

Semen processability and freezability of Saanen fith bucks under the climatic conditions of the Sudan.

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SUMMARY

Semen was collected from six Saanen bucks using an artificial vagina. Collection was done at weekly intervals throughout the seasons of one year. The bucks were imported from Holland and were allowed one year acclimatization period under the dry-arid climate of Khartoum. Three different types of diluents were used for processability and freezability of the semen. These were skimmed-milk diluent for short-term storage at +5 °C. The other two diluents were intended for deep freezing of semen in liquid nitrogen. Both diluents composed of the same constituents (tris-egg-yolk) but one was used for the one-step method of dilution and the other for the two-steps method of dilution. Percentage motility of spermatozoa that survived after freezability were not significant between the two methods. However, percentage motility of spermatozoa processed with milk was significantly high. For all types of diluent, the effect of season has shown that percentage motility of spermatozoa was lowest in Summer compared to Autumn and Winter.,

INTRODUCTION

Semen evaluation is used to predict the breeding value of a sire used in

natural service or artificial insemination (Rice, 1970; Sorensen, 1979). In line with the ongoing attempt to upgrade the indigenous breeds, Khartoum State Ministry of Agriculture has imported a herd of Saanen goats from the Netherlands in 1993. However, understanding the effect of genetic-environment interaction on the reproductive performance represents the first challenge for any gain anticipated from this exotic breed. However, perhaps the most important single technique ever devised for genetic improvement of animals on large scale is artificial insemination (AI). Processing the semen of Saanen

breed locally would provide a permanent source of high quality semen. It is also economically feasible for small holders to make use of AI. The present study was carried out with the objective to evaluate the processability and freezability of semen collected from Saanen bucks at different seasons of the year.

MATERIALS AND METHODS

Semen was collected from six Saanen bucks throughout the seasons of the year at weekly interval. Collection was done by using an artificial vagina (AV). Three types of diluent were used to extend the semen : These were skim-milk diluent for short term storage at +5 °C. Beside two deep freezing extenders which were Tris-egg-yolk diluent for one step method of dilution

and tris-egg-yolk diluent for two steps method of dilution. The constituent of each diluent is shown in Tables 1, 2 and 3.

The collected semen was maintained at 30 oC untill diluted. Each of the milk diluent and tris-based diluent (one-step method) was added to the semen in the ratio of 1:4. For the two-step method diluent, Di fraction was added to the semen at 30 oC to achieve only half of the final pre-freezing rate. After cooling for 60 minutes to +5 oC, the semen was extended further to the final rate with D2 containing the glycerol (Table 3). The pre-freezing percentage motility of spermatozoa was estimated by placing a drop of chilled (at 5oC) diluted sample in a warm slide and examined with a cover slip under a light microscope. The semen was then aspirated into 0.5 ml polyvinyl straws. Semen samples extended with tris-base diluent were equilibrated with the diluent components over one hour, frozen first in nitrogen vapour and gradually immersed in liquid nitrogen for long-term storage. One straw per buck per batch was thawed in a water bath at 35 oC for 21 seconds. The freezability was expressed as a percentage of sperm surviving the **deep freezing process**.

RESULTS

The average motility of spermatozoa extended with skimmed-milk diluent and chilled to + 5 oC was 65.11%. A significantly higher motility percentage was obtained in Autumn than either Summer or Winter (Table 4).

The freezability of unwashed spermatozoa varied significantly with seasons (Tables 5 and 6). Satisfactory results were obtained in Autumn and Winter. An average of 30.03% and 33.44% spermatozoa survived the deep-freezing process for the one-step and the two-steps method of dilution respectively. However, no significant differences between the two methods were detected.

Table 1 : Skimmed milk diluent for buck semen.

Components	Amounts
Glucose (g)	0.2
Skimmed milk (g)	10
Streptomycin (mg)	50
Penicillin (IU)	50.00
Bi-distilled water to (ml)	100

Table 2 : Tris – egg – yolk – glucose diluent for the one

step method of dilution	
Components	Amounts
Tris (hydroxymethyl) aminomethane (g)	3.756
Glucose (g)	0.625
Citric acid (g)	2.17
Egg-yolk (ml)	2.5
Glycerol (ml)	5
Penicillin (IU)	100.000
Streptomycin (mg)	100
Glass distilled water to (ml)	100

Table 3 : Tris – egg – yolk – glucose diluent for the two

steps method of dilution

Components g>	Amounts	
	D1	D2
Tris (hydroxymethyl)		
aminomethane (g)	3.634	3.634
Glucose (g)	0.5	0.5
Citric acid (g)	1.99	1.99
Egg-yolk (ml)	2.5	2.5
Glycerol (ml)		14
Penicillin (IU)	50.000	50.000
Streptomycin (mg)	50	50
Glass distilled water to (ml)	100	100

Table 4 : Effect of season on the motility of Saanen bucks spermatozoa diluted with milk and chilled to +5 °C.

Source of variation	N	Motility %
Overall mean $\pm$ sd	46	65.11 $\pm$ 9.47
Season :		
Summer	7	51.43 $\pm$ 6.39B
Autumn	21	69.05 $\pm$ 7.34A
Winter	18	65.83 $\pm$ 7.63A

Means with different superscripts differ significantly (p <0.01).

Table 5 : Effect of season on the motility of Saanen bucks spermatozoa processed with Tris-egg-yolk-glucose diluent and diluted in One-step.

Source of variation	N	Motility at +5°C	Post-thawing motility %
overall			
mean $\pm$ sd	98	61.33 $\pm$ 7.48	30.03 $\pm$ 12.61
Season :			
Summer	12	57.08 $\pm$ 7.7.	17.08 $\pm$ 5.19B
Autumn	36	63.19 $\pm$ 6.36	33.33 $\pm$ 13.02A
Winter	SO	60.00 $\pm$ 7.68	30.80 $\pm$ 11.59A

Means with different superscripts within the same column differ significantly (p < 0.01).

Table 6 : Effect of season on the motility of Saanen spermatozoa processed with Tris-egg-yolk-glucose diluent and diluted in two-steps.

Source of variation	N	Motility at +5oc	Post-thawing motility %
overall			

meantsd	93	61.41±8.05	33.44±11.12
Season :			
Summer	16	56.25±4.51 ¹³	20.94±5.92 ^B
Autumn	30	60.17±3.80 ^A	38.17±10.68 ^A
Winter	47	63.40±8.82 ^A	34.89±4.65 ^A

Means with different superscripts within the same column differ significantly (p <0.01).

DISCUSSION

The percentage of spermatozoa that survived freezability (30.03% **and** 33A4% for the one and two-steps methods of dilution) was lower than **that** (46%) obtained by Loubser and Van Miekerc (1983) for washed Angora spermatozoa. This would illustrate the fact that washing spermatozoa before freezing would give better results. According to Mune (1987), washing would remove the enzyme phospholipase present in the semen, which attacks the lecithen of egg-yolk releasing lysolecithen that is toxic to spermatozoa.

The effect of season on spermatozoa motility showed significant lower motility in the semen collected during Summer than Winter and Autumn. Similar findings were obtained by Westhynsen (1978), Loubser and Miekerc (1983). It is recommended that washing of semen could completely reverse the seasonal variation in the unwashed deep-freezing spermatozoa (Corteel, 1977).

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