

PHYSICAL CHARACTERISTICS OF OESTRUS MUCUS AND CONCEPTION RATES IN REPEAT BREEDER BUFFALOES

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ABSTRACT

A project was planned to study some physical characteristics of oestrus mucus and conception rates in repeat breeder buffaloes after different treatments. For this purpose, 60 adult buffaloes with history of repeat breeding were used. Mucus samples from these animals were collected during heat and studied for colour, consistency, pH and fern pattern. Experimental buffaloes were randomly divided into four equal groups A, B, C and D. In buffaloes of group A, GnRH was given immediately after insemination. In group B antibiotic infusion was given 24 hr after insemination. In animals of group C, insemination was done in the uterine horn ipsilateral to ovary bearing mature graafian follicle. Animals of group D were inseminated in the uterine body and served as control.

The results indicated that oestrus mucus was transparent in 55.0%, translucent in 38.33% and whitish in 6.67% buffaloes. The consistency of mucus was viscous in 38.33%, thin in 50.0% and thick in 11.67% repeat breeder buffaloes. Mean pH of oestrus mucus was 7.49 ± 0.35 . Fern pattern was very characteristic in 6.67%, characteristic in 48.33% and less characteristic in 45.0% buffaloes. The conception rates in animals of group B were significantly higher ($P < 0.05$) than those of group A, C or D; the differences in conception rates among buffaloes of the latter three groups were non significant. It was concluded that post-insemination antibiotic infusion may be used to improve conception rates in repeat breeder buffaloes.

Key words: Mucus characteristics, fertility, repeat breeder buffaloes.

INTRODUCTION

Buffalo is a major dairy animal in Pakistan. At present, there are approximately 21.3 million heads of buffaloes in the country (Ahmad *et al.*, 1998). Besides providing milk and meat for human population, they are also a source of hides and provide draught power for various farm operations.

Repeat breeding is a major problem adversely affecting the productive and reproductive performance of buffaloes. Under classical definition, a repeat breeder buffalo is one that has two or more unsuccessful services, has normal oestrus cycle, is free from any palpable abnormalities, shows no abnormal vaginal discharge, has calved at least once before and is less than 10 years old (Drost, 1987).

Previous work has indicated that delayed ovulation (Erb *et al.*, 1976), inadequate luteal function (Kimura *et al.*, 1987), embryonic death (Ayalon, 1984) managerial errors (O'Farrell *et al.*, 1983) and non-specific uterine infection (Samad *et al.*, 1984) are among some possible causes of repeat breeding. Physical characteristics of oestrus mucus including colour, consistency, elasticity, pH, viscosity and fern pattern are considered as effective laboratory tools to predict fertility in cattle (Pandey *et al.*, 1983). Body

condition score also seems to be associated with fertility (Bhalaru *et al.*, 1987).

The present project was designed to study physical characteristics of oestrus mucus including colour, consistency, pH and fern pattern and body condition score in repeat breeder buffaloes. Attempts were also made to improve conception rate in these repeat breeder animals through the use of GnRH, post insemination intrauterine antibiotic infusion and deep intrauterine insemination in the horn ipsilateral to the ovary bearing mature graafian follicle.

MATERIALS AND METHODS

Animals

For this study, 60 buffaloes with history of repeat breeding, brought to the clinic of the Department of Animal Reproduction University of Agriculture, Faisalabad for insemination or infertility treatment were used. Animals that had at least two unsuccessful services and were free from any clinical abnormalities of reproductive tract were included. In these animals oestrus was detected by behavioral signs and confirmed through rectal palpation. Only buffaloes showing signs of true heat were selected.

Collection and examination of mucus

During rectal palpation, mucus was squeezed out from the reproductive tract and collected in a glass beaker. Immediately after collection, mucus samples were examined for physical characteristics including colour, consistency, pH and fern pattern. The colour of mucus was visually assessed and classified as transparent, translucent or whitish. For determination of consistency, a drop of mucus was put on a glass slide held in a sloppy direction and the speed of drop on the slide was noted. On the basis of consistency mucus was classified as thick, thin or viscous. A pH meter was used to determine pH of mucus. In order to observe fern pattern, about 0.5 ml of mucus was smeared on a glass slide. The smear was air dried and examined under microscope (X100). Depending on the degree and pattern of crystallization and length of branches of the fern, the fern pattern was described as very characteristic, characteristic, less characteristic and missing fern pattern (Agarwall and Purbey, 1983).

Body condition score

The body condition score of each animal was recorded on a numerical scale ranging from 0 to 5. For this purpose, the thickness of fat over the lumber and tail-head areas of each animal was estimated and a score from 0 (emaciated) to 5 (very fat) was assigned, as described by Peters and Ball (1987).

Treatment of animals

After heat detection and collection of mucus, the experimental animals were inseminated and randomly divided into four groups A, B, C and D, with 15 animals in each group. In animals of group A, 2 ml of GnRH (Dalmarelin, Prix Pharma) was injected intramuscularly immediately after insemination. The buffaloes of group B were treated with intrauterine infusion (procaine penicillin 40.00000 I.U. + streptomycin 2 gm) 24 hours after insemination. In animals of group C, deep intra-uterine insemination was performed in the horn ipsilateral to the ovary bearing mature Graafian follicle. Animals of group D were inseminated in the body of uterus and served as control.

Insemination in buffaloes of the four groups was performed using freshly diluted good quality semen. Animals of all groups were examined for pregnancy through rectal palpation at least two months after insemination.

