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Research Article

Studies on the Semen quality of different Veterinary Institutions

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ABSTRACT

Twenty frozen semen straws of Jersey and 10 from Jersey X Red Sindhi crossbred bulls procured from semen processing Laboratory Palampur were evaluated for quality. Equal number of straws from same bulls and batches were evaluated randomly at different Veterinary institutions of the state. The mean live sperm percentage of Jersey bull semen in frozen thawed straws from semen laboratory was 64-8±1.70 as compared to 55.71±2.43 and 53.13±2.76 in hospitals and dispensaries, respectively. Live sperm percentage of the semen samples from laboratory was significantly higher ($p<0.01$) from those procured from field institutions. Similarly, progressive motility (%) of semen samples from laboratory, hospitals and dispensaries was 57.93±1.55, 48.71±2.07 and 46.45±2.48, respectively. The acrosomal integrity (%) of semen laboratory samples was 76.0±0.71 and was significantly better than hospitals (67.45±2.47) and dispensaries (69.59±1.17). The mean live sperm percentage in crossbred bull semen of semen laboratory was 60.42±2.79 and was better as compared to live percentage of 55.90±2.85 in hospitals and 56.44±2.04 in dispensaries. The progressive motility of samples from semen laboratory was 55.0±2.42. It was 50.90±2.85 and 50.88±1.79 in the samples from hospitals and dispensaries, respectively, however, the difference was non significant. The acrosomal integrity of frozen semen straws from crossbred bull semen was 75.42±1.49, 68.10±3.46 and 67.88±1.68, in the samples from laboratory, hospitals and dispensaries, respectively, the difference between samples from laboratory and field institutions was significant (P0.05).

Key words: AI, Jersey, crossbred, semen quality

Artificial insemination (AI) is the single most important technology that has ever been developed for genetic improvement of livestock. However, the average post AI fertility rate in the field has remained below 30 percent leading to increase in infertility rate in cattle. The success of AI program is always possible linked with the prolongation of fertile life of spermatozoa under *in-vitro* storage conditions. Improper semen handling can result in low conception rates and adversely affects an AI programme. Semen is most frequently damaged during handling, after thawing and prior to insemination of a cow.

In order to evaluate semen quality as a possible cause of low conception in field conditions frozen semen straws prepared in semen processing laboratory Palampur were evaluated and compared with semen straws of same bull and batch in the field.

MATERIALS AND METHODS

Twenty frozen semen straws of Jersey and 10 from Jersey X Red Sindhi crossbred bulls, to be supplied in field veterinary institutions for artificial insemination (AI), were procured from semen processing Laboratory Palampur and were evaluated for quality. Equal number of straws from same bulls and batches were randomly evaluated at different Civil Veterinary hospitals and Veterinary dispensaries of the state, respectively.

Frozen semen straws procured from various institutions were thawed in warm water at 40°C for 14 sec and evaluated for live sperm percentage (Campbell *et al.*, 1953), progressive motility and acrosomal integrity (Saacke *et al.*, 1968). Statistical analysis was carried out

by 't' test as described by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

The semen quality evaluation of Jersey and Jersey cross bulls of semen lab, hospitals and dispensaries have been shown in table 1.

The mean live sperm percentage of Jersey bull semen in frozen straws from semen lab (n=20) was 64.8±1.70 (range 54 to 77%) as compared to 55.71±2.43 (range 32 to 77%, n=20) and 53.13±2.76 (range 30 to 70%, n=20) in hospitals and dispensaries, respectively. Live sperm percentage of the semen samples from laboratory was significantly higher ($p<0.01$) from the Sindhi crossbred bull semen was 75.42±1.49 (range 70 to 81%), 68.10±3.46 (48 - 81%) and 67.88±1.68 (59 - 77%), in the samples from laboratory (control), hospitals and dispensaries, respectively. The difference between samples from laboratory and field institutions was significant ($P<0.05$). These figures are nearly similar to some earlier reports (Jondet and Rabadeux, 1976; Verma *et al.*, 1977; Chen *et al.*, 1993; Singh *et al.*, 1993). However motility of 46.9 percent has been reported by Dhami *et al.* (1995) which is quite lower than our results.

