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EFFECT OF PMSG FOLLOWED BY HCG ON ESTRUS SYNCHRONIZATION IN WEANED SOWS

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ABSTRACT: A total of 60 crossbred sows (Hampshire X Khasi Local) were selected a week after weaning and divided into two groups (30 in each). The sows in group-I were injected with 800 IU of PMSG followed by 400 IU of HCG 56 hours after PMSG. In Group-II served as untreated / control. Natural service was given to all estrus sows after 96 hours of hormonal treatment. It was noticed that 90 % of sow exhibited all the sign of estrus after 96 hours and 75 % of sows were sexually receptive to boar. The average interval between treatments to onset of estrus was 87.74 ± 10.72 hours. The duration of estrus varied from 40 to 56 hours with an average of 42.2 ± 3.24 hours in treatment group. Whereas, in control group it ranged from 27 to 52 hours with an average of 36.78 ± 4.12 hours. The furrowing rate was 88 and 90.9 % respectively in treated and control group, while the litter size was 10.37 ± 0.57 and 9.15 +0.34 and number of live born per litter was 9.24 ± 0.43 and 8.78 ± 0.27 respectively. Present finding suggested that it is possible to induce and synchronize fertile estrus with PMSG followed by HCG in weaned sows. The study also suggested that estrus synchronization followed by synchronized furrowing might be practiced to reduced pre-weaning piglet mortality during winter.

Key Words: Estrus synchronization, Weaned sows, PMSG, HCG.

INTRODUCTION

Northeast as a whole is pork consuming zone and pig rearing is very common in almost every household. Pig husbandry is an integral part of diversified resource poor agriculture in tribal belts of NEH region of India. The pig farming has a special significance as it can play an important role in improving the socio-economic status of the farmers and to meet demand in the region. One of the common problems in pig husbandry is high rate of pre-weaning piglet mortality during winter season due to severe cold in the region. In this context, estrus induction / synchronization followed by synchronized furrowing may be an option to reduce pre-weaning piglet mortality during peak winter.

Estrus induction and synchronization in sows may also permit to execute the breeding operation in fixed days of a year and pork will be produced according to market demand. Moreover, the period between weaning to first service need to be minimized to enhance the

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reproductive efficiency of herd. Numerous factors affect responsiveness to PMSG & HCG in sow and could vary between herds and production system (Estenne and Hartsock 1998).

Keeping the above points in view, this study was undertaken to investigate the effect of PMSG plus HCG on the estrus induction and synchronization in weaned sows.

MATERIALS AND METHODS

The present study was conducted in Division of Animal Production, ICAR Research Complex for NEH Region, Meghalaya, India. A total of 55 crossbred sows (Hampshire X Khasi Local) with 75% Exotic Hampshire inheritance, were selected ramdomly a week after weaning and maintained in the same management condition. All the sows were maintained in the indoor pen system of housing and fed with balanced concentrate mash ration twice daily. The sows in group-I (no. 30) were injected with 800 IU of PMSG (Foligon) followed by 400 IU of HCG (Chorulon) 56 hours after PMSG injection. The untreated (no. 25) sows (Group-II) served as control. The parameters like onset of estrus, estrus intensity, duration of estrus and sexual receptivity were observed at 12 hours interval. Natural mating was followed on estrus sow 72 hours after PMSG injection. Pregnancy rate, litter size, number of live born piglets and litter weight at birth were recorded. The data were analyzed with suitable statistical methods given by Snedecor and Cochran (1989).

Table 1: Response of PMSG followed by HCG treatment on sow (Mean ±SE)

Sl.No.	Parameter	Treatment group	Control group
1	Number of sow treated	30	25
2	Percentage of sow responsive to treatment (no. of sow)	90 (27)	44(11)
3	Average treatment to onset of estrus interval (h)	87.74 ± 10.72	-
4	Average duration of estrus (h)	42.23 ± 3.24^{a}	36.78 ± 4.12^{b}
5	Furrowing rate (number of sow)	88 % $(24)^{a}$	90.9% $(10)^{a}$
6	Litter size	10.37 ± 0.57^{a}	9.15 ± 0.34^{b}
7	Number of live born per litter	9.24 ± 0.43^{a}	8.78 ± 0.27^{a}

Figures having different superscript differs significantly ($P<0.05$)

RESULTS AND DISCUSSION

Estrous Behaviour

Rapid follicular growth ensures rise in circulating level of estradiol. The estradiol is responsible for the behavioral changes associated with estrus and elicits the gonadotropin surge, resulting in ovulation. The estrus behaviour of sow in response of

hormonal treatment are presented in (Table 1). The estrous signs like swollen congested vulval lips, restlessness and less feed intake were observed only in 25% of sows after 48 hours of treatment. However, swollen and congested vulva lips, homosexual behaviour, presence of sticky mucous discharge from vulva and immobilization with back pressure were recorded in 75 % of sows after 72 hours, but only 25 % of sows were sexually receptive to boar. Even after mating, estrus signs were observed in 40 % of sows upto 120 hours after treatment. In untreated (control) group, 11 (44%) sows exhibited estrus sign out of 25 sows during study period. The percentage of sows exhibited standing estrous after treatment (90%) in the present study was similar to the finding of Nafornita *et al.* (1986) who reported 92.8% and 32.1 % of sows exhibited standing estrus in PMSG plus HCG treated and control groups respectively. Schafer *et al.*(1999) also observed that all treated sows came into estrus compare with only half of sows in controls groups.

