Theriogenology Insight: 6(1): 73-77, April, 2016
**DOI Number: 10.5958/2277-3371.2016.00010.3**

# Effect of different extenders on the quality of boar semen during preservation at 15°C and 5°C

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**Abstract**

The study was aimed to evaluate the effect of three extenders viz. GEPS, BTS and Modena on quality of boar semen during preservation at 15°C and 5°C up to 96 hours. A total of 24 ejaculates were included for the study. The semen quality was significantly higher (P<0.05) in Modena followed by BTS and GEPS extended semen irrespective of preservation temperature and preservation period. Sperm motility, live sperm, live intact sperm and HOST-reacted sperm was significantly higher (P<0.05) at 15°C than 5°C. The sperm quality reduced gradually during different preservation periods. In conclusion, Modena extender was found to be superior to BTS and GEPS extenders for preservation of Hampshire boar semen.

**Keywords:** Extender, Hampshire, semen quality, preservation temperature

Small scale pig farming predominates throughout the North Eastern Region including Assam, which accounts 28% of the total pig population in India (Khan *et al.* 2006). But still a huge gap exists between the demand and availability of pork mainly due to traditional husbandry system. Hence, in order to improve production potentiality of indigenous pigs, crossbreeding is the only remedy which can be attained by means of artificial insemination (AI) with germplasm of elite exotic breeds.

Liquid stored semen or fresh semen is used for AI in commercial swine herds (Wagner and Thibier, 2000). However,the fertility of liquid semen is gradually lost during extended period. Therefore frozen semen technology might fulfill this gap. Many studies have confirmed the influence of different extenders

on longevity (Vyt *et al.* 2004) and semen quality (Waterhouse *et al.* 2004). The present study therefore aimed to evaluate the effect of certain extenders on quality of boar semen during preservation.

## Materials and Methods

A total of four boars were maintained at National Research Centre on Pig, ICAR, Rani, Assam and included for the study. A total of 24 ejaculates were comprising 6 ejaculates from each boar were utilized for this study. After initial evaluation, semen was hold at 22°C for 4 hours. Each semen ejaculate was split into three parts, each part was extended (1:4) with GEPS, BTS and Modena extenders. The extended semen was then added with 100 µg of Butylatedhydroxytoluene (BHT) and preserved into 2 ml of micro centrifuge tube at 15°C and 5°C in a BOD incubator up to 96 hours. Semen prior to evaluation was thawed at 37°C for 2 minutes and shaken gently between palms for homogenization. The evaluation of sperm motility, live sperm, live intact acrosome and HOST-reacted sperm at 0 (immediately after extension), 24, 48, 72 and 96 hours of preservation was carried out as per the methods described for fresh semen.

## Results and Discussion

### Sperm motility

The mean percentage of sperm motility significantly higher ($P<0.05$) in Modena followed by BTS and GEPS extended semen irrespective of preservation temperature and preservation period. The difference in mean sperm motility was significant among different extenders.

**Table 1: Mean sperm motility in different extenders during different preservation period at 15°C and 5°C**

| Preservation period | SPERM MOTILITY (%) | | | | | |
|---|---|---|---|---|---|---|
| | 15°C | | | 5°C | | |
| | GEPS | BTS | MODENA | GEPS | BTS | MODENA |
| 0 h | 86.67±1.15 | 85.83±1.46 | 87.92±0.73 | 86.67±1.15 | 85.83±1.46 | 87.92±0.73 |
| 24 h | 62.08±3.36 | 72.00±3.20 | 76.73±2.90 | 48.75±2.50 | 50.83±3.33 | 71.67±2.27 |
| 48 h | 42.92±3.35 | 58.83±3.53 | 66.25±3.77 | 35.83±2.93 | 45.83±2.99 | 59.33±3.25 |
| 72 h | 35.42±2.15 | 46.50±3.19 | 57.92±2.96 | 32.92±3.24 | 41.25±2.79 | 56.25±3.29 |
| 96 h | 29.17±2.51 | 38.25±4.14 | 51.17±4.98 | 21.67±2.88 | 29.67±2.72 | 42.08±3.05 |

The sperm motility reduced significantly during different preservation period irrespective of preservation temperatures. However the sperm was significantly higher (P<0.05) in semen preserved at 15°C than at 5°C irrespective of different extenders and preservation period which was in collaboration with the findings of others (Lalrintluanga *et al.* 2009; Mapeka *et al.* 2012). The more loss of sperm motility during preservation at 5°C might be due to the loss of glycerol activity following cold shock (Blachshaw 1958).

In the present study, sperm motility recorded was comparable to the reports of earlier researchers (Funahashi and Sano 2005; Kadrivel *et al.* 2005).

## Live sperm

Live sperm differ significantly (P<0.01) among extenders irrespective of preservation temperature and preservation period. In this study, mean percentage of live sperm was significantly higher (P<0.05) in Modena than BTS and GEPS. Contrary to present finding, lower live sperm percentage was recorded by Khan *et al*. (2006) and Kumaresan *et al.* (2009).The percentage of live sperm reduced significantly during different preservation period irrespective of preservation temperatures. The mean percentage of live sperm was significantly higher (P<0.05) in sperm when preserved at 15°C than at 5°C.

