

Effect of equilibration period on quality of frozen semen in Beetal x Assam local crossbred goats*

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ABSTRACT

A total of 36 pooled ejaculates collected from four adult crossbred goats (Beetal x Assam Local goats) were used to study the effect of three equilibration periods on quality of frozen semen. The semen extended in Tris-egg yolk-citric acid-fructose-glycerol extender was frozen in French medium straws in liquid nitrogen vapour. The mean per cent sperm motility and intact sperm acrosome after freezing were significantly higher at 5 hours (54.58±1.30, 81.33±0.17) than at 3 (48.75±1.39, 80.58±0.25) and 7 (51.67±0.71, 79.21±0.31) hours of equilibration periods.

Key words: Equilibration period, frozen semen, sperm motility, intact acrosome, crossbred goat

Processing of semen for freezing determines the quality of frozen semen to a large extent. Equilibration period constitutes an important factor in processing of semen for successful freezing. Some workers (Westhuysen, 1978, Sinha, 1989) favoured longer equilibration period, while others (Ganzalez, 1978, Das, 1988) obtained beneficial effects by adopting shorter equilibration period in freezing semen of various breeds of goat. Effect of equilibration period in freezing of semen of crossbred goats of Assam has not been reported. Hence, the present investigation was taken up to study the suitability of three equilibration periods in improving quality of frozen semen in Beetal X Assam local crossbred goats.

Semen was collected by artificial vagina twice in a week from four adult healthy crossbred (Beetal x Assam Local) goats maintained at Goat Research Station, Assam Agricultural University, Burnihat during October'92 to February'93. Semen obtained from the bucks was pooled together and then extended using Tris-egg yolk-citric acid-fructose-glycerol (TEYCAFG) extender (Deka, 1984) with 6 per cent glycerol. The extended semen was cooled gradually and then equilibrated for 3, 5 or 7 hours at 5°C prior to freezing. A total of 36

pooled ejaculates comprising 12 for each of three equilibration periods (3, 5 and 7 hours) were used in the study. Semen was frozen in 0.5ml French straws in liquid nitrogen vapour and then stored in liquid nitrogen. Microscopic evaluation of percent individual sperm motility (450 X) and percent intact sperm acrosome (100X) using Giemsa staining technique (Watson, 1975) was made after equilibration and after freezing. Statistical analysis of the data was done following the methods of Snedecor and Cochran (1967).

The mean per cent individual sperm motility was found to be 70.42±1.15, 69.58±1.30 and 66.67±0.71 after 3, 5 and 7 hours of equilibration respectively. Similar findings were reported by Sinha (1989) in goats for equilibration period of 2 to 6 hours. Deka (1984) recorded higher values on equilibrating goat semen for 1 to 5 hours in TEYCAFG extender. This could be due to difference in breed and glycerol concentration. The per cent sperm motility differed significantly ($P < 0.01$) between equilibration periods. Critical difference test showed that per cent sperm motility was significantly ($P < 0.05$) lower after 7 hours of equilibration as compared to 3 and 5 hours, the difference between 3 and 5 hours being non-significant. Das (1988) also found that sperm motility differed significantly between equilibration periods in goat. The lower sperm motility after 7 hours of equilibration could be

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attributed to longer duration of storage in glycerol-containing extender at 5°C.

The mean individual sperm motility after freezing was 48.75 ± 1.39 , 54.58 ± 1.30 and 51.67 ± 0.71 percent with 3, 5 and 7 hours of equilibration period respectively, the differences being significant ($P < 0.01$). Similar observations were made by Deka (1984) and Sinha *et al.* (1987) in goat semen with different equilibration periods using Tris-based extender. Increase in post thaw sperm motility with increase in equilibration period from 3 to 5 hours and subsequent decrease at 7 hours find support in the observation of Sahni and Roy (1972). The equilibration period of 5 hours that yielded the highest post thaw sperm motility coincided with the equilibration time utilized by Deka (1984).

The mean intact sperm acrosome was 92.38 ± 0.21 , 91.96 ± 0.17 and 90.92 ± 0.21 per cent after 3, 5 and 7 hours of equilibration respectively. The incidence of intact sperm acrosome after equilibration differed significantly ($P < 0.01$) between equilibration periods which supports the observations of Deka (1984) and Sinha (1989). On critical difference test it was found that the incidence of intact acrosome was significantly ($P < 0.05$) lower for 7 hours of equilibration as compared to 3 and 5 hours. Similar observation of higher intact sperm acrosome count with lower equilibration period was made in goat semen by Sinha (1989). Deka (1984) also recorded lower incidence of damaged goat sperm acrosome after equilibration with shorter equilibration period in TEYCAFG extender.

The mean per cent intact sperm acrosome after freezing was recorded to be 80.58 ± 0.25 , 81.33 ± 0.17 and 79.21 ± 0.31 with 3, 5 and 7 hours of equilibration period respectively. Comparable data were reported by Sinha (1989) in goat semen using TEYCAFG extender with equilibration period of 2 to 6 hours. However, Deka (1984) observed lower incidence of damaged acrosome after freezing goat semen in TEYCAFG extender. This could be due to difference in breed, initial quality of semen, concentration of glycerol used and processing procedure. The mean per cent intact sperm acrosome after freezing was significantly ($P < 0.05$)

lower with 7 hours of equilibration period as compared to 3 and 5 hours, the difference between 3 and 5 hours being non-significant. Sinha (1989) obtained a significantly ($P < 0.05$) higher per cent intact sperm acrosome after freezing with shorter rather than longer equilibration periods. Deka (1984) also reported significantly lower per cent damaged sperm acrosome in goat semen frozen after 1 hour of equilibration than that frozen after 3 or 5 hours of equilibration.

Based upon the present results, it could be inferred that 5 hours of equilibration period was more suitable as compared to 3 and 7 hours of equilibration for the freezing semen of Beetal x Assam Local crossbred goats.

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