The average time interval from treatment to onset of estrus ranged 56 -102 hours with an average of 87.74 ± 10.72 hours. Similar finding was reported by Luca *et al.*(1999). They reported that the treatment to estrus interval was 98.7 hours in sows received PMSG (750 IU) on 3 days after weaning. However, slightly higher interval of 3.97 days was recorded in sows treated with 400 IU PMSG plus 200 IU HCG at weaning by Lanchester (1987). This difference in treatment to estrus interval may be due to effect of day of treatment after weaning (Lucia *et al.* 1999) and dosage of hormone (Matousek and Liskovcova 1984).

The duration of estrus varied from 36 to 56 hours with average of 42.23 ± 3.24 hours in treated group, whereas, in control group it ranged from 27 to 56 hours with an average of 36.78 ± 4.12 hours. The duration of estrus was significantly ($P< 0.05$) higher in treated groups than that of control groups(natural estrus), which is in accordance with those observed by Jacob and Elze (1989). They reported that the duration of ovulation was longer in induced estrus with PMSG plus HCG than in non-induced control females. On contrary, Lucia *et al.* (1999) stated that the estrus with PMSG did not affect the estrus duration and they recorded mean estrus duration of 55.9 hours in the treated groups.

Furrowing rate and litter size

The furrowing rate and litter size in treatment and control groups are presented in same table 1. In treatment group, the furrowing rate was 88%, while in control group, the furrowing rate was 90.9 %. There was no significant difference on furrowing rate between treated and control groups. Estienne and Hartsock (1998) reported furrowing rate of 82.37 % in PMSG treated group and 96.6 % in control group which was as per with the present finding. Similarly, Huhn and Konig (1989) and Maass and Huhn (1988) recorded the furrowing rate of 81.7% and 81.5 % respectively in PMSG treated sows. Huhn and Konig (1986) also recorded pregnancy rate of 73.8-80.6 % in sows treated with PMSG on the day of weaning followed by HCG. However, higher pregnancy rate of 97.4% was reported by Schafer *et al.* (1999). The furrowing rate of 48.3 - 57.1 % reported by Raasch *et al.* (1985) and 58.4 -62.0 % by Matous and Liskovcora (1984) in PMSG treated sows in lower that that observed in our study.

The present study recorded an average litter size of 10.37 ± 0.57 (7 to 14) and 9.15 ± 0.34

respectively in treated and control group. There was significantly ($P<0.05$) higher litter size in treated group than in control group. The average litter size at birth (10.37) recorded in the study in treated group is similar to those observed (10.7) by Huhn and Konig (1989), (10.0) Maass and Huhn (1988) and (9.7) Matousek and Liskovcova (1990) after PMSG followed by HCG treatment groups. The significant higher litter size in treated groups in the study is in agreement with Estienne and Hartsock (1998) who reported that the total litter size (by 11.3 piglets /litter) was greater for PMSG treated sows given PMSG plus HCG than in control group. The longer half life of PMSG may be attributed to the prolonged period of follicular stimulation which leads to release of more number of ova, and the sows in turn had normal or even above normal ovulation in treated sow (Estienne and Hartsock 1998) which would account for the apparent increase in litter size in PMSG treated sows in present study.

The present study recorded 9.24 ± 0.43 and 8.78 ± 0.27 of average live born piglets per litter in treated and control group respectively. These findings were in agreement with Huhn and Konig (1986) and Maass and Huhn (1988) respectively who recorded average number of live born piglets of 10.62 and 9.5 and 9.37 and 9.10 in sows and gilts respectively treated with PMSG. Similarly, Norqvist *et al.* (1982) observed that the average live born piglet per litter was 11.0 and 10.3 respectively in treated and untreated control. Though, there was significantly higher litter size in treated group than in control group. The average live born piglets per litter between treated and control groups were not significant. This was mainly due to higher incidence of stillbirth in treated groups than control group. However, Estienne and Hartsock (2000) observed that piglets born live was higher in PMSG treated sows than in untreated sows and he recorded average live born piglets of 12.7 and 11.7 per litter respectively in treated and control groups.

The pregnancy rate and litter size that varied between studies with PMSG plus HCG treatment may be due to numerous factors (day of treatment after weaning, dosage of hormone and route of administration, body condition of sow, insemination methods and dose, nature of breeding). These factors affect the weaning -to-estrus interval in sows and responsiveness to PMSG & HCG in sow and could vary between herds and production system (Estienne and Hartsock 1998). However, Huhn (1995) summarized that no adverse effect were observed even after years of treatment with 750-800 IU of PMSG after weaning and the effect of treatment on reproductive performance was beneficial.

This study concluded that it is possible to induce and synchronize fertile estrus in sows by injecting 800 IU of PMSG followed by 400 IU HCG 56 hours later. However, more research using larger number of crossbred sow is needed to address the issue of ovulation rate, furrowing rate and litter size after PMSG plus HCG treatment. The results also suggested that estrus synchronization followed by synchronized furrowing might be practiced to reduce pre-weaning piglet mortality during winter.

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