**Table 2: Mean live sperm in different extenders during different preservation period at 15°C and 5°C**

| Preservation period | LIVE SPERM (%) | | | | | |
|---|---|---|---|---|---|---|
| | 15°C | | | 5°C | | |
| | GEPS | BTS | MODENA | GEPS | BTS | MODENA |
| 0 h | 72.91±1.65 | 77.67±1.55 | 81.29±1.89 | 72.91±1.60 | 76.66±1.55 | 80.20±1.88 |
| 24 h | 65.54±4.62 | 72.18±2.89 | 76.68±1.85 | 61.56±3.30 | 66.21±2.73 | 73.42±1.90 |
| 48 h | 63.76±3.57 | 68.63±3.56 | 73.17±2.39 | 57.83±3.31 | 61.32±3.28 | 65.43±3.51 |
| 72 h | 58.52±2.52 | 62.24±2.59 | 70.17±2.41 | 54.08±2.42 | 58.93±3.60 | 60.04±3.19 |
| 96 h | 53.08±3.63 | 60.63±2.46 | 65.33±4.36 | 49.25±3.62 | 54.75±3.84 | 59.68±4.36 |

## Live intact sperm

In the present study, the live intact sperm percentage was significantly lower (P<0.05) in GEPS extender than Modena and BTS extenders. The live intact sperm percentage reduced significantly during different preservation period irrespective of preservation temperatures. The mean live intact sperm irrespective of extender and preservation period was significantly higher

(P<0.05) in semen, preserved at 15°C than at 5°C. The current findings were lesser than that reported by Yeste *et al*. (2008) and Lalrintluanga *et al*. (2009).

**Table 3: Mean live intact sperm in different extenders during different preservation period at 15°C and 5°C**

| Preservation period | LIVE INTACT SPERM(%) | | | | | |
|---|---|---|---|---|---|---|
| | 15°C | | | 5°C | | |
| | GEPS | BTS | MODENA | GEPS | BTS | MODENA |
| 0 h | 71.33±1.60 | 75.42±1.44 | 78.13±1.89 | 70.33±1.60 | 72.44±2.33 | 76.33±2.77 |
| 24 h | 60.12±2.85 | 66.02±3.27 | 71.22±2.60 | 50.64±3.19 | 51.17±3.01 | 66.83±2.40 |
| 48 h | 57.18±3.12 | 53.85±3.15 | 65.00±2.40 | 43.73±3.24 | 50.96±3.70 | 55.48±3.33 |
| 72 h | 47.54±2.66 | 52.93±2.87 | 62.71±2.61 | 39.13±2.97 | 47.55±3.96 | 53.61±3.58 |
| 96 h | 39.67±3.47 | 49.67±2.91 | 52.46±3.95 | 36.83±3.23 | 40.79±4.18 | 49.58±4.24 |

## HOST-reacted sperm

In the current study, the mean percentage of HOST-reacted spermatozoa was significantly higher (P<0.05) in BTS extender than in Modena and GEPS extenders in different preservation temperatures and preservation periods. The percentage HOST-reacted sperm reduced significantly during different preservation period irrespective of preservation temperatures. The mean HOST-reacted spermatozoa was significantly higher (P<0.05) in semen preserved at 15°C than at 5°C irrespective of different extenders and preservation periods. In this study, the HOST-reacted sperm was higher than the earlier observations (Zou and Yang 2000; Correa *et al*. 2006).

**Table 4: Mean HOST-reacted sperm in different extenders during different preservation period at 15°C and 5°C**

| Preservation period | HOST-REACTED SPERM(%) | | | | | |
|---|---|---|---|---|---|---|
| | 15°C | | | 5°C | | |
| | GEPS | BTS | MODENA | GEPS | BTS | MODENA |
| 0 h | 65.88±2.30 | 73.38±1.67 | 68.42±2.59 | 63.66±1.89 | 71.38±2.56 | 62.43±3.01 |
| 24 h | 51.83±3.10 | 56.04±2.87 | 58.92±3.05 | 45.67±2.98 | 54.96±3.62 | 56.46±3.03 |
| 48 h | 45.88±1.72 | 51.21±2.66 | 55.54±2.50 | 44.46±2.81 | 48.46±2.53 | 51.75±2.83 |
| 72 h | 44.13±1.80 | 49.71±2.85 | 47.88±2.86 | 41.29±2.23 | 46.13±2.48 | 46.75±3.21 |
| 96 h | 40.54±3.09 | 43.71±3.32 | 46.25±2.71 | 39.17±3.18 | 41.29±3.78 | 42.67±3.13 |

## Conclusion

In conclusion, Modena extender was found to be superior to BTS and GEPS extenders for preservation of Hampshire boar semen. It was also observed that preservation of Hampshire boar semen was better at 15°C than 5°C.

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