Statistical analysis

Conception rates (%) in animals of the four experimental groups were computed. In order to see the

magnitude of variation in conception rates among animals of various groups, the data were subjected to statistical analysis using two by two relative frequency chi-square test (Samuels, 1991).

RESULTS AND DISCUSSION

Physical characteristics of mucus

In this study, physical characteristics of oestrus mucus including colour, consistency, pH and fern pattern were investigated in repeat breeder buffaloes. The results indicated that mucus was transparent in 55%, translucent in 38.33% and whitish in 6.67% repeat breeder buffaloes. According to Enkhia and Kohli (1982), transparent mucus was found in 50.0% repeat breeder cows, translucent mucus was in 30% and yellowish in remaining 20% cows. For optimum fertility, the oestrus mucus should be transparent.

In this study, the consistency of oestrus mucus was found to be viscous in 38.33% repeat breeder buffaloes, thin in 50.0% and thick in 11.67% buffaloes. Enkhia and Kohli (1982) reported thin oestrus mucus in 35.0% repeat breeder cows. Pandey *et al.* (1983) observed watery mucus in most of repeat breeder cows, which do not support our results in buffaloes.

The pH of oestrus mucus in repeat breeder buffaloes included in this study ranged from 7.0 to 8.2, with an average of 7.49 ± 0.35 . Bishoni *et al.* (1982) observed that pH of oestrus mucus varied from 6.8 to 8.5. Thakur *et al.* (1981) did not record any difference in pH of mucus from fertile or repeat breeder buffaloes; animals of both groups had alkaline pH of mucus.

In repeat breeder buffaloes, fern pattern was very characteristic in 6.67%, characteristic in 48.33% and less characteristic in 45.00% animals. Missing fern pattern was not seen in any sample. Bishoni *et al.* (1982) observed atypical fern pattern in 62% and typical in 38% repeat breeder cows. According to Thakur *et al.* (1981), there was no difference in magnitude of ferning in normal and repeat breeder buffaloes. Body condition score of an animal has been shown to be associated with conception rates in cows and buffaloes (Bhalaru *et al.*, 1987). Among repeat breeder buffaloes included in this study, 10.0% were thin, 36.67% satisfactory, 50.0% good and 3.33% were fat.

Conception rates

The conception rates in repeat breeders buffaloes of four treatment groups A, B, C and D are given in Table 1. The highest conception rate 73.33% was recorded in buffaloes of group B given post insemination antibiotic infusion, while the lowest conception rates (33.33%)

Table 1; Conception rates in repeat breeder buffaloes of the four experimental groups

Experimental groups	No. of animals inseminated	No. of animals conceived	Conception rates(%)
A-Given GnRH after insemination	15	8	53.33a
B- Given post insemination antibiotic infusion	15	11	73.33b
C- Inseminated in the uterine horn	15	8	53.33a
D- Inseminated in the uterine body (control)	15	5	33.33a

Values with different superscripts differ significantly ($P < 0.05$)

were observed in buffaloes of control group D, the difference was significant ($P < 0.05$). The conception rates of animals of group B were significantly higher than those of groups A, C and D, the differences in conception rates among buffaloes of latter three groups were non significant.

These results indicate that administration of antibiotic, infusion 24 hours after insemination improved conception rates over control animals. However, post-insemination GnRH administration was ineffective in this regard. The same was true for deep intrauterine insemination in the horn ipsilateral to the ovary bearing mature Graafian follicle. From these results it appears that in repeat breeding buffaloes included in this study, the problem was due to sub-clinical uterine infection. Delayed ovulation does not seem to be associated with repeat breeding in buffaloes used in this study.

Post-insemination intrauterine antibiotic infusion has been shown to improve conception rates in repeat breeder cows and buffaloes. Luktuke and Joshi (1961) recorded 60.0% conception rates in repeat breeder cows infused with a solution containing penicillin and streptomycin in 40 ml of distilled water. Shukla and Pandit (1989) observed 60.29% conception rates in repeat breeder cows through post-insemination intrauterine penicillin and streptomycin infusion. These results support findings of this study.

Contrary to the findings of this study, Stevenson *et al.* (1988) demonstrated that administration of GnRH at the time of insemination to repeat breeder dairy cows increased pregnancy rates upto 54%. Similarly, Lewis *et al.* (1990) concluded that GnRH increased first-service pregnancy rates by an average of 5 to 6%.

Stevenson *et al.* (1984) suggested that GnRH administration during oestrus might affect time of ovulation, corpus luteum development, progesterone secretion and embryo survival. According to Michael *et al.* (1993), GnRH administration at oestrus in repeat breeding dairy cows increased serum progesterone levels earlier after ovulation and these higher progesterone levels were maintained for upto 40 days after treatment and seemed to be associated with higher embryo survival until 42-56 days after insemination.

Deep intrauterine insemination into the horn ipsilateral to the ovary bearing mature Graafian follicle

seems beneficial, keeping in view the mechanism of fertilization. However, this technique is never risk-free, as there is every possibility of manual rupture of premature follicle during ovarian examination per rectum. This problem can be overcome through insemination bilaterally in the both uterine horns without ovarian examination. However, William *et al.* (1988) reported little benefit for bilateral uterine horn over uterine body insemination. Graves *et al.* (1991) recorded 62.9% conception rates through uterine body inseminations while 54.2% when inseminations were done in both uterine horns. Thus, further studies are suggested to investigate the usefulness of insemination in the uterine horn in fertile, as well as repeat breeder, buffaloes.

From these studies it can be concluded that post-insemination intrauterine antibiotic infusion may be used to increase conception rates in repeat breeder buffaloes. However, in this regard the role of GnRH at the time of insemination needs to be further investigated.

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