EFFECT OF SALINE DILUTION OF FOWL SEMEN AND ARTIFICIAL INSEMENATION IN LAYER BREEDER HENS

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ABSTRACT

The study was conducted to assess the effect of saline dilution of fowl semen for artificial insemination in egg layer breeder hens under the prevailing environmental conditions. The study was conducted in BV300 layer breeding hens. The dilutions were made with normal saline in the ratio of 1:1 and undiluted semen served as control. Three thousand two hundred and fifty (3250) hens were assigned at random to each group. The dose of insemination was 0.05 ml and the hens were inseminated artificially twice in a week in the afternoon between 1430 h and 1730 h. It was found that the hens in saline dilution group produced significantly ($P < 0.05$) less infertile eggs than the hens in undiluted semen group. Besides, diluted semen inseminated group had numerically lesser early embryonic mortality per cent, dead in shell per cent, lesser live in shell per cent, lesser chicks culling per cent and increased hatchability and saleable female chicks. The present study provided evidence that hens inseminated with 1:1 semen dilution produced more fertile eggs compared to those hens inseminated with undiluted semen. Additionally, insemination with saline diluted semen group had reduced the cost by ₹ 0.47 per female chick.

KEY WORDS: Layer parents, Semen dilution, Fertility, Economics

INTRODUCTION

Artificial insemination (AI) in caged breeder birds is practiced widely and this gives better fertility and hatchability with better performance of their progeny. Now a days to reduce the cost of production, artificial insemination is being done with diluted semen. The advantages of semen dilution include maximum use of good quality semen in short supply, reduction in the ratio of males to females and use of valuable sires with low semen quantity for many females. Further, it is difficult to handle very small volume of undiluted semen and expel it from a tube because of its very viscous nature. However, diluents make it possible the spread of semen to many more hens.

In the past, some research workers have successfully employed various diluents for chicken and turkey semen like Ringer's solution, Lake's solution, sodium phosphate buffer, egg yolk, egg white, milk and tyrode solution (Ahmed, 1983) and in most cases good fertility results were obtained compared to undiluted semen. Keeping in view the benefits of semen dilution in artificial insemination, present study was designed to explore the advantages of saline dilution of fowl semen over undiluted semen in artificial insemination in breeder hens. The objective of the semen dilution is to maximize the reproductive efficiency of cock and to reduce the cost of production per chick.

MATERIALS AND METHODS

The study was carried out at a private layer breeder farm cum hatchery at Namakkal. The birds were divided into 2 groups randomly in such a way that each group had 3250 birds. At the same time, cocks were selected from the same flock and transferred to cages for the production of semen for artificial insemination. Birds in treatment groups were reared under cage system of rearing with standard managemental practices throughout the experimental period. The feed was formulated

following commercial standards. All the experimental diets were prepared on isocaloric and isonitrogenous basis.

The birds were provided with 16 hours of day length (photoperiod) at 24 weeks of age which continued up to 36 weeks of age. The hens in grourp A served as control and were inseminated with undiluted semen, whereas hens in group B were artificially inseminated with semen diluted with normal saline (0.9%) in the ratio of 1:1 (Vasicek *et al*., 2015). The dose of diluted and undiluted semen was 0.05 ml and artificial insemination was done twice in a week between 1430 h and 1730 h (Mian *et al.,* 1990). The eggs were collected five times in a day from the sheds and stored in the egg room at about 16 -17^{0}C prior to setting them in the incubator.

After hatching, egg break open study was conducted and the data were recorded for the number of infertile eggs, early embryonic mortality, dead in shell, live in shell, hatchability percentage and saleable male and female chicks. Twenty two consecutive hatches were taken and data were analysed as per the methods suggested by Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

Breeder hens inseminated with saline diluted semen (group B) recorded significantly ($P < 0.05$) lower infertile eggs (1.80 %) than the group inseminated with undiluted semen (2.43 %). This may be due to the viscosity of undiluted semen. The results indicated that the fertility was better in diluted semen group than in undiluted group, which is in accordance with Mian *et al.* (1990) and Sexton (1976).

Break open studies were conducted after every hatch and data were analysed and the results are presented in the table.

Egg break open parameters	**Treatment groups**	
	Group A : AI with Undiluted semen (n=22)	Group B: AI with Saline diluted semen (n=22)
Infertile eggs %	2.434 ± 0.13	1.803 ± 0.13*
Early embryonic mortality %	1.442 ± 0.09	1.420 ± 0.10
Dead in shell %	1.045 ± 0.09	0.954 ± 0.08
Live in shell %	0.537 ± 0.05	0.506 ± 0.05
Hatchability %	92.68 ± 0.34	93.46 ± 0.36
Saleable female chicks %	49.80 ± 0.14	50.17 ± 0.14
Male per cent %	50.20 ± 0.14	49.83 ± 0.14
Chicks culled %	0.984 ± 0.03	0.952 ± 0.06

*significant at $P < 0.05$ between groups

The above data revealed that, early embryonic mortality, dead in shell, live in shell and hatchability per cent were not significantly affected by saline dilution of semen. But, numerically all the above parameters are better in group B. Moreover, saleable female chicks were higher in semen diluted inseminated group.

Based on the above results, semen dilution was found successful and the maintenance of male

birds could be reduced from the sex ratio of 1:10 to 1:6. Cost of production of male from day old to 24th week of age was Rs. 386.00 per bird. This cost could be reduced since sex ratio was reduced from 1:10 to 1:6, and the cost of production of commercial layer chicks is reduced with the availability of more space for female parents. The production cost of commercial layer female chick was Rs. 25.60. This cost is increased by Rs. 0.47 (based on the average of 110 female chicks per female layer parent) per female chick. This is in accordance with Surai and Wishart (1996) and Brillard (2003).

From this study, it could be concluded that, the breeder hens inseminated with saline diluted semen in 1:1 ratio had more advantages in terms of production of more fertile eggs and other parameters. Further, the advantages of semen dilution and artificial insemination include better overall fertility and hatchability, thus reducing the cost of production per unit of day-old chicks.

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