

**AN ELECTROPHORETIC STUDY ON SERUM
PROTEINS IN ARABIAN RACE HORSES
NATURALLY INFECTED WITH Babesia equi**

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SUMMARY

Electrophoretic patterns of serum protein in 12 Arabian race horses acutely infected with *Babesia equi* revealed a significant decrease in albumin ($P < 0.01$) and beta globulins ($P < 0.05$) where, alpha globulins fractions significantly ($P < 0.01$) increased. No significant ($P > 0.05$) changes were recorded in gamma globulins fractions and total serum protein.

INTRODUCTION

Equine piroplasmosis, caused by *Babesia equi* and or *B. Caballi*, is a tick-borne blood disease affecting horses throughout the world. Infection with either agent may produce clinical disease and death. *B. equi* infections are more frequently characterized by higher parasitemias, red cells lysis, and death due to anemia (1). There is paucity of literatures on the electrophoretic pattern of serum protein in *Babesia* infection in different animals, especially in horses. However, Gourlay et al., (2) had been used disc electrophoresis as an aid in the diagnosis of *Babesia rodhaini* in mice.

Changes in serum proteins and leukocyte count were studied in 25 naturally infected cattle with Babesia. The acute phase was accompanied by a hypoproteinemia in 36% of animals, a fall in albumin in 71% and an increase in globulins (3).

Ivanova (4) found a decrease in total serum protein, albumin, gamma globulins and an increase in alpha-globulins in six sheep experimentally infected with *B. ovis*.

The present work was conducted to study the changes in serum protein fractions in Arabian race horses acutely infected with *Babesia equi*.

MATERIALS AND METHODS

The present study was conducted on twelve horses showed clinical signs of babesiosis (Icteric mucous membranes, fever and haemoglobinuria in some of them) and twelve clinically normal horses. Ten mls of blood were collected with and without anti-coagulant (K-EDTA) from the jugular vein of each horse.

Thin blood smears were made using Leishman's stain. *Babesia equi* was noticed in the red blood cells of infected horses and the parasitaemia was ranged from (1- 2%).

Serum was separated by centrifugation at 3000 rpm and stored at - 20°C for later chemical estimations. Total serum protein concentration was estimated using Golderg Refractometer (Refractometer 10400 A, American Optical Scientific Instrument Division, 13 Buffalo, N.Y. 1421).

Serum protein fractions were determined by electrophoresis on cellulose acetate papers using barbitone buffer at PH 8.6 with Ponceau-S stain 0.2% for ten minutes and acetic

acid 5% for washibg (5). The stained clear bands were scanned by seroskop elvi 160, Italy scanner.

The data were analyzed statistically utilizing student's T-test.

RESULTS

Serum protein fractions values were summarized in table 1 and the changes in albumin, globulins fractions were shown in figures 1-6.

The albumin and beta globulins fractions decreased significantly ($P < 0.05$) while the alpha globulins increased significantly ($P < 0.01$). No significant ($P > 0.05$) changes were observed in gamma fractions and total serum protein.

DISCUSSION

Electrophoresis of serum protein in infected horses revealed a decrease in albumin fractions. This decrease was similar to that reported in cattle (3), sheep (4) and calves (6).

The decrease may be due to liver cells damage as massive liver damage was observed in calves experimentally infected with *B. bigemina* (7).

There was a decrease in beta - globulins fractions while Suteu and Giurgea - Iacob (3) reported an increase in these fractions in cattle infected with *Babesia*. This decrease in beta-globulins fractions in horses may be due to a decrease transferrin as it occurs in the acute and chronic inflammatory response, follows a decrease in albumin (8). This decrease also probably due to a reduction in hemopexin - heme binding

protein as it reduces in haemolytic anemia, also low levels usually accompanied by low albumin levels (5).

The increase in the alpha globulins fractions was similar to the recorded in sheep experimentally infected with *B. ovis* (4) and calves experimentally infected with *B. bigemina* (6).

The reduction in gamma globulins fractions was in agreement with that reported in sheep (4) cattle.(3).

