Effect of Semen Diluents and Dilution Rates on Motility of Guinea Fowl Spermatozoa Under Short-Term Storage

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Abstract
The assessment of spermatozoa motility is one of the most often used parameters for semen evaluation. The study was conducted at Poultry Research Station, Madhavaram Milk Colony, Chennai- 600 051, to find the effect of different semen diluents and dilution ratio on percent spermatozoa motility of pooled guinea fowl semen at 5°C under short term storage (0, 3 and 6 Hours). Irrespective of the storage periods and dilution ratio, the semen diluted with BPSE had shown better spermatozoa motility than with IMV diluent. Superior motility at the maximum storage period of six hours was found in semen diluted with Beltsville Poultry Semen Extender at the ratio of 1:2 (77.25±1.32%). Based on the study, it is concluded that dilution ratio and storage period had significant influence on spermatozoa motility and the same must be considered for better fertility by Artificial insemination (AI) in guinea fowls.

Key words: Spermatozoa Motility, BPSE, IMV, Guinea Fowl.

Spermatozoa motility is one of the major determinants of fertility in domesticated fowl. Guinea fowls are semi-domesticated birds in which the fertility parameters are yet to be improved for commercial production. Success in assisted reproductive technology (artificial insemination) depends on the quality of pooled semen used for insemination. In addition, while inseminating large number of birds the time lag for insemination, until the last bird must be considered. Hence, the study was made to find the ability of different diluents in maintaining the motility of guinea fowl spermatozoa under short-term storage. The birds used for the study were housed in individual cages and maintained under standard feeding and managemental conditions.

Materials and Methods
Sixteen male guinea fowls of pearl variety (aged one year) were housed in individual cages and were trained for semen collection by abdominal massage technique. Semen was collected during early hours of the day, twice a week as per the procedures described by Burrows and Quinn (1937). Pooled semen sample collected was then kept at 5°C and was diluted with two different diluents namely Beltsville Poultry Semen Extender (BPSE) and IMV poultry semen preservation media each in the ratio of 1:2 and 1:3. The spermatozoa motility was analyzed at 0, 3 and 6 hours of storage.

The overall spermatozoa motility was assessed and expressed as per the procedures described by Peters et al. (2008). A drop of diluted semen with the aid of a micropipette was placed on a microscope slide, which was then covered with a glass cover slip and examined under 400x magnification in a light microscope. The motility determination was carried out by taking into consideration subjective measurements based on the judgment of individuals making the determination. The motility was expressed as the percentage of cells that are motile under their own power.

The statistical analysis of the data was carried out by one way ANOVA using Statistical Package for the Social Sciences 20.0 software.

Results and Discussion
Effect of semen diluents and dilution rates on motility of guinea fowl spermatozoa under short term storage was presented in Table: I

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The semen diluted with BPSE had shown significantly (P≤0.01) higher percent spermatozoa motility in all treatment combinations. Optimum motility for artificial insemination (above 80%) was found in semen diluted in the ratio of 1:2 with BPSE (84.94±0.84), 1:3 with BPSE (81.00±1.22) and 1:2 with IMV (80.00±1.12) stored for three hours. Superior spermatozoa motility at six hours of storage was found in semen diluted (1:2) with BPSE (77.25±1.32%) compared to IMV (70.28±2.01%). Similar trend was also observed by Iaffaldano et al. (2010) wherein the superiority of BPSE extender was reported compared to IGGKPh and Lake extender in turkey semen. The findings in this study was also in agreement with earlier findings of Keerthy (2014) who reported a higher motility of 90.00% in guinea fowl semen diluted with BPSE at 1:4 and 1:5 dilution rates at one hour of storage compared to Lakes semen extender and Modified Beltsville poultry semen extender.

The effect of storage period on percent motility observed in this study was complimentary with the previous studies by Lavoret et al. (2012) and Slowinska et al. (2012) in guinea fowl and chicken semen respectively, wherein the per cent motility decreased over storage periods. Keerthy (2014) also observed similar results in guinea fowl semen.

The magnitude of decrease in seminal motility with increase in the dilution ratio as observed in this study may be attributed to the efficacy of the diluent in maintaining the motility of the guinea fowl spermatozoa. Complimentary results were also observed by Keerthy (loc. cit) with Lakes semen extender in the ratio of 1:3 and 1:5 respectively. Superiority of BPSE extender over IMV is evident in this study in maintaining the guinea fowl spermatozoa irrespective of dilution ratio and storage period.

**Summary**

Spermatozoa motility of above 80% was known to be suitable for AI in domestic animals and poultry. In the present study, BPSE diluent had maintained optimum motility of guinea fowl spermatozoa upto three hours of storage period irrespective of the dilution ratio. Therefore while working with AI in guinea fowl, the semen diluted with BPSE diluents in the ratio 1:2, with the maximum of three hours storage can be considered for maximum mobility of spermatozoa in the female reproductive tract, which subsequently may have positive impact on fertility while covering more number of birds with AI by using extended semen.

**Table I.** Effect of different semen extenders, dilution ratio and storage periods on per cent spermatozoa motility of pooled guinea fowl semen at 5°C (Mean± SE). n=20

<table>
<thead>
<tr>
<th>Dilution rate</th>
<th>Storage period (hours)</th>
<th>Diluents</th>
<th>‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BPSE</td>
<td>IMV</td>
</tr>
<tr>
<td>0</td>
<td>92.80±0.76</td>
<td>87.74±1.28</td>
<td>3.687**</td>
</tr>
<tr>
<td>1:2</td>
<td>84.94±0.84</td>
<td>80.00±1.22</td>
<td>3.372**</td>
</tr>
<tr>
<td>6</td>
<td>77.25±1.32</td>
<td>70.28±2.01</td>
<td>2.967**</td>
</tr>
<tr>
<td>F value</td>
<td>65.398**</td>
<td>34.251**</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>89.43±0.65</td>
<td>85.78±0.95</td>
<td>3.078**</td>
</tr>
<tr>
<td>1:3</td>
<td>81.00±1.21</td>
<td>75.76±1.25</td>
<td>2.929**</td>
</tr>
<tr>
<td>6</td>
<td>71.84±0.97</td>
<td>64.44±1.78</td>
<td>3.647**</td>
</tr>
<tr>
<td>F value</td>
<td>84.099**</td>
<td>58.960**</td>
<td></td>
</tr>
</tbody>
</table>

Means bearing different superscript in a column differ significantly.
Acknowledgement

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References


