A COMPARATIVE STUDY ON CLEAVAGE AND MORULA DEVELOPMENT IN SYNTHETIC OVIDUCTAL FLUID MEDIA (mSOF) WITH OR WITHOUT CITRATE AT TWENTY PER CENT OXYGEN LEVEL

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SUMMARY

The efficiency of buffalo embryo production is much lower than that of cattle. The culture system employed for performing fertilization and subsequent embryo culture up to the transferable stage are sub optimal and need substantial improvement. The present study was carried out with the aim to increase the production of the number of transferable buffalo embryos by adding citrate in embryo development media (mSOF). Follicle of slaughter house ovaries were aspirated and the collected cumulus oophorus complexes (COCS) were cultured in TCM-199 medium supplemented with 10% fetal calf serum, 20% buffalo follicular fluid and 0.5 g / ml FSH for 24 h. The matured oocytes were then inseminated with frozen thawed buffalo semen processed in BO medium. After 18 h of post insemination, the oocytes were cultured in modified synthetic oviductal fluid containing 0.8% BSA and amino acids without (mSOFa) or with citrate (mSOFac). The developmental stages of embryos were assessed at every 48 h interval. Cleavage and morula development rate in mSOFac under 20% O₂ tension were 6.11% and 1.53%, while under same O₂ tension and cultured in mSOFa, the cleavage and morula development rate were 9% and 4%, respectively. It may be concluded that citrate at 20% O₂ level reduces cleavage and morula development in buffalo.

Key words: In-vitro embryo culture, buffalo, synthetic oviductal fluid media

The efficiency of buffalo embryo production is much lower than that of cattle (Palta and Chauhan, 1998). The culture system employed for performing fertilization and subsequent embryo culture up to the transferable stage are sub optimal and need substantial improvement. Citrate stimulates fatty acids synthesis (Goodridge, 1973) and is a chelator of calcium ions. This feature may be of importance for maintaining junctional integrity and thus important for compaction of cells (Gray et al., 1992) in growing embryos under 5 % O₂ tension. Better embryonic development was noticed in mouse in presence of citrate in mSOFa under 5 % O₂ tension (Keskindtepe et al., 1998). The present study compares cleavage and morula development following IVF in mSOFa and mSOFac under 20 % O₂ tension in buffalo.

Follicles of slaughter house buffalo ovaries were aspirated and collected cumulus oophorus complexes (COCS) were cultured in TCM-199 medium supplemented with 10 % fetal calf serum, 20 % buffalo follicular fluid and 0.5 mg / ml FSH for 24 h. The matured oocytes were then inseminated with frozen thawed buffalo semen processed in BO medium. On 18 h of post insemination, the oocytes were cultured in modified synthetic oviductal fluid containing 0.8 % BSA and amino acids (mSOFa) or mSOF containing amino acid and sodium citrate (mSOFac). The developmental stages of embryos were assessed at every 48 h interval.

Cleavage and morula development rate in mSOFac was 6.11 % and 1.53 %, while in mSOFa was 9 % and 4 %, respectively (Table 1). Better embryonic development had been noticed in mouse in presence of citrate in mSOF under 5 % O₂ tension (Keskindtepe et al., 1998). But in this study, under 20 % O₂ tension, the results were poor in mSOFac as compared to sodium citrate, which by interacting with high level of O₂ tension might be producing some toxic
Table 1
Comparative study on cleavage and morula development of buffalo embryos in synthetic oviductal fluid under 20% O₂ tension

<table>
<thead>
<tr>
<th>Gp</th>
<th>Media used for IVC</th>
<th>No. of culturable oocytes</th>
<th>No. of matured oocytes</th>
<th>No. of cleaved oocytes</th>
<th>No. of morula</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mSOFaac</td>
<td>131</td>
<td>108</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(6.11 %)</td>
<td>(1.53 %)</td>
</tr>
<tr>
<td>11</td>
<td>mSOFaa</td>
<td>128</td>
<td>118</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(9 %)</td>
<td>(4 %)</td>
</tr>
</tbody>
</table>

Table 1: Comparative study on cleavage and morula development of buffalo embryos in synthetic oviductal fluid under 20% O₂ tension

REFERENCES


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