

## AN ELECTROPHORETIC STUDY ON SERUM PROTEINS IN NORMAL ARABIAN RACE HORSES

A. Sh. Sultan and A.K.A.AL-Delaimi

Departement of Medicine and Therapeutics , College of Vet. Medicine ,  
University of Baghdad . Baghdad , Iraq.

### SUMMARY

Electrophoretic Pattern of Serum proteins were studied in thirty normal Arabian race horses . The resolution of the serum protein fractions in 24 (80%) of horses , group I revealed five fractions , albumin and the globulins (  $\alpha_1$ ,  $\alpha_2$  ,  $\beta$  and  $\gamma$  ) . The total serum protein was ranged from ( 6.2-8.4 gm/dL ) with mean (7.57  $\pm$  0.17) in the this group of horses .

Where-as four fractions , albumin and the globulins (  $\alpha_2$  ,  $\beta$  and  $\gamma$  ) were observed in 6(20%) of horses , group 2 .

The total serum protein was ranged from (6.0 - 7.4 gm/dL) with mean (6.76  $\pm$  0.27) in that group of horses .

The Albumin/Globulin ratio in both Groups was (0.66  $\pm$  0.13) ; (0.89  $\pm$  0.07) , respectively .

### INTRODUCTION

The fluid portion of blood is termed plasma and contains approximately 93% water .

The solid components of the plasma comprise proteins , lipids , carbohydrates and salts (1) .

Fractionation of plasma protein has two purposes :

- 1) Isolate certain plasma components , clarifying the characteristics and functions of these components .

2) To aid diagnosis and therapy in the field of clinical medicine (2) .

The choice of cellulose acetate papers in electrophoretic pattern given good resolution for serum components that separated normally into five fractions , albumin and the globulins (  $\alpha_1$ ,  $\alpha_2$  ,  $\beta$  and  $\gamma$  ) ( 3) .

The relative proportion of these components differs among different species and in various pathological conditions (1).

The present work was conducted to study the normal serum protein fractions in clinically normal Arabian race horses.

### MATERIALS AND METHODS

The present study was conducted on thirty clinically normal Arabian race horses ; their ages ranged from 3 - 5 years at Al-Furusiya club in Baghdad province.

Ten mls of blood samples without anticoagulant were collected from the jugular vein of each horse , and the serum was separated by centrifugation at 3000 rpm for ten minutes and stored at - 20°C for chemical estimations .

Total serum protein concentration was estimated using Goldberg Refractometer.

Serum protein fractions were obtained on cellulose acetate papers using shandon appratus with barbital buffer at PH 8.6 , ponceau-s stain 0.2 % was used ten minutes and acetic acid 5% for washing (5) .

The stained clear bands were scanned by seroskop (elvi 160 , Italy scanner ) .

### RESULTS

Serum protein fractions and the total serum protein values are summarized in table 1.

Five protein fractions albumin and the globulins ( $\alpha_1$ ,  $\alpha_2$ ,  $\beta$  and  $\gamma$ ) were seen in the group 1 (Figure 1).

The total serum protein was ranged from (6.2 - 8.4 gm/dL) with mean ( $7.57 \pm 0.17$ ).

Where as four serum protein fractions were detected in the group 2 : albumin and globulins ( $\alpha_2$ ,  $\beta$  and  $\gamma$ ), figure 2.

The total serum protein was ranged from (6.0 - 7.4 gm/dL) with mean ( $6.76 \pm 0.27$ ).

The Albumin / Globulin ratio in both groups of horses was ( $0.66 \pm 0.13$ ); ( $0.89 \pm 0.07$ ), respectively.

## DISCUSSION

The resolution of the serum protein fractions in group 1 of horses into five fractions was in agreement with that reported in 101 clinically normal Arabian horses (6) and that reported by (7 and 8).

The separation of beta globulins into beta -1 and beta -2 was not seen in these horses. Matrin Otero et al., (9), also, reported that beta globulins resolved into beta -1 and beta -2 in only 19% of 100 clinically healthy horses. Where as schalm et al., (10) stated that horses serum is resolved into two alpha, two beta and gamma globulin fractions.

The presence of four fractions ; albumin and the globulins ( $\alpha_2$ ,  $\beta$  and  $\gamma$ ) in the group 2, with the absence of alpha 1 zone may be due to " shoulder " which is sometimes found on the alpha side of albumin that lowers it's amount (11).

The total serum proteins in both groups were similar to that reported in sixty Arabian race horses (12).

The present work revealed that the resolution of serum proteins into five fractions was in agreement with most studies among different workers.

Furthermore, Values could be influenced by health status and environment of the horses (11, 13 and 14).

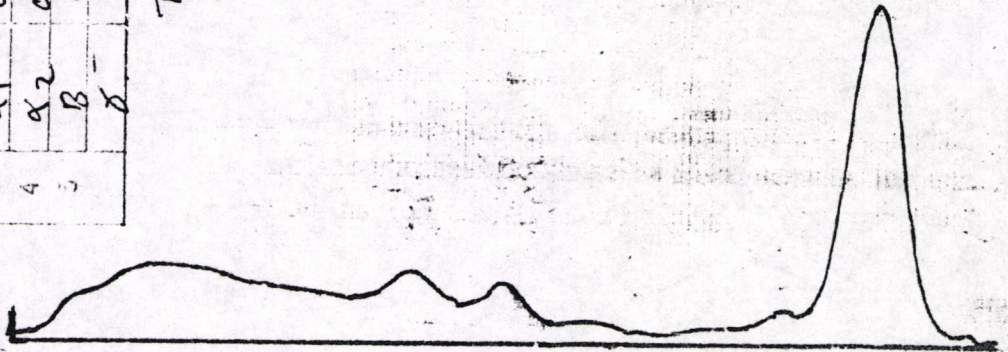
Table 1 : Mean protein values (gm/dL  $\pm$  SE) of normal Arabian race horses .

