

Sodium dodecyl sulphate (SDS)-polyacrylamide gel electrophoresis of seminal plasma proteins in yak

D HAZARIKA¹, D BHATTACHARYA², S SARMA³, K K BARUAH⁴, J SAIKIA⁵ and S DEORI⁶

National Research Centre on Yak, ICAR, Dirang, Arunachal Pradesh 790101 India

Received:31 January 2012 ; Accepted: 25 April 2012

Key words: Protein, SDS-PAGE, Seminal plasma, Yak

The yak is known for its high degree of adaptability to harsh cold climate of high altitude. Seminal plasma proteins are associated with fertility of the bull and are the natural medium for final maturation of spermatozoa through hormonal, enzymatic and surface modifying events. Reports on seminal plasma protein in bovine (Jobim *et al.* 2004), ram (Jobim *et al.* 2005), equine (Jobim, 2011), buffalo bull (Asadpour *et al.* 2007) are available. The compositions of seminal plasma protein are species specific and there is very meagre information about electrophoretic pattern of seminal plasma protein of yak. Therefore, the present study was undertaken to evaluate seminal plasma protein profile of yak to work out an essential index on semen quality hither to its fertility.

Clinically healthy yak bulls (6) maintained under identical and optimal conditions of feeding and management at Nyukmadung yak farm, National Research Center on Yak, ICAR, Dirang, Arunachal Pradesh, India were selected for this study. Semen samples were collected twice weekly using standard artificial vagina. From each animal 6 ejaculates were used for the present study.

The seminal plasma was separated immediately after collection by centrifugation at 3000 g for 15 min. Following centrifugation, the seminal plasma (supernatant) was collected and stored at –20°C till further analysis. Total protein concentration was determined at 280 nm following standard methodology. The molecular weight of various seminal plasma proteins were determined by discontinuous gel electrophoresis using 10% polyacrylamide gel. The gel

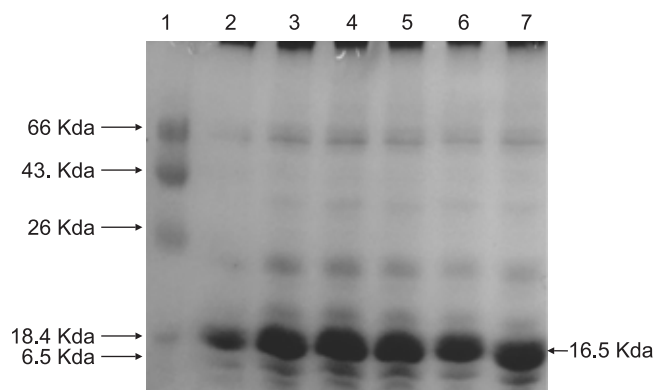


Fig. 1. 10% SDS-PAGE showing protein profile of yak seminal plasma. Lane 1: Marker protein: lane 2-7: seminal plasma samples.

was stained by 0.1% Coomassie brilliant blue.

The seminal mean total protein concentration was 7.82 ± 0.34 g% irrespective of bulls. The present finding was comparable with the earlier report of Kumar *et al.* (1984) for Red Dane $\times$ Jersey $\times$ Murrah bulls. However, differences in respect of total protein content between bulls were observed. Total protein content in seminal plasma is positively correlated with freezability of semen (Gundogan 2006). Low protein content in seminal plasma could reduce the buffering capacity of semen, and in turn, could lower semen quality.

The yak seminal plasma revealed 6 protein bands (Fig.1) and their molecular masses ranged from 6 kDa to 66 kDa. Similar banding patterns were seen in all bulls in respect of seminal plasma protein. The protein with a molecular weight of 16.5 kDa is highly prominent in all the animals. Earlier Kulkarni *et al.* (1996) reported the seminal plasma protein in various species is highly heterogeneous consisting of pre-albumin, albumin, globulin and various enzymes. Further, Jobim *et al.* (2004) reported some low molecular weight proteins in bovine bull seminal plasma which were recorded as fertility associated proteins. The present observation on

Present address : ¹Senior Research Fellow (dipankar.assam@gmail.com), ²Senior Scientist (debasis63@rediffmail.com), Veterinary Parasitology; ⁴Director (baruah_kk@rediffmail.com), ⁶Scientist (sourabhd1@rediffmail.com), Animal Reproduction. ³Professor and Head (sarmasatya49@yahoo.in), Department of Veterinary Biochemistry; ⁵M.V.Sc. Scholar (gsaikia123@gmail.com), Department of Animal Genetics and Breeding, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati 781022.

seminal plasma protein will be helpful as baseline information as unique characteristic of yak semen and seems to be the first report on Indian yak.

SUMMARY

Studies were conducted to evaluate seminal plasma protein profile of yak semen. The mean total protein concentration found in the present study was 7.82 ± 0.34 g%. Total protein concentration differed between the bulls. Electrophoretic pattern of seminal plasma protein revealed 6 major protein bands (6 KDa to 66 KDa). The 16.5 kDa molecular weight protein band is prominent irrespective of all animals. In the present study some low molecular weight seminal plasma proteins were also observed which may be associated with fertility of the yak bull.

ACKNOWLEDGEMENT

The authors are thankful to all the staff of Nyukmadung yak farm, National Research Centre on Yak, ICAR, Dirang, Arunachal Pradesh, India for their support during the study.

REFERENCES

- Asadpour R, Alavi-Shoushtari S M, Asri Rezaii S and Ansari M H K. 2007. SDS-polyacrylamide gel electrophoresis of buffalo bull seminal plasma proteins and their relation with semen freezability. *Animal Reproduction Science* **102**: 308–13.
- Gundogan M. 2006. Some reproductive parameters and seminal plasma constituents in relation to season in Akkaraman and Awassi rams. *Turkish Journal of Veterinary and Animal Sciences* **30**: 95–100.
- Jobim M I M, Oberst E R, Salbego C G, Souza D O, Wald V B, Tramontina F and Mattos R C. 2004. Two dimensional polyacrylamide gel electrophoresis of bovine seminal plasma proteins and their relation with semen freezability. *Theriogenology* **61**: 255–66.
- Jobim M I M, Oberst E R, Salbego C G, Wald V B, Horn A P and Mattos R C. 2005. BSP A1/A2-like proteins in ram seminal plasma. *Theriogenology* **63**: 2053–62.
- Jobim M I M, Trein C, Zirkler H, Gregory R M, Sieme H and Mattos R C. 2011. Two-dimensional polyacrylamide gel electrophoresis of equine seminal plasma proteins and their relation with semen freezability. *Theriogenology* **76**: 765–71.
- Kulkarni B A, Dhhande S G and Patankar D D. 1996. Seminal plasma protein profile of Holstein Friesian, Jersey and cross bred bulls. *International Journal of Animal Sciences* **11**: 133–37.
- Kumar S, Tripathi S S and Saxena V B. 1984. Effect of successive semen ejaculations on total protein, sialic and lactic acids and electrophoretic pattern of proteins in Red Dane, Jersey and Murrah bulls. *Indian Journal of Animal Sciences* **54** (9): 885–86.