



SHORT COMMUNICATION

Study of Effective Artificial Insemination in West African Dwarf (WAD) Does Using 10% Coconut Milk-egg Yolk Citrate Extended Semen.

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INTRODUCTION

Goat population in Nigeria is put at 27million by ILCA (1984) and 28 million by FAO (Bertu *et al.*, 2010). This population of goat is grossly inadequate in meeting the protein requirement of Nigerian population of about 150 million. Other sources of protein abound but the goat which is mostly reared at subsistence level at the back yards of homes is more often favoured for meat supply. The goat is a good source of income to families in Africa in general and Nigeria in particular. However multiplication of this species has necessitated the need to maximize its reproductive potentials and reduce reproductive wastages. One way of doing this is by Artificial insemination. Several Extenders are in use for the purpose of artificial insemination. Some of these are vegetative materials like tomato and coconut (Norman, 1962; Sule *et al.*, 2007; Oloye *et al.*, 2008). Availability and cost favours the use of these materials at the expense of some others. The standard egg-yolk extender is suitable for extension of goat semen when kept at room temperature (Oloye *et al.*, 2008) but with limitation at refrigerator temperatures because of the presence of egg yolk-coagulating enzyme which hydrolyses egg yolk lecithin to fatty acid and lysolecithin. The lysolecithin, in large quantity is lethal to the goat's spermatozoa (Noakes *et al.*,

2001; Oloye *et al.*, 2008).

The objective of the study was to evaluate the effectiveness of using 10% coconut milk-egg yolk citrate preparation for artificial insemination in the goat. The availability and the low cost of coconut has the potential of reducing the cost of artificial insemination and hence increase the production of goat.

KEY WORDS: Artificial Insemination (A.I), Does, Semen, Extenders.

MATERIALS AND METHODS

Four does and one buck were used for the experiment. The animals were kept in a standard pen and maintained intensively being fed rations. The female weighed averagely, 13.5kg and were kept away from the buck whose weight was 13.0kg. They were given water *ad libitum*. They were all prophylactically treated for ecto and endo parasites, blood parasites and systemic infections. 2.9% trisodium citrate dihydrate was prepared by dissolving 2.9g of the trisodium citrate dihydrate in 100ml of distilled water. Coconut milk was squeezed out from pulverized coconut flesh excised from coconut fruits using clean sterilized white cloth. The milk was then centrifuged at 500 rev/min for 15 minutes after which oily topmost layer was skillfully separated from the underlying milk. In preparing the egg yolk, sterilized fresh eggs

were cracked opened at the tip through which the albumin was let out thereby separating it from the yolk. The semen extender, using the buffer, coconut milk and egg yolk was then prepared at the ratio of 80:10:10 respectively. The mixture was mixed thoroughly and Penicillin – streptomycin at dosage rate of 1000 I.U per ml and kept for semen extension.

Semen was collected using electro-ejaculator and immediately assessed for colour, volume, mass activity, pre dilution motility, concentration and live/dead ratio. This prediluted semen as left on the shelf at room temperature (28°C) and semen characteristics evaluation repeated every 30 minutes. Four trials of this were done. Another four trials of semen extension using prepared coconut egg yolk citrate were done. For each, semen characteristics were evaluated (pre and post extension). At the point of insemination Volume of extender used was calculated after semen collection using the formula:

(Sperm concentration x Sperm motility x Semen volume x % normal spermatozoa) ÷ (Insemination dose)

Insemination dose used was 10×10^6 cells/ml, semen volume of the semen collected on the day of insemination was 0.2ml, and concentration was 7.5×10^8 cells/ml. Motility was 95%

$$\text{Volume of extender} = \frac{7.5 \times 10^8 \times 95 \times 0.2 \times 95}{10 \times 10^6 \times 100 \times 100}$$

Volume of extender used was 13.5ml. This implied that 13 does could be inseminated with this volume. However, only four does were available for insemination. Insemination was done immediately after extension through the transcervical route.

Insemination of the dose was actualized after their synchronization using Prostaglandin F_{2α}. A Non- return to estrus was taken as diagnostic of conception. Kidding was also expected about 145- 150 days after insemination. Data was analysed using Student's T- test (Steele and Torrie, 1996).