Parameters	No. of Horses	
	Group 1 (24)	Group 2 (6)
Total serum protein	7.57 $\pm$ 0.17	6.76 $\pm$ 0.27
Albumin	2.9 $\pm$ 0.39	3.13 $\pm$ 0.08
globulins		
Alpha1	0.64 $\pm$ 0.08	-----
Alpha2	0.85 $\pm$ 0.07	0.52 $\pm$ 0.04
Beta	0.95 $\pm$ 0.08	0.67 $\pm$ 0.03
Gamma	1.99 $\pm$ 0.02	2.42 $\pm$ 0.29
A/G ratio	0.66 $\pm$ 0.13	0.89 $\pm$ 0.07

2	AI	2.6
3	$\alpha_1$	0.38
4	$\alpha_2$	0.48
5	B	0.71
	$\delta$	2.52

T. S. P 6.2

38 elvi-proteo densitometer



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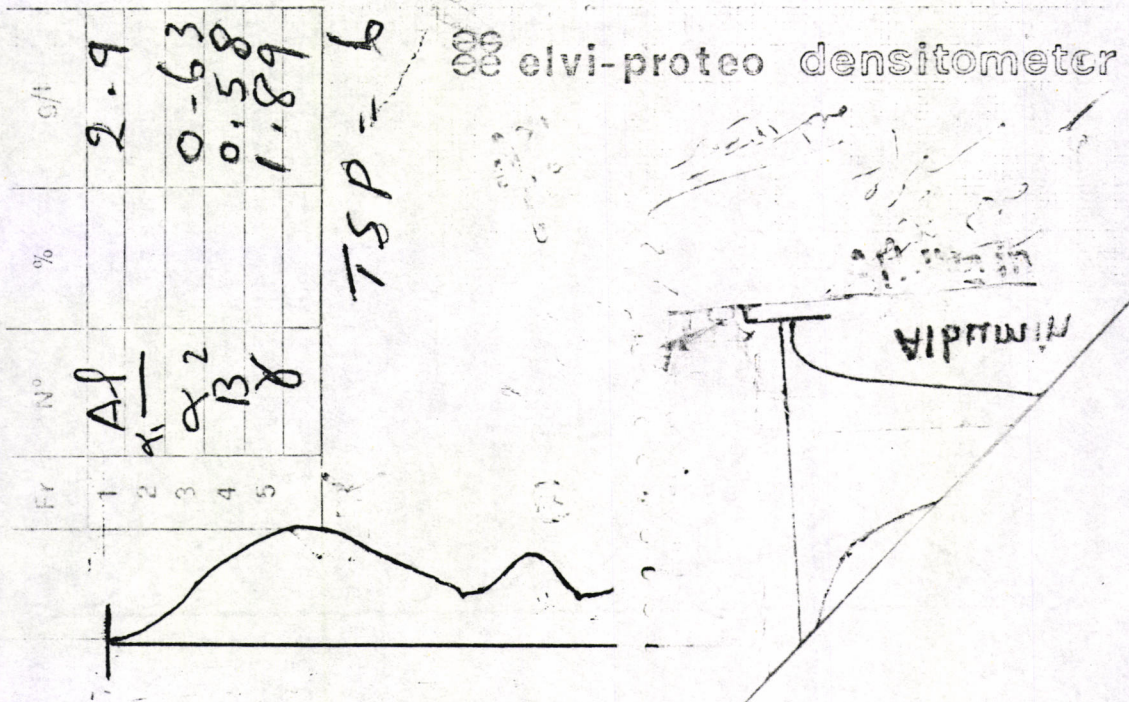


Figure 2 : An electrophoretic pattern of serum proteins in normal Arabian race horses showing four fractions albumin and the globulins ( $\alpha_2$ -alpha 2 ,  $\beta$ -beta and  $\gamma$ -gamma).

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دراسة في الهجرة الكهربائية لبروتينات مصل الدم في خيول السباق العربية الطبيعية.

علي شلفن سلطان و عبد الكريم احمد الدليمي

قسم الطب والعلاج ، كلية الطب البيطري ، جامعة بغداد ، بغداد /العراق.

الخلاصة :

لقد درست الهجرة الكهربائية لانماط (اشكال) بروتينات مصل الدم على ثلاثين حصانا طبيعيا من خيول السباق العربية .

اظهر التحليل لاجزاء بروتينات المصل في 24 (80%) من الخيول ، المجموعة الاولى ، خمسة اجزاء هي الالبومين والكلويولينات ( الالف 1 ، الالف 2 ، بيتا والكاما ) .

تراوح مجموع بروتين المصل من (6.2-8.4 غم / 100 مليلتر) مع المعدل (  $7.57 \pm 0.17$  ) في هذه المجموعة من الخيول .

بينما لوحظت اربعة اجزاء من البروتينات ، الالبومين والكلويولينات ( الالف 2 ، بيتا و الكاما ) في 6 (26%) من الخيول ، المجموعة الثانية .

تراوح مجموع بروتين المصل من (6-7.4 غم/100 مليلتر) مع المعدل (  $6.76 \pm 0.27$  ) في هذه المجموعة من الخيول .

كانت نسبة الالبومين / الكلويولين في كلا المجموعتين هي (  $0.13 \pm 0.66$  ) ، (  $0.07 \pm 0.89$  ) على التوالي .