proteinogram of Chinese Goose (*Anser cygnoides*) Vaccinated or Not Against Newcastle Disease

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Abstract: The blood proteinogram was investigated in Chinese geese vaccinated or not against Newcastle disease, using Ulster 2C, B1 and LaSota strains. Total serum protein, globulins and albumin/globulin ratio showed no significant differences between birds vaccinated or not against Newcastle disease. Albumin concentration was significantly lower in 42 day-old Chinese geese vaccinated with LaSota strain.

Key words: Chinese goose, newcastle disease, total serum protein, albumin, LaSota strain

INTRODUCTION

The Chinese goose (*Anser cygnoides*, Linnaeus, 1758, Anseriformes: *Anatidae*) is a large sized domesticated breed of geese. A large number of breeds have been selected in captivity and are thought to have been domesticated in China about three thousand years ago. They provide protein and also a large amount of fat and feather for use in garment and household linen industries and its commercial production is extensively distributed in several countries around the world (Buckland and Guy, 2002).

Protein is the most abundant component of plasma. However, this large mass of protein consists of many different individual protein molecules (Eckersall, 2008). Blood proteins are important complementary constituents in the diagnosis of gastrointestinal, hepatic, renal or infectious diseases. Determination of these proteins seldom leads to a specific diagnosis but will help to evaluate the nature, severity, and progress of a disease (Lumeij, 2008). Moreover, there are only a few experimental studies that interpret bird's proteins responses after antigen exposition and immune stimulation. Thus, the objective of the present study was to evaluate the blood proteinogram in Chinese goose vaccinated or not against Newcastle disease.

MATERIALS AND METHODS

Thirty-six (seven to 49 day-old) Chinese geese were distributed in a completely randomized experimental design into four different treatments of nine birds each. Birds were designated to treatments, according to vaccination strain as G1 (Ulster 2C), G2 (B1), G3 (LaSota) and to treatment G4 (control group-not vaccinated). Commercial live NDV vaccines (Ulster 2C, B1 and LaSota) were administered to each experimental group, as described by Paulillo *et al.* (1996). Chinese geese were housed in box over litter keeping distance between the groups, receiving water and food *ad libitum*. The feed was formulated with corn and soybean according to NRC (1994) recommendations.

Birds were vaccinated at seven days of age and revaccinated at 21 days of age, with the same vaccine strain that was applied in the first vaccination, by eye drop. Blood samples of Chinese goose were collected from seven to 49 days of age, at regular seven day intervals. Aliquots of each blood sample were transferred immediately to a 10-mL plain glass tube containing no anticoagulant for serum protein analyses. Blood samples of the Chinese goose were collected from the jugular and ulnar superficial vein, from these birds on days 07, 21, 28, 35, 42 and 49 for the determination of serum total protein and albumin concentrations, with a semi-automated (spectrophotometer) chemistry analyzer (Labquest®, Labtest®). The globulin value was determined by the difference between serum total protein and albumin. The ratio Albumin/Globulin was calculated (albumin concentration/globulin concentration). Sera samples were submitted to inhibition of Hemagglutination (HI) test, according to Cunningham (1971). The data were analyzed by ANOVA and those with statistical differences were submitted to the Tukey´s test at 0.05%, using Statview® (version 5.0).

Table 1: Mean antibody titres measured by HI test (log_2) of Chinese Goose (*Anser cygnoides*) submitted to different vaccination programs against ND

		Mean antibody titles by HI test (log_2)						
		Chinese goose age (days)						
Group	Vaccine	7	14	21	28	35	42	49
I	Ulster 2C	0.0	0.0	4.0^{a}	3.0^{a}	5.8^{a}	3.0^{a}	3.6^{b}
II	B_1	0.0	0.0	6.0^{b}	3.6^{b}	6.4^{a}	4.0^{a}	2.6^{a}
III	LaSota	0.0	0.0	4.8^{ab}	3.0^{a}	4.2^{a}	3.2^{a}	2.8^{ab}
IV*	-	0.0	0.0	0.0^{c}	0.0^{c}	0.0^{b}	0.0^{b}	0.0^{c}

*Control group-not vaccinated against ND. Means followed by the same letter, in the same column, are not different at 5% of probability by Tukey test (p>0.05)

Table 2: Total serum protein, albumin, globulin and albumin/globulin ratio in 07, 21 and 28 day-old Chinese Goose (*Anser cygnoides*), vaccinated or not against Newcastle disease (Mean±sd)