RESULTS AND DISCUSSION

The colour of the semen collected for the four predilution trials ranged between milky to creamy while volume ranged from 0.3 to 0.5ml. Motility score was between 90% and 95%. (Table I). Average concentration was $8.78 \times 10^8 \pm 0.28$ sperm cells/ml, while live/dead ratio was $91.25 \pm 2.99\%$ (Table I). The pre-dilution semen characteristics of the buck were considered satisfactory and similar to values reported earlier for the same breed (Akusu *et al.*, 1984; Ajala *et al.*, 1997; Oloye *et al.*, 2008).

Average motility score reduced from 95% to 0% and lasted for 6 hours in pre dilution trials while this lasted for 72 hours in post dilution trials. (Tables II and III). The gradual reduction in motility observed in both prediluted and post diluted semen is in consonance with Dauzier's (1956) finding that fertilizing capacity of ram and buck semen decreased with increased storage time. The keeping potential of the extender used was quite significant ($p < 0.005$) comparing motility score of the spermatozoa pre-extension with post-extension. This is attributable to energy source obtained from both the coconut milk and egg yolk which maintained the motility of the sperm cells (Salisbury *et al.*, 1978). Oloye *et al.* (2008) recommended 80% fresh coconut milk – citrate for extension of buck's semen at room temperature usable just within 6 hours post dilution, however, this work has established a possible extension of the period of use when 10% egg yolk is added.

There was a non – return to estrus at 17-25 days after insemination in all the four does indicative of conception. Also, all the does kidded singletons between day 145 and 151 after insemination. Therefore a combination of citrate buffer, coconut milk and egg yolk in the proportion 80:10:10 respectively are suitable for artificial insemination in the goat for an upward period of 24 hours. Buck semen could be safely extended in 10% coconut milk-egg yolk – citrate extender and used fresh for artificial insemination with 100% conception rate and kidding rate.

TABLE 1
Pre Extension Semen Characteristics at Four Trials \pm SEM

Characteristics	Trial 1	Trial 2	Trial 3	Trial 4	Mean
Colour	Creamy	Milky	Creamy	Milky	
Volume(ml)	0.3	0.4	0.4	0.5	0.4 \pm 0.82
Mass activity	+++	+++	+++	+++	+++
Live/Dead Ratio (%)	95.0	90.0	92.0	88.0	91.3 \pm 2.99
Concentration (X 10 ⁸)	9.1	8.5	8.9	8.6	8.8 \pm 0.28
Motility	95.0	90.0	95.0	90.0	92.5 \pm 2.89

TABLE II
Gradual reduction of spermatozoa motility in pre diluted semen

Period (minutes)	Motility (%) at room temperature
0	95
30	90
60	85
90	80
120	75
150	70
180	65
210	60
240	50
270	30
300	20
360	0

TABLE III
Gradual reduction of spermatozoa motility in post diluted semen

Period (hrs)	Motility (%) at room temperature
0	95
12	85
24	75
36	50
48	30
60	15
72	5

CONCLUSION

Artificial insemination in West African Dwarf Goats using an extender containing 10% coconut milk, 10% egg yolk and 80% trisodium citrate dihydrate was undertaken using four does and one buck at the Small Ruminant Research unit of Department of Veterinary surgery and Reproduction, University of Ibadan. Prior to extension, the buck's semen analysis, from four trials, had mean values + standard error of mean (SEM) 0.4 \pm 0.82ml, 91.3 \pm 2.99%, 8.8 x 10⁸ \pm 0.28 sperm cells/ml, 92.5 \pm 2.89% for volume, live-dead ratio, concentration and motility respectively. The colour of the semen ranged between milky to creamy. In carrying out the artificial insemination, estrus synchronization was done using PGF2 α , semen was collected using electroejaculator and then extended and stored at room temperature (28 $^{\circ}$ c). A 100% conception rate was obtained following 17-25 days non-return to estrus post breeding. The does kidded between 145-151 days post insemination. This study showed that, buck semen could be safely extended in 10% coconut milk-egg yolk – citrate extender and used fresh for artificial insemination with approximately 100% conception rate and kidding rate.

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