The significant difference in live sperm percentage and post-thaw motility of Jersey semen and acrosomal integrity of Jersey and crossbred semen between semen

Table 1: Evaluation of semen quality of Jersey and Jersey X Red Sindhi crossbred bulls in different Veterinary Institutions

Breed	Characteristic	Semen Lab	Hospitals	Dispensaries
Jersey (n=20)	Live sperm (%)	64.8±1.70[a]	55.71±2.43 [b]	53.13±2.76[b]
	Progressive motility (%)	57.93±1.55[a]	48.7 ±2.07[b]	46.45±2.48 [b]
	Acrosomal integrity (%)	76.0±0.71 [a]	67.45±2.47 [b]	69.59±1.17[b]
Crossbred (n=10)	Live sperm (%)	60.42±2.79	55.90±2.85	56.44 ±2.04
	Progressive motility (%)	55.0±2.42	50.90±2.85	50.88±1.79
	Acrosomal integrity (%)	75.42±1.49[a]	68.10±3.46[b]	67.88±1.68[b]

Figures with different superscripts within a row differ significantly

samples from field institution. Similarly, progressive motility (%) of semen samples from laboratory (control), hospitals and dispensaries were 57.93±1.55 (46 - 68%), 48.71±2.07 (25 - 77%) and 46.45±2.48 (20 - 60%), respectively. The acrosomal integrity (%) of semen lab samples was 76.0±0.71 (range 72 to 82% and was significantly better than hospitals (67.45±2.47, range 40 to 80%) and dispensaries (69.59±1.17, 58 - 80%), respectively.

The mean live sperm percentage in crossbred bull semen from semen lab (n=10) was 60.42±2.79 (range 53 to 73%) and was better as compared to live percentage of 55.90±2.85 (35 - 65%) in hospitals (n=10) and 56.44±2.04 (44- 70%) in dispensaries (n=10). Similarly, progressive motility (%) of samples from semen lab was 55.0±2.42 (50-70%). It was 50.90±2.85 (30 - 60%) and 50.88±1.79 (48 - 70%) in the semen samples from hospitals and dispensaries, respectively. The difference was statistically non significant. The acrosomal integrity (%) in frozen semen straws from Jersey X Red lab and field institution is suggestive of some mismanagement either during transportation and/ or distribution of semen straws from semen laboratory to field institutions or during handling and storage of semen in field institutions, thus leading to poor semen quality and eventually low conception.

The non significant fall in live sperm percentage and post thaw motility of crossbred bull semen between semen lab and field institution can be attributed to its greater resistance to mishandling during transportation or storage in field institutions than Jersey bull semen. However, there was significant difference in acrosomal integrity between semen lab. and field institutions which might suggest that though crossbred semen may be more resistant to mishandling in terms of live sperm percentage and progressive motility but not in respect of stability of acrosomal membrane to repeated mishandling insults. Since the acrosome plays a key role in the fertilization process and sperms with damaged acrosomes are unlikely to be capable of fertilization, thereby resulting in poor

conception despite non significant fall in progressive motility and live sperm percentage between semen lab and field institution in crossbred bull semen.

Therefore, the present study emphasizes that the quality of semen employed, its handling and AI procedure have an important bearing on the fertility in cattle. Inseminator should review proper methods of semen handling (Graham, 1968; Hafs *et al.*, 1970). Once semen is delivered to the nitrogen refrigerator, it should be maintained at a constant temperature (-196° C). The nitrogen level in the tank should be monitored closely. If the nitrogen dissipates, the semen is destroyed. Care should be exercised while removing an individual straw from the goblet (Salisbury *et al.*, 1978). When semen is transferred, the exchange should be made quickly into tanks previously filled with nitrogen. It is essential that semen is handled properly which involves precise temperature control more than anything else, in order to prevent fertility reduction (Sullivan, 1970).

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