

Effect of Addition of Oxytocin in Preserved Semen at the Time of Insemination on Fertility

Lalrintluanga. K^{*}, Deka, B.C.^{}, L.Hmar^{***}; Ayub Ali^{****} and
P.Choudhury^{*****}**

** Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary Science and Animal Husbandry, Central Agricultural University, Selesih, Aizawl, Mizoram.*

*** Professor & Head, Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary Science and Animal Husbandry, AAU, Khanapara*

**** Professor, Department of LPM, College of Veterinary Science and Animal Husbandry, CAU Selesih.*

***** Professor, Department of Veterinary Biochemistry, College of Veterinary Science and Animal Husbandry, Selesih.*

****** Assistant Professor, Department of Veterinary Microbiology, College of Veterinary Science and Animal Husbandry, Selesih.*

ABSTRACT:

A total of 124 pigs were inseminated comprising 32, 35 and 57 female pigs using preserved semen added with 5 IU oxytocin, 10 IU of oxytocin (Syntocinon Inj. 5iu/ml. Novartis Pharma) and no Oxytocin (control) respectively. The farrowing rate was 65.60, 68.57 and 64.90 per cent in the three groups of pigs respectively. The effects of addition of oxytocin in preserved semen before insemination on fertility rate were found to be non-significant. The mean litter size in sows inseminated with preserved semen added with 5 and 10 i.u. oxytocin and without addition of oxytocin (Control) was 7.86 ± 0.33 , 8.00 ± 0.37 and 7.84 ± 0.25 respectively. The effect of addition of oxytocin prior to insemination on litter size was found to be non-significant. This study revealed that the addition of oxytocin to the semen at the time of insemination had no significant effect on farrowing rate and litter size in sows.

Key words: Oxytocin, farrowing rate, litter size, insemination.

Oxytocin was supposed to increase uterine contraction improving the sperm cells transport thus allowing the establishment of an adequate oviductal sperm reservoir if it was added at the time of insemination. It might also induce the endogenous PGF₂α production (and vice versa) and it was likely that both the hormones would advance the onset of ovulation and so would result in a better synchronization between insemination and ovulation resulting in better fertility. However, conflicting reports were given by earlier workers. This study was carried out to investigate the effect of addition of Oxytocin in preserved semen at the time of insemination on fertility in sows.

MATERIALS AND METHODS

Semen was collected twice a week from seven LWY boars by gloved hand technique (Hancock and Hovell, 1959) using a dummy as mount as per the routine programme of semen collection in Artificial Insemination Centre, Selesih, Aizawl, Mizoram. Semen collections were made in the morning from 6.00 to 7.00 AM. from one or two boars per

collection day. The boar was brought to the semen collection site and was allowed to mount over the dummy. Good quality semen was extended in Beltsville Thawing Solution (BTS) keeping 4 billion sperm per insemination in 100 ml volume. The diluted semen was packed in cottle and stored at 18°C in BOD incubator. Preserved semen was used within three days of storage. Artificial insemination (A.I.) was done using sponge tip 'Golden pig' catheter.

A dose of 5 and 10 IU Oxytocin (Syntocinon Inj. 5iu/ml. Novartis Pharma) were added to the preserved semen just before insemination. A total of 124 pigs were inseminated comprising 32, 35 and 57 female pigs using preserved semen added with 5 IU oxytocin, 10 IU of oxytocin and no oxytocin (control) respectively. The farrowing rate and litter size at birth were recorded.

RESULTS AND DISCUSSION

The effects of addition of different doses of oxytocin in the preserved semen at the time of insemination on farrowing rate in pigs are presented in Table 1.

A total of 32 and 35 oestrous pigs were inseminated with preserved semen in which Oxytocin @ 5 and 10 i.u per dose respectively was added at the time of insemination. Fifty seven oestrous pigs (Control) were inseminated without oxytocin. The farrowing rate was 65.60, 68.57 and 64.90 per cent in the three groups of pigs respectively. The farrowing rate recorded with 5 and 10 i.u. oxytocin in the present study was comparable with the reports of Baranov and Vysotskii (1971) and Kudlac *et al.* (1978). But the present findings were lower than the reports of earlier workers (Sergeev, 1963; Schlegel and Loebel, 1972; Konig *et al.*, 1975; Huhn *et al.*, 1977 and Krajnak, 1988).

The effects of addition of oxytocin in preserved semen before insemination on fertility rate were found to be non-significant (Table 1). This was in agreement with the findings of Baker *et al.* (1968), Baranov and Vysotski (1971), Huhn *et al.* (1977) and Tarocco (2002). On the contrary, improved farrowing rate with addition of oxytocin at the time of insemination was reported by earlier workers (Sergeev, 1963; Schlegel and Loebel, 1972; Konig *et al.*, 1975; Krajnak, 1988; Flowers, 1996 and Kirkwood, 1999). However, Flowers and Esbenshade (1994) reported that response to addition of oxytocin in semen on farrowing rate was variable. Levis (2000) reported that the addition of 4-5 IU of oxytocin to semen immediately prior to use improved farrowing rate in warm seasons but not during cool or moderate months. The climatic condition of Mizoram where the present study was carried out was moderate in all seasons of the year. This might be the reason for not getting significant improvement in farrowing rate after addition of oxytocin in the inseminate dose.

