# INFLUENCE OF PROSTAGLANDIN F2α ON PRESERVABILITY OF JAMUNAPARI BUCK SEMEN

Gautam Kr Pankaj, S.K. Chaudhary, R.P. Pandey And Sanjiv KR

Department of Animal Reproduction Gynaecology and Obstetrics

Bihar Veterinary College, Patna - 800014

Corresponding author : Email - gtmpankaj@gmail.com

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## ABSTRACT

One hundred and forty four ejaculates were collected in artificial vagina from six Jamunapari bucks. After collection semen samples were split-diluted in EYC without (control) and with prostaglandin F2α @ 4 µg/ml (treated) and stored at 4°C up to 72 hrs. The seminal characteristics, i.e. progressive motility, live sperm percentage, and abnormal percentages of acrosome, head and tail were evaluated at 72 hourly intervals. There were significant differences between control and prostaglandin F2α treated samples for sperm motility, viability and head abnormality percentages at 24, 48 and 72 hrs of preservation. Prostaglandin F2α was found to be good additive in terms of progressive motility, live sperm percentage, and sperm tail and acrosomal abnormality percentage and hence may be used in routine refrigeration preservation of buck semen.

**KEY WORDS:** Jamunapari bucks, PGF2α, Progressive motility, Live sperm percentage, Head, Tail and Acrosomal abnormality percentage.

## INTRODUCTION

To improve the goat population (particularly non-descript/desi breeds) for meat, milk and wool (Pashmina) production, it is necessary to exploit the better germplasm up to maximum limits which could be achieved only through assisted reproduction technologies such as semen preservation, AI, MOET (Multiple Ovulation and Embryo Transfer) etc. The number of productive animal and productivity of local breed can also be increased within stipulated time through these techniques. Semen is an important constituent and plays an important role in AI. The effects of addition of different semen extender additives, viz., theophyllin (Hoskins et al., 1974) on bull semen, caffeine (Sinha et al., 1994) on goat semen and prostaglandin F2α (Ramana, 1986) on buffalo bull semen have been reported. However, very few works have been documented regarding addition of prostaglandin F2α in buck semen diluted in egg yolk citrate (EYC) extender. Hence, the present investigation was carried out to observe the effect of addition of prostaglandin F2α in EYC diluent on various attributes of buck semen preserved at refrigerated temperature.

## MATERIALS AND METHODS

Six Jamunapari bucks aged about 1.5-2.5 years were selected and maintained under identical feeding and managemental regimen. One hundred and forty four ejaculates (24 from each buck) were collected in artificial vagina twice a week. Collected semen samples were split into two parts and were diluted separately with EYC without PGF2α (control) and one with added PGF2α @ 4 µg/ml (treated). Samples were pooled in test tube, evaluated and extended with EYC in the ratio of 1:10. Temperature of dilutor and semen was maintained at 30°C at the time of dilution. The test tubes containing the diluted semen samples were placed in a beaker having 250 ml of water at 25°C - 30°C and kept in a refrigerator for gradual cooling. After 2-3 hours when water of the beaker attained the temperature of 4°C, it was removed and test tubes were kept in the empty beaker for preservation up to 72 hrs at 4°±1°C (Muller, 1962). The diluted semen samples were

examined for percentages of progressive motility, live sperm, acrosomal abnormality, and head and tail abnormality at 0, 24, 48 and 72 hours of preservation at refrigeration. Statistical analysis of the data was done according to the method described by Snedecor and Cochran (1967).

## RESULTS AND DISCUSSION

The findings of buck semen characteristics studied at different intervals of refrigeration preservation in EYC extender with and without PGF2$\alpha$ are portrayed in Table.

Although sperm motility and live percentage of spermatozoa declined gradually in both additive added and control extender (EYC) during preservation, the values remained significantly higher in presence of PGF2$\alpha$ than control diluent. The values of these characteristics were 79.58 and 80.84 % at 0 hr and 55.09 and 56.76 % at 72 hrs of preservation, respectively in control, and 80.11 and 81.31 % at 0 hr and 58.80 and 59.60 % at 72 hrs in presence of PGF2$\alpha$. Effect of both duration / hours of preservation and additive on these seminal attributes were found significant ($P<0.01$) at all intervals beyond 0 hr, EYC added with Prostaglandin F2$\alpha$ being superior. The similar findings have been obtained by Sinha et al. (1994).