The present study revealed that changes in the electrophoretic fractions in horses infected with *Babesia equi* were similar to that reported in other animals.

Furthermore, these changes could be used to evaluated the course of the disease and response of the infected horses to the treatment when these fractions return to the normal limits.

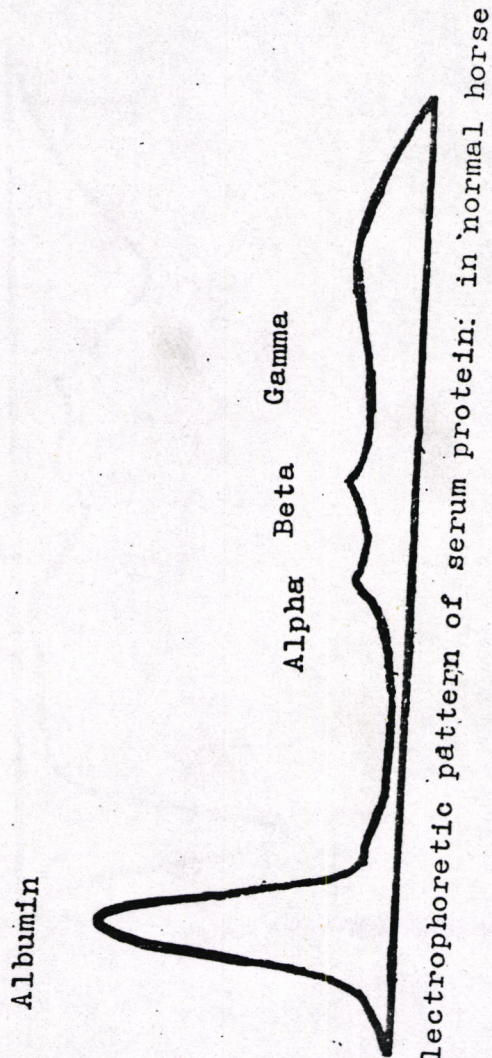


Figure. I Electrophoretic pattern of serum protein: in normal horse

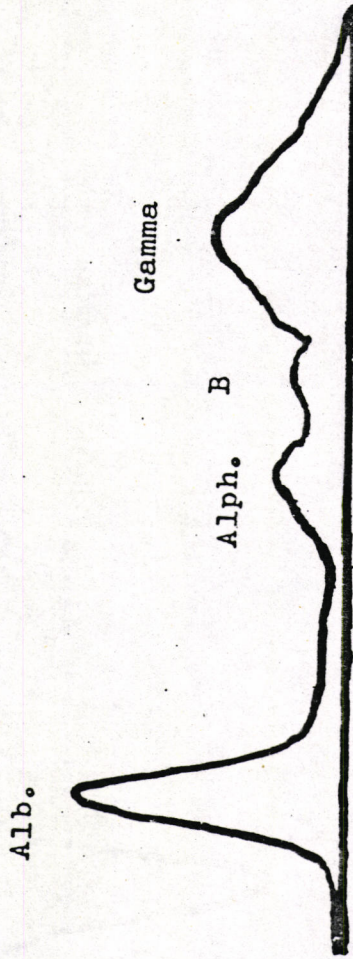


Figure.2 Electrophoretic pattern of serum protein in infected horse No. (8)

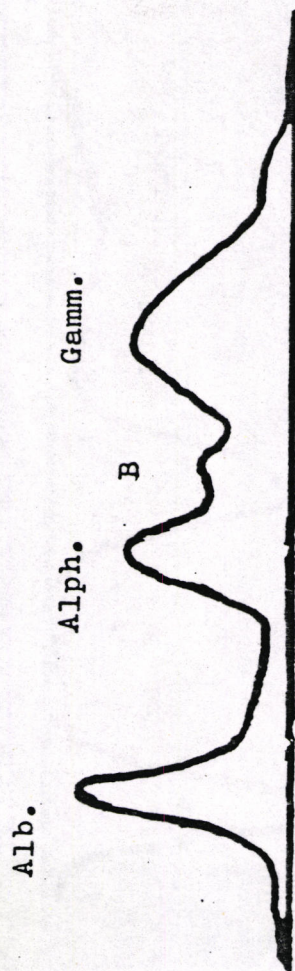


Figure .3 Electrophoretic pattern of serum protein in infected horse No. (12.)