The mean litter size in sows inseminated with preserved semen added with 5 and 10 i.u. oxytocin and without addition of oxytocin (Control) was 7.86 ± 0.33 , 8.00 ± 0.37 and 7.84 ± 0.25 respectively (Table 2). The effect of addition of oxytocin prior to insemination on litter size was found to be non-significant. This was in agreement with the finding of Huhn *et al.* (1977), Kudlac *et al.* (1978) and Tarocco (2002). The non-significant effect of addition of oxytocin to the semen at the time of insemination on farrowing rate and litter size might be because the contraction of adequately stimulated uterine horn of sow produces a natural secretion of oxytocin (Tarocco, 2002). This study revealed that the addition of oxytocin to the

semen at the time of insemination had no significant effect on farrowing rate and litter size in sows.

Table 1: Effect Of Addition Of Different Doses Of Oxytocin In The Preserved Semen At The Time Of Insemination On Farrowing Rate In Female Pigs

Oxytocin doses	No. of sows inseminated	No. of sows Farrowed	Farrowing rate (%)	Chi-Square value
5 IU	32	21	65.60	0.030679 ^{NS}
10 IU	35	24	68.57	
Control	57	37	64.90	
Overall	124	82	66.13	

^{NS} Non significant

Table 2: Effect Of Addition Of Different Doses Of Oxytocin In The Preserved Semen At The Time Of Artificial Insemination On Litter Size In Female Pigs

Oxytocin dose (IU)	No. of farrowing	Litter size	
		Mean \pm SE	Range
5	21	7.86 \pm 0.33	5 - 11
10	24	8.00 \pm 0.37	4 - 11
Control	37	7.84 \pm 0.25	4 - 11

ACKNOWLEDGEMENT

The authors are thankful to the Director, A.H. & Vety. Deptt. Govt. of Mizoram for providing necessary facilities to conduct the research work. The Manager and in-charge Pig A.I. laboratory, Selesih, Aizawl, Mizoram is also thankfully acknowledged for the help during this research work.

REFERENCES

- i. Baker, R. D. ; Dziuk, P. J. and Norton, H. W. (1968). Effect of volume of semen, number of sperm and drugs on transport of sperm in artificially inseminated gilts. *J. Anim. Sci.* **27** : 88-93.
- ii. Baranov, F. A. and Vysoskii, N. I. (1971). Effect of sperm numbers and inseminated volume on conception rates and litter size of sows. *Zhivotnovodstvo, Mosk.* **31**(9): 83-85 (*Anim. Breed.Abst.* **1** : 808)
- iii. Flowers, W. L. (1996). Influence of oxytocin as a pre breeding stimulation of sows. *J. Anim. Sci. (Suppl. I)* **74** : 236.
- iv. Flowers, W.L. and Esbenshade, K.L. (1993). Optimizing management of natural and artificial matings in swine. *J. Reprod. Fertil. Suppl.* **48** : 217-228.
- v. Hancock, J. L. and Hovell, G. L. K. (1959). The collection of boar semen. *Vet. Rec.* **71**:664.
- vi. Huhn, U ; Fritsch, M ; Dahms, R. (1977). Control of the fertility of artificially inseminated gilts and sows. Part 2. Effect of addition of oxytocin to boar semen on

- duration of insemination, pregnancy rate and litter size. *Archiv-fur-Experimentelle-Veterinarmedizin.*, **31**(4): 561-566.
- vii. Kirkwood, R. N. (1999). Pharmacological intervention in swine reproduction. *Swine Health Prod.* **7**(1): 29 - 35.
- viii. Konig, I. ; Huha, M. ; Schlegel, W. ; Sklenar, V. ; Papenthin, V. ; Keil, H.W. and Lemcke, K. (1975). Improving the results of pig artificial insemination by adding oxytocin to the semen. *Monatshefte fur veterinary medicin.* **30** (5): 187-190.
- ix. Krajnak, P. (1988). The effect of oxytocin added to insemination doses on fertility of pigs. *Zivocisna Vyroba* **33** : 845-850.
- x. Kudlac, E ; Kozumplik, J ; Plachy, A. (1978). The effect of adding oxytocin to semen before insemination on the reproductive performance of sows. *Veterinarstvi.*, **28** (9): 395-397.
- xi. Levis *et al.*, (2000). Effect of oxytocin at the time of insemination on reproductive performance: A review. Nebraska Swine Report. University of Nebraska. Cited by Knox, R.V. (2001) Artificial Insemination of Swine: Improving Reproductive Efficiency of the Breeding Herd. *Proceeding of Manitoba Agriculture, Food and Rural initiatives swine Seminar 2001*, **15** : 1-16
- xii. Schlegel, W. and Loebel, J. (1972). Studies on the dependence of fertility on uterine motility and semen backflow and the effect of oxytocin on them. *Monatshefte fur Veterinarmedizin*, **27** (14): 537-539.
- xiii. Sergeev, N.I. (1963). Result of Artificial inseminating pigs when oxytocin and neurotropic substances were used. *Zivotsnovodstvo* **25**(2):26-79 (*Anim. Breed. Abstr.* **31**(3):2296).
- xiv. Tarocco, C. (2002). The use of oxytocin for artificial insemination. *Rivista disuinicoltura Bologne, Italy*, **43** (7):31-36 (*Anim. Breed. Abstr.* **71**(6): 4033).