The percentage of acrosomal abnormality had increasing trend in both the diluents with relatively low magnitude in EYC with added PGF2$\alpha$. The acrosomal abnormality was found to be lower in EYC added with prostaglandin F2$\alpha$ compared to control at 72 hours of preservation (3.89 vs 4.39 %). These findings are in agreement with those of Sinha (1986) and Deka (1984). The variation in the head abnormalities of the spermatozoa diluted in EYC with additive at different hours of preservation did not vary significantly. Similar findings have been reported by Sinha (1986). The incidence of tail abnormality was recorded 4.505 % at 0 hr which increased to 7.87 % at 72 hrs of preservation. The incidence of tail abnormality was recorded to be non-significantly different between additive and control, but varied significantly ($P<0.01$) between different hrs of preservation. It was found lower in semen samples diluted with EYC with prostaglandin F2$\alpha$ as compared to control. The present finding is comparable to the report of Sinha (1986). Similar observations have also been reported by Ramana (1986), Muralinath et al. (1990), and Arangasamy et al. (2002), who observed that prostaglandin F2$\alpha$ had sperm motility enhancing effect when added in diluted semen of animals of different species.

The physiological function of the prostaglandins F2$\alpha$ in semen is still not well understood because of their widespread distribution in various organs and tissues. On their mechanism of action and pharmacological effects many hypotheses had been advanced. It was believed that Prostaglandin F2$\alpha$ exerts their effect on sperm by interacting with the adenylcyclase-adenosine-3'-5'-monophosphate systems.

Thus on the basis of evaluation of post preservation seminal characteristics, it could be concluded that the semen quality of bucks semen can be maintained better with PGF2$\alpha$ added EYC extender up to 72 hrs of refrigeration preservation, as progressive motility and live sperm percentage were good with prostaglandin F2$\alpha$ added EYC extender in comparison to control.

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**Table : Mean±S.E and CV% of progressive motility, live sperm, acrosomal abnormality, head abnormality and tail abnormality percentage of spermatozoa preserved at different hours interval.**

| Seminal Atributes | Progressive motility percentage | | Live sperm percentage | | Acrosomal abnormality percentage | | Tail abnormality percentage | | Head abnormality percentage | |
|---|---|---|---|---|---|---|---|---|---|---|
| Period | Control (EYC) | EYC+ $PGF_{2\alpha}$ | EYC (Control) | EYC+ $PGF_{2\alpha}$ | EYC (Control) | EYC+ $PGF_{2\alpha}$ | EYC+ (Control) | EYC+ $PGF_{2\alpha}$ | EYC+ (Control) | EYC+ $PGF_{2\alpha}$ |
| | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% | Mean ± SE & CV% |
| 0 hr | $79.58^{aA}$ ± 0.12 (1.049) | $80.11^{aA}$ ± 0.10 (0.812) | $80.84^{aA}$ ± 0.42 (3.726) | $81.31^{aA}$ ± 0.25 (1.489) | $0.82^{aA}$ ± 0.002 (0.109) | $0.81^{aA}$ ± 0.001 (0.121) | $4.505^{aA}$ ± 0.065 (5.058) | $4.462^{aA}$ ± 0.049 (3.862) | 0.0856 ± 0.004 (5.87) | 0.0841 ± 0.00 (6.82) |
| 24 hr | $70.31^{aB}$ ± 0.11 (1.315) | $74.00^{bB}$ ± 0.12 (0.706) | $70.82^{aB}$ ± 0.11 (1.079) | $74.44^{bB}$ ± 0.25 (2.349) | $1.82^{aB}$ ± 0.011 (3.371) | $1.46^{aB}$ ± 0.014 (1.364) | $5.976^{aB}$ ± 0.025 (1.784) | $5.282^{aB}$ ± 0.052 (3.884) | 0.0891 ± 0.0 6 (8.45) | 0.0869 ± 0.00 (4.10) |
| 48 hr | $64.71^{aC}$ ± 0.14 (1.844) | $68.07^{bC}$ ± 0.14 (2.439) | $65.44^{aC}$ ± 0.21 (2.371) | $68.43^{bC}$ ± 0.16 (1.840) | $3.14^{aC}$ ± 0.022 (5.358) | $2.52^{aC}$ ± 0.016 (4.629) | $6.225^{aC}$ ± 0.067 (4.552) | $5.413^{aC}$ ± 0.015 (1.068) | 0.0925 ± 0.005 (5.9 ) | 0.0902 ± 0.007 (7.05) |
| 72 hr | $55.09^{aD}$ ± 0.22 (6.221) | $58.80^{bD}$ ± 0.17 (3.251) | $56.76^{aD}$ ± 0.17 (3.035) | $59.60^{bD}$ ± 0.24 (3.907) | $4.39^{aD}$ ± 0.029 (3.744) | $3.89^{aD}$ ± 0.012 (4.268) | $7.877^{aD}$ ± 0.041 (2.573) | $6.156^{aD}$ ± 0.050 (3.179) | 0.0996 ± 0.006 (4.4 ) | 0.0967 ± 0.003 (6.43) |

Means with super scripts (row-wise: a&b and column-wise A,B,C,D) did not differ significantly.

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