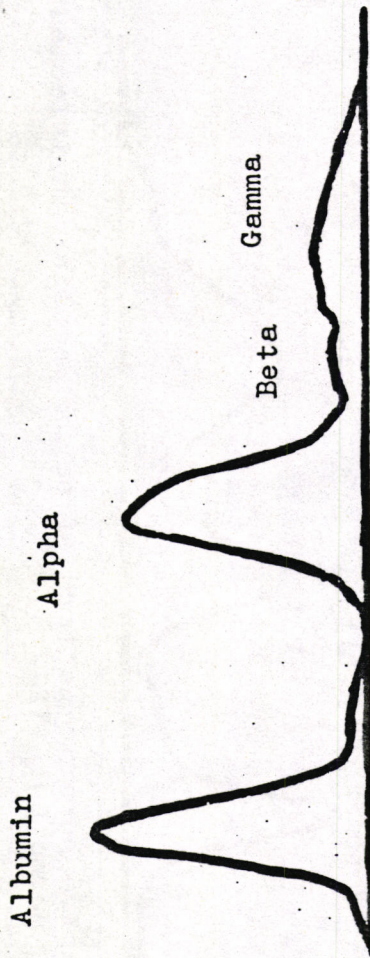


Figure.4 Electrophoretic pattern of serum protein in infected horse No.(3)

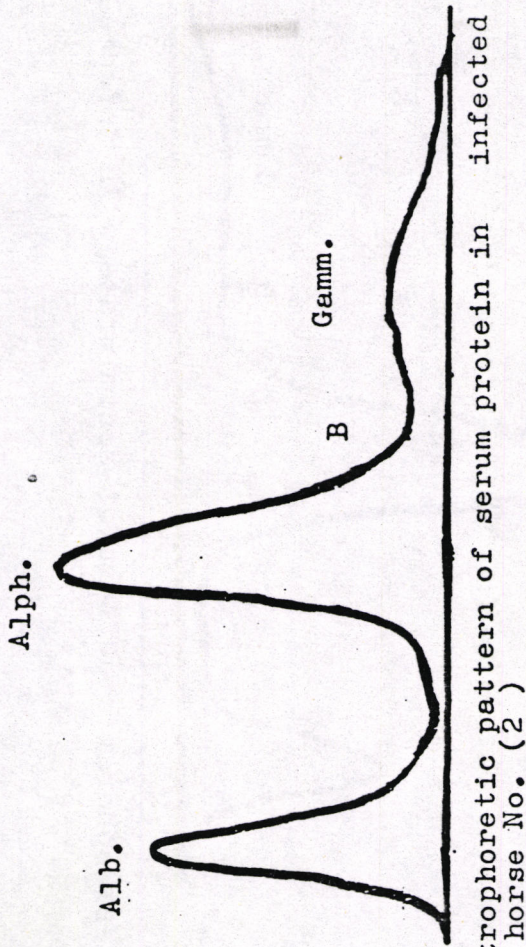


Figure.5 Electrophoretic pattern of serum protein in infected horse No. (2)

