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Comparative study of seminal plasma proteins in dromedary camels

GORAKH MAL[1], SUMANT VYAS[2] and N V PATIL[3]

National Research Centre on Camel, Bikaner, Rajasthan 334 001 India

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ABSTRACT

Semen ejaculates (30) were obtained from 5 Jaisalmeri camels. Fresh semen samples were centrifuged at 6,000 rpm for 30 min and clear supernatant of seminal plasma was separated and stored at –20°C until used. Total protein from the seminal plasma was estimated and the molecular weight was analysed. The total protein concentration was between 2.28–2.59 g/dl in the seminal plasma. In the seminal plasma of 4 camels, 11 protein bands were observed ranging from 11.7–104.0 kDa, whereas, 9 protein bands were observed in the seminal plasma of 1 camel. The present study showed similar seminal plasma protein profile in Jaisalmeri camels except 2 protein fractions of 40kDa and 12.9kDa were expressed in 4 camels and not in 1 camel. It can be concluded that at least 9 protein fractions were in common between these camels.

Key words: Jaisalmeri camel, Seminal plasma protein, SDS-PAGE, Total protein

Seminal plasma proteins are involved in the regulation of osmotic pressure and pH of the seminal plasma, transport of ions, lipids and hormones (Kulkarni 2003) and play an important role in extending the life of spermatozoa (El-Naggar and Abdel-Raouf 1977). Fertility-associated proteins were found in the seminal plasma of many species including dairy bulls and stallions. Killian *et al.* (1993) identified 4 fertility-associated proteins in bovine seminal plasma that appear to be of value in predicting small differences in relative fertility among bulls. The seminal plasma appears to be an essential component in natural mating because it serves as a carrier and protector of the spermatozoa (Hafez 1993). Very little is known about the proteins present in camel seminal plasma and the role of these proteins in reproductive physiology. Therefore, the objective of the present study was to ascertain the protein profile of Jaisalmeri camel's seminal plasma using SDS-PAGE technologies.

MATERIALS AND METHODS

Semen collection and seminal plasma separation: The study was conducted on 5 adult single humped male camels of Jaisalmeri breed belonging to the National Research Centre on Camel, Bikaner. The animals were apparently healthy and were maintained under uniform standard conditions of feeding and management. Semen samples were collected twice a week during rutting season as described previously (Vyas *et al.* 1998). After collection of samples a cocktail of protease inhibitors was added and seminal plasma was harvested according to Mal *et al.* (2011).

Total protein estimation in seminal plasma: Total protein was estimated in seminal plasma samples so that an equivalent amount of protein could be used for gel preparation. Protein concentrations from each seminal plasma sample were estimated as per Lowry *et al.* (1951).

Molecular weight determination: SDS-polyacrylamide-gel electrophoresis of seminal plasma proteins was carried out under identical experimental conditions (Laemmli 1970) using 15% polyacrylamide gel. Test samples were compared with medium range molecular weight markers run on the gel simultaneously. All other chemicals used were of analytical grade and were obtained commercially.

RESULTS AND DISCUSSION

Electrophoretic profiles of the seminal plasma proteins: Eleven protein bands of different intensities were observed in the range of 11.7–104.0 kDa in the seminal plasma of four camels (Fig.1, lanes 2–4). Nine protein bands were observed in the seminal plasma of one camel (Fig.1, lane 5). Protein bands of around 40.0 kDa and 12.9 kDa with very strong intensity were observed in 4 camels (Table 1). This clearly indicated that seminal protein profiles vary from animal to animal. The total protein bands observed in the seminal plasma in the present study supported the earlier findings reported by El-Naggar and Abdel-Raouf (1977). These workers reported 10–14 protein fractions with 3–4 major

Present address: [1]Principal Scientist (gorakh14@yahoo.com), Indian Veterinary Research Institute, Regional Station, Palampur, Himachal Pradesh. [2]Principal Scientist (sumantv@scientist.com), [3]Director (nvpatil61@gmail.com).

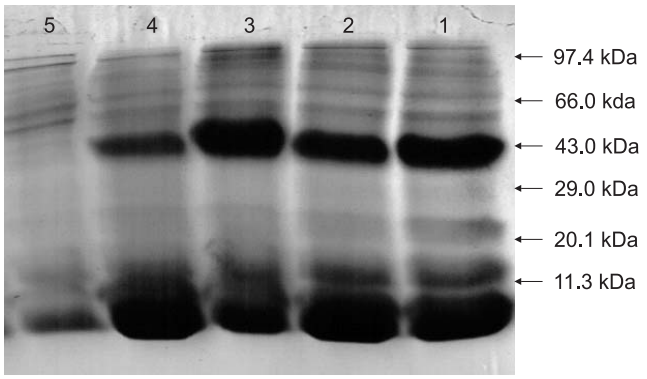

Fig. 1. Comparative seminal plasma protein profiles of 5 Jaisalmeri camels.

Table 1. A comparison of molecular weights (kDa) of the seminal plasma proteins of 5 Jaisalmeri camels

Camel 1	Camel 2	Camel 3	Camel 4	Camel 5
104.0	104.0	104.0	104.0	104.0
88.1	88.1	88.1	88.1	88.1
81.6	81.6	81.6	81.6	81.6
70.8	70.8	70.8	70.8	70.8
65.1	65.1	65.1	65.1	65.1
40.0	40.0	40.0	40.0	Not present
28.0	28.0	28.0	28.0	28.0
23.0	23.0	23.0	23.0	23.0
17.4	17.4	17.4	17.4	17.4
12.9	12.9	12.9	12.9	Not present
11.7	11.7	11.7	11.7	11.7

components in the camel seminal plasma. But our study showed 9–11 protein fractions with 2–4 major components in addition to the minor fractions. It is remarkable to notice that the camel seminal plasma proteins varied in its electrophoretic behaviour. There are patterns with only 10 fractions, while others showed 14 fractions, but the majority of patterns showed 12 fractions (El-Naggar and Abdel-Raouf 1977). One of the possible reasons for differential expression of protein profiles may be due to variable levels of fertility, as reported in human and other animal species that protein expressions could be correlated to fertility indices (Killian *et al.* 1993, Brandon *et al.* 1999). Adams and Ratto (2013) reported seminal plasma proteins of molecular mass of approximately equal or higher than 30 kDa and 14.0 kDa could act as ovulation inducing factors in llama camels.

The present study showed similar seminal plasma protein profile in Jaisalmeri camels except 2 protein fractions of 40 kDa and 12.9 kDa were expressed in 4 camels and not in 1 camel. Proteins found in our study are of the size which is similar to those found in llama camels (Adams and Ratto 2013) and suggested that the ovulation inducing factors may exist in the dromedary semen and these proteins must be characterized. Further research work could be undertaken to establish the reason for low or no expression of these proteins in the camel semen plasma.

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