		Means and e standard-deviation of total serum proteins (Pst) (g/dL), albumin (Alb) (g/dL), globulins (Glo) (g/dL) and A/G ratio											
	Vaccination	Chinese goose age (days)											
	07 days	07				21				28			
	Revacccination												
Groups	21 days	Pst	Alb	Glo	A/G	Pst	Alb	Glo	A/G	Pst	Alb	Glo	A/G
I	Ulster 2C	3.8±	1.5±	2.3±	0.7±	3.8±	1.2±	2.6±	0.5±	4.4±	1.4±	2.9±	0.5±
		0.4^{a}	0.2^{a}	0.5^{a}	0.2^{a}	0.8^{a}	0.8^{a}	0.9^{a}	0.2^{a}	0.0^{a}	0.0^{a}	0.1^{a}	0.0^{a}
II	B_1	4.2±	1.5±	2.7±	0.7±	4.2±	2.1±	2.1±	1.0±	4.2±	1.4±	2.8±	0.5±
		0.9^{a}	0.3^{a}	1.1^{a}	0.4^{a}	0.7^{a}	0.6^{a}	0.5^{a}	0.5^{a}	0.4^{a}	0.1^{a}	0.4^{a}	0.1^{a}
III	LaSota	3.9±	1.2±	2.7±	0.4±	4.3±	1.8±	2.4±	0.8±	4.6±	1.5±	3.1±	0.5±
		0.1^{a}	0.6^{a}	0.1^{a}	0.0^{a}	0.7^{a}	0.3^{a}	0.7^{a}	0.4^{a}	1.0^{a}	0.4^{a}	0.7^{a}	0.1^{a}
IV*	-	4.0±	1.3±	2.7±	0.5±	4.2±	1.8±	2.4±	0.7±	4.4±	1.6±	2.8±	0.6±
(control)		0.5^{a}	0.2^{a}	0.6^{a}	0.2^{a}	0.3^{a}	0.3^{a}	0.4^{a}	0.2^{a}	0.9^{a}	0.4^{a}	0.6^{a}	0.0^{a}

Table 3: Total serum protein, albumin, globulin and albumin/globulin ratio in 35, 42 and 49 day-old Chinese Goose (*Anser cygnoides*), vaccinated or not against Newcastle disease (Mean±sd)

		Means and e standard-deviation of total serum proteins (Pst) (g/dL), albumin (Alb) (g/dL), globulins (Glo) (g/dL) and A/G ratio											
	Vaccination	Chinese goose age (days)											
	07 days	35				42				49			
	Revacccination												
Groups	21 days	Pst	Alb	Glo	A/G	Pst	Alb	Glo	A/G	Pst	Alb	Glo	A/G
I	Ulster 2C	4.6±	1.6±	3.1±	0.5±	4.1±	1.3±	2.8±	0.5±	4.1±	1.2±	2.7±	0.5±
		0.8^{a}	0.4^{a}	0.6^{a}	0.1^{a}	0.3^{a}	0.2^{ab}	0.3^{a}	0.1^{a}	0.3^{a}	0.4^{a}	0.6^{a}	0.3^{a}
II	B1	4.2±	1.4±	2.8±	0.5±	4.1±	1.2±	2.9±	0.4±	4.1±	1.2±	2.9±	0.4±
		0.3^{a}	0.4^{a}	0.4^{a}	0.2^{a}	0.8^{a}	0.3^{ab}	0.6^{a}	0.1^{a}	0.3^{a}	0.7^{a}	0.2^{a}	0.0^{a}
III	LaSota	4.2±	1.4±	2.8±	0.6±	3.9±	1.0±	2.9±	0.4±	4.2±	1.2±	2.9±	0.4±
		0.3^{a}	0.4^{a}	0.4^{a}	0.3^{a}	1.1^{a}	0.3^{b}	0.8^{a}	0.0^{a}	0.4^{a}	0.9^{a}	0.4^{a}	0.1^{a}
IV*	-	4.4±	1.5±	2.9±	0.5±	4.4±	1.5±	2.8±	0.5±	4.2±	1.2±	2.9±	0.4±
(control)		0.4^{a}	0.5^{a}	0.4^{a}	0.2	0.5^{a}	0.3^{a}	0.5^{a}	0.1^{a}	0.6^{a}	0.3^{a}	0.4^{a}	0.1^{a}

RESULTS AND DISCUSSION

Mean antibody titres against NDV from Chinese goose are shown in Table 1. As the control group (G4) was not vaccinated, its antibody titres were null from seven to 49 days of age.

Tables 2 and 3 summarize the blood proteinogram values for Chinese goose, vaccinated or not against Newcastle disease. There were no significant differences (p>0.05) for total serum proteins, globulins and the ratio albumin/globulin between vaccinated and non-vaccinated Chinese goose. However, at 42 days of age, the albumin concentration was significantly lower between Chinese geese vaccinated with LaSota strain and the control group (Table 3). Such fact may suggest that this decrease of albumin concentration was caused by a reduction in food intake due to anorexia in Chinese geese vaccinated with the LaSota strain. This result is compatible with the great diffusion potential of LaSota strain (Winterfield *et al*., 1957). Rivetz *et al*. (1977) found significant differences in total protein concentrations in birds inoculated with a virulent strain of NDV, with a reduction in total protein and albumin concentrations but without any alterations in globulin concentrations. Schmidt *et al*. (2009) also found significant differences in albumin concentration in ring-necked pheasants vaccinated against NDV with LaSota strain at 52 days of

age, but the vaccinated birds had higher albumin concentration then the control group. Talebi (2006) reported significant differences in total protein and albumin concentrations in broiler chickens vaccinated against NDV, infectious bronchitis and infectious bursal disease.

On the other hand, albumin is a negative acute phase protein and the concentration of this protein falls gradually with the reduction in concentration being more noticeable in chronic inflammatory disease (Eckersall, 2008). Thus, it would be necessary to determine the electrophoretic protein profile of these birds, to evaluate this hipoalbuminemia in Chinese geese vaccinated with the LaSota strain. However, according to Eckersall (2008), the interpretation of a fall in serum concentration of this protein is complicated because they are also affected by nutritional status.

Conclusion: Chinese geese showed alterations in albumin concentration suggesting that the blood proteinogram was affected by vaccination against NDV, especially with LaSota strain at 42 days of age.

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