Preservation characteristics of buffalo semen in citric acid–whey as an extender

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It has been reported from this laboratory (Ganguli, Bhosrekar & Stephen, 1973; Ganguli, 1974) that 'citric acid–whey' (CAW) is a superior diluent for the preservation and freezing of buffalo semen. Data on the preservation characteristics of buffalo semen in this extender are presented in this communication.

Ejaculated semen was collected by means of an artificial vagina (Herman & Madden, 1953) from 8 Murrah buffalo bulls of the Institute herd. CAW was prepared from the milk of cows of the Red Sindhi, Sahiwal and Tharparkar breeds and cross-bred cows as described previously (Ganguli *et al.*, 1973). The pH of CAW was adjusted to different levels with 10% NaOH. The skim milk–egg yolk (SKMEY) and sodium bicarbonate–glucose–fructose–egg yolk (SBGFY) diluents were prepared by the methods given by Tomer & Desai (1961). Roller-dried and spray-dried milk powder prepared from cow skim milk were from the Experimental Dairy of the Institute. Samples of the semen from each bull were placed in each diluent. The motility of the spermatozoa was evaluated by the method of Salisbury & VanDemark (1961) and progressive motility was taken as the assessment criterion.

Motility was sustained for a longer period in CAW than in the other two diluents tested (Table 1). Of the breeds tested, CAW prepared from the milk of Red Sindhi cows was observed to be superior, whereas CAW prepared from colostrum was ineffective. An immediate difference in the initial motility was noted when spermatozoa were placed in CAW prepared from milk of different breeds of cow. The pH was observed to be critical and motility in CAW was greatest at pH 6.8. Initial motility was greatest with dilution of semen with CAW at 1:5 (90%) and 1:10 (83%), and the drop after storage at 5–7°C for 96 hr was only 25 and 28% respectively. Some improvement in sperm motility after storage was obtained when fructose or glycerol were added to the CAW diluent. CAW prepared from skim milk powder was effective as a buffalo semen extender and roller-dried powder did not even require the heating step necessary for the milk (Thacker & Almquist; Ganguli *et al.*, 1973)

Table 1. Motility of buffalo spermatozoa in different diluents at 5–7°C before and after storage

Diluent*	% Motility		
	0 hr	96 hr	144 hr
CAW	85.0	58.0	—
SKMEY	78.0	43.0	—
SBGFY	77.0	28.0	—
CAW + fructose (1.0%)	75.0	60.0	40.0
CAW + glycerol (7.0%)	82.0	62.0	50.0
CAW from spray-dried powder			
Unheated	69.5	12.5	—
Heated	79.5	63.2	44.0
CAW from roller-dried powder			
Unheated	76.0	58.6	45.0
Heated	79.0	63.2	50.0
CAW from packet	76.0	59.0	40.0

* All extenders were adjusted to pH 6.8 and dilution rate was 1:10. CAW was always from cow skim milk. In all cases at least 8 experiments were carried out.

and spray-dried powder based diluents. A packet containing skim-milk powder and citric acid (solid) has been formulated for the easy preparation of CAW for field application and semen diluent made in this way gave good results (Table 1).

To test the efficacy of the diluents, buffalo cows were artificially inseminated as described by Herman & Madden (1953). The conception rate in fresh semen in CAW (at pH 6.8, 1:10 dilution with addition of antibiotics) was 63.4% (260 inseminations) compared with 44.8% (58 inseminations) with semen in SBGFEY ($P < 0.05$), when the cows were inseminated on the first day of oestrus (detected by running with a teaser bull). After storage of semen in CAW for 24 hr, the conception rate was 6.5% higher.

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