FERTILITY ASSESSMENT AND PREDICTION USING IN VITRO SPERM FUNCTION TESTS IN MURRAH BUFFALO BULLS

Archana Verma

Dairy Cattle Breeding Division, NDRI, Karnal, India

The fertility potential of an artificial insemination (AI) dose is a function of the quantity, quality and health status of the semen contained therein. Therefore, identification of additional semen quality attributes associated with fertility could provide more accurate methods to predict, manage and select for AI sire fertility of predicting a bull's fertility rat. The objective of this study was to assess and predict fertilizing potential of Murrah buffalo bull spermatozoa using in vitro tests viz Hypo-osmotic Swelling Test (HOST), Acrosome Reaction (AR), Sperm Mitochondrial Activity Index (SMAI) and Nuclear Chromatin Decondensation Test (NCDT) and to check the accuracy of such a prediction. A total of 40 Murrah bulls were divided into two groups

i) high fertility and

ii) low fertility bulls based on the records of their respective conception rates (CR).

After thawing, the semen samples from individual bull were treated with hypo-osmotic solution at 100 mOsm/kg with 40 minutes incubation and the percentage of coiled tails was scored. Average scores for HOST were 59.76±0.98 and for high and low fertility groups were 71.39±0.68 and 53.27±1.08 respectively. The correlation (r) of conception rate with HOST was 0.91. The experiment was also conducted to observe the acrosome reacted spermatozoa in the semen samples with 9 minutes of incubation in capacitation medium with 0.5 μm Calcium Ionophore (CaI). The average increase in acrosome reacted spermatozoa was 67.74±0.69 and for high and low fertility groups were 61.29±0.89 and 73.47±0.56 respectively. The correlation of conception rate with AR was 0.87 and that between the two parameters was 0.89. The regression equation was constructed to predict CR of the bulls. The predicted CR were later found to be comparable with actual CR. These findings suggest that a combination of in vitro tests including AR and HOST may be used to predict fertility of bulls.

Keywords: Sperm function tests, fertilizing potential, murrah bulls