



Electrophoretic profile of serum proteins from Dromedary camels

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ABSTRACT

Electrophoretic pattern of serum protein and dialysed serum protein profiles were studied from apparently healthy camels on 10 and 15% SDS-PAGE in addition to total protein and immunoglobulin content. The electrophoretic pattern of camel serum protein revealed 7 prominent bands of molecular weights ranging from 28.21 kDa to 123.07 kDa on 10% SDS-PAGE and dialysed serum protein revealed 4 prominent bands of molecular weights ranging from 24.30 kDa to 110.87 kDa. The electrophoretic pattern of camel serum protein on 15% SDS PAGE revealed 8 prominent bands of molecular weights ranging from 0.005 to 121.04 kDa along with 5 bands of dialysed serum protein. There are about 7 lower molecular weight bands which may be of prealbumin and other lower molecular weights of proteins. The lower molecular weight bands may be of prealbumin. The band with higher molecular weight may be of different globulin fractions including immunoglobulins. Total protein and immunoglobulin content were low in present study suggesting that it is due to very hot temperature and limited grazing facility during summer.

Key words: Camel, Electrophoretic pattern, Immunoglobulin SDS-PAGE, Serum protein

The camel possesses many unique physiological characteristics, which make it different to other livestock species in the arid and semiarid desert ecosystem. Much of the research carried out on the blood chemistry of the camel has taken place in India, Egypt and Sudan, and to a lesser extent in Israel. Most of the results appear to be contradictory, the anomalies perhaps arising from different methods of analysis and the difficulties of reproducing the same conditions in exactly the same way. Some of the differences can be explained by seasonal and nutritional factors and by the effects of sex and the *rut* but many anomalies are unexplained (Al-Busadah 2007). The present study was designed to investigate serum protein and dialysed serum protein profile of dromedary camels on 10 and 15% SDS-PAGE in addition to some blood parameters: total protein and immunoglobulin.

MATERIALS AND METHODS

The present study was conducted at National Research Centre on Camel, Bikaner. The serum was obtained from apparently healthy dromedary camels maintained at the National Research Centre on Camel, Bikaner. The blood was collected from jugular vein and later serum was separated. The serum samples were also dialysed for about 4 h against 0.067M sodium phosphate buffer, pH 7.4. The

serum protein and dialysed samples were subjected to SDS-PAGE using 10 and 15% separating gel concentrations as per Laemmli (1970). The protein weight markers (19.4 to 94 kDa) were also electrophoresed along with protein mixture. The mobility of the respective bands of different lanes was calculated as per Weber and Osborn (1969). The total protein in serum samples was estimated spectrophotometrically using commercial kit. Serum immunoglobulins were estimated by modified zinc sulphate turbidity test (BgVV/GTZ 1994)

RESULT AND DISCUSSION

Electrophoretic pattern of serum proteins in camel was investigated by some workers (Khadjeh, 1998 and Nazifi *et al.*, 2001, El-Bahrawy and El Hassanein 2011). Khadjeh (1998) studied electrophoretic pattern of serum proteins in the Iranian one humped camel by cellulose acetate electrophoresis which revealed 5 protein bands, viz. albumin, α_1 , α_2 , β , and γ globulins. Purohit *et al.* (1981) revealed 6 protein bands, viz. albumin, α_1 , α_2 , β , γ_1 , γ_2 globulins. In present study 7 prominent bands with molecular weights ranging from 28.21 kDa to 123.07 kDa were observed. The molecular weight equal to 63.7 kDa may be of serum albumin. Nazifi *et al.* (2001) suggested that the most obvious protein of camel serum was of molecular weight 63 kDa. The higher molecular weight of 123.07 kDa may be of immunoglobulins (Table 1). In fractionation of serum protein globulins was not depicted clear since it requires a gradient gel electrophoresis and further purification of the serum. The molecular weight up to around 28 kDa was noticed in 10% SDS PAGE. Whereas

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Table 1. Mobility with their respective molecular weights of serum protein samples on 10% and 15% SDS-PAGE

Band	On 10% SDS-PAGE		On 15% SDS-PAGE	
	Mobility	Molecular weight (kDa)	Mobility	Molecular weight (kDa)
1.	0.09	123.07	0.05	121.04
2.	0.13	116.29	0.46	20.46
3.	0.2	105.48	0.48	19.26
4.	0.33	84.40	0.53	15.67
5.	0.46	63.70	0.56	13.28
6.	0.63	43.27	0.60	10.92
7.	0.78	28.21	0.66	6.41
8.	—	—	0.78	0.005

Table 2. Mobility with their respective molecular weights of dialysed serum protein samples on 10% and 15% SDS-PAGE

Band	On 10% SDS-PAGE		On 15% SDS-PAGE	
	Mobility	Molecular weight (kDa) 15%	Mobility	Molecular weight (kDa) 10%
1.	0.16	110.87	0.14	108.87
2.	0.33	84.40	0.33	84.40
3.	0.56	51.33	0.56	13.28
4.	0.83	24.30	0.60	10.92
5.	—	—	0.72	0.009

in the dialysed samples a prominent band from 110.87 to 84.40 kDa was seen in which may be of immunoglobulins (Table 2). There were also faint bands of molecular weights around 24 kDa. Eight prominent bands with molecular weights ranging from 0.005 kDa to 121.04 kDa were noticed in the camel serum protein which was run on 15% SDS-PAGE (Table 1). The higher molecular weight may be of immunoglobulins and 5 bands of dialysed serum protein were observed and ranged between 0.14 and 0.72 KDa (Table 2). Ungar *et al.* (1987) mentioned that camel serum contains a complex Ig G- like protein associated with an additional molecule of approximately 100 kDa. Upon reduction of the disulfide bonds the complex dissociates into 3 protein bands corresponding to gamma and L- like chains and a protein band have an average molecular weight of about 40,000 Da which is specific for dromedary species. The molecular weights below 20 kDa which were not noticed in 10% SDS-PAGE were observed in 15% SDS-PAGE. There are about 7 bands, which are of low molecular weight proteins.

Total protein was in the range of other results reported earlier (Patodkar *et al.* 2010, El- Bahrawy and El Hassanein 2011), for all the serum samples the total protein was estimated between 6.7 and 7.2 g/dl and the immunoglobulin content revealed 16 to 18 mg/ml. Roy and Sharma (1991) reported that Ig levels in adult female camels above 3 years of age with suckling calves up to 1 month of age was 26.62 ± 2.91 mg/ml (mean $\pm$ SE). Kataria and Kataria (2004) observed a mean Ig content of 2.43 and 2.86 g/dl in dromedary camels in moderate and hot climates,

respectively. Sena *et al.* (2011) conducted a clinical trial to study the effect of herbal immunomodulator during summer stress among 10 camel calves of 5–6 months age and observed immunoglobulin and suggested that the reduction in bodyweight and immunoglobulin was might be due to stressful hot climate in summers.

In conclusion, differences were observed in electrophoretic patterns of serum protein on 2 different gel concentration because of difference in molecular mass and restrain resulted due to concentration of gel. Total protein and immunoglobulin content observed low in present study suggested that it is due to very hot temperature and limited grazing facility during Summer.

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