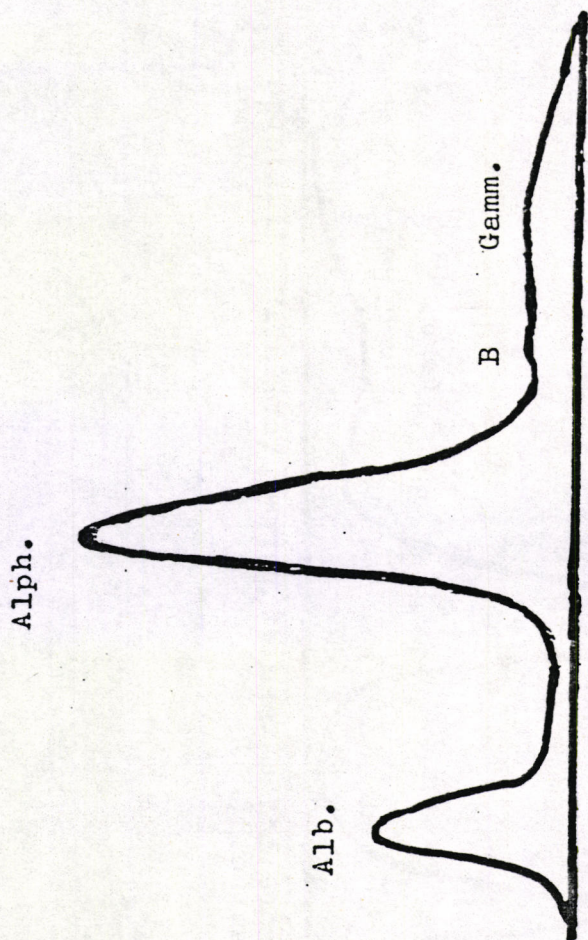


Figure. 6 Electrophoretic pattern of serum protein in infected horse No. (7)

Table 1 : Serum protein fractions and total serum protein values (gm/dl) in infected and normal horses Mean \pm SE.

Animal no.	Total serum protein		Albumin				Alpha		Beta		Gamma	
	Infec.	Contr.	Infec.	Contr.	Infec.	Contr.	Infec.	Contr.	Infec.	Contr.	Infec.	Contr.
1.	6.9	7.4	2.57	2.88	1.65	1.51	0.66	1.62	2.01	1.38		
2.	9.5	8.3	2.77	2.77	5.3	3.22	0.4	1.25	1.0	1.0		
3.	7.0	9.0	2.5	3.97	3.0	2.69	0.54	0.66	0.96	1.65		
4.	9.5	9.3	3.68	2.94	1.06	2.8	1.45	1.28	3.3	2.23		
5.	7.5	8.2	2.12	2.77	4.1	1.12	0.57	1.27	0.69	3.0		
6.	6.8	8.3	2.55	3.6	1.36	1.89	0.72	0.42	2.17	3.0		
7.	8.2	8.0	1.6	5.17	5.4	1.43	0.29	0.35	0.9	2.17		
8.	7.0	9.2	2.35	5.22	1.08	0.69	0.53	0.69	3.01	2.58		
9.	9.2	7.6	3.53	3.5	4.0	1.39	0.51	0.46	1.16	1.82		
10.	9.2	9.0	3.22	4.26	4.38	1.18	1.11	0.97	0.48	2.57		
11.	9.0	7.4	2.33	2.99	2.3	0.46	0.7	0.75	3.66	3.17		
12.	9.0	9.2	2.34	2.62	2.2	1.18	0.66	1.48	3.79	3.92		
M \pm SE	8.23 \pm 0.20	8.40 \pm 0.20	**2.63 \pm 0.17	3.55 \pm 0.26	**2.98 \pm 0.46	1.63 \pm 0.24	*0.67 \pm 0.08	0.93 \pm 0.12	1.92 \pm 0.35	2.37 \pm 0.23		

* P < 0.05
 ** P < 0.01

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دراسة في الترحيل الكهربائي لبروتينات مصل الدم في خيول السباق العربية المخمجة طبيعيا بطفلي بابيزيا الخيول

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العراق

الخلاصة

أظهرت نتائج الترحيل الكهربائي لبروتينات مصل الدم في اثني عشر حصانا من خيول السباق العربية والمخمجة طبيعيا بطفلي بابيزيا الخيول بان هناك انخفاضا ملحوظا في ألبومين مصل الدم وكلوبيولينات بيتا ($P < 0.05$) ($P < 0.01$) على التوالي. بينما لوحظ زيادة ذات مغزى إحصائي ($P < 0.01$) في كلوبيولينات الألفا. لم تلاحظ تغيرات معنوية ($P < 0.05$) في كلوبيولينات من نوع كاما وبروتين مصل الدم الكلي