COMPARATIVE STUDY OF OESTRUAL MUCUS SPINBARKEIT VALUE AND FERTILITY IN CROSSBRED CATTLE DURING HEAT STRESS AND AT COMFORTABLE PHASE

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Abstract

The study was envisaged to compare *oestrual mucus spinbarkeit value and fertility in crossbred cattle during heat stress and at comfortable phase. A total of 24 apparently healthy cyclic crossbred cows in oestrus were selected for the study during the phase November – January (Group I), which was identified as comfortable phase. Another group of 20 animals in oestrus were also selected during March- May (Group II), which was identified as heat stress phase. Cervico- vaginal discharge during oestrus was collected and stretchability measured by spinbarkeit test. All the animals were inseminated 12 h after the onset of oestrus and pregnancy of non-returned animals was determined by rectal examination on day 45 post AI. Mean spinbarkeit values of conceived and non conceived animals in Group I were 16.56 ± 0.65 cm and 12.80 ± 0.50 cm respectively with overall mean of 14.20 ± 0.54 cm. The corresponding values of group II animals were 17.60 ± 1.43 cm, 16.53 ± 1.31 cm and 16.8 ± 1.03 cm. Significantly higher spinbarkeit values were obtained in conceived animals of the both the groups. Conception rates during comfortable phase and at heat stress were 37.5 and 25 per cent respectively.*

Key words: Spinbarkeit values, THI Index, fertility, heat stress, cows

Review of literature reveals that heat stress has been extensively associated with a decrease in fertility (De Rensis and Scaramuzzi, 2003). Based on THI index, heat stress phase in Kerala has been identified as during March - May and comfortable phase during November-January (Prasad, 2014). Wolfenson *et. al.* (1997) reported that plasma oestrogen concentrations were low during heat stress period in dairy cows. The changes in sex steroid levels greatly influenced the biophysical and biochemical properties of bovine cervical mucus (Rutlant *et al*., 2002). Oestrogen decreased the viscosity of cervical mucus and converted in to string form during oestrus (Hafez *et al*., 2000).

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Layek *et al.* (2013) noticed that spinbarkeit values of cervical mucus directly influenced the conception rate. Spinnbarkeit value of cervical mucus reaches a maximum value immediately before or during the ovulatory phase in cows, due to the rise in estrogen concentration. A wide variation in spinnbarkeit values of cervical mucus have been reported in different breeds (Tsiligianni *et al*., 2001). The study was undertaken to compare the oestrual mucus spinbarkeit values and fertility of crossbred cattle during comfortable and heat stress phase.

Materials and Methods

The crossbred cows maintained under uniform management conditions at University Livestock Farm and Fodder Research Development Scheme (ULF & FRDS), Mannuthy, Thrissur district of Kerala were utilized for the study. A total of 24 apparently healthy cyclic cows in oestrus were selected for the study during the comfortable period November – January (Group I). Another group of 20 animals in oestrus were also selected during heat stress phase March- May (Group II).

For the collection of oestrual mucus, animals in oestrum were examined per rectum to fix the cervix and external-os was located. Vulval lips were cleaned thoroughly using a sterile cotton swab. Cervico-vaginal discharge was aspirated during oestrus using a sterile glass pipette attached to a sterile disposable syringe connected by an adapter. Sterile glass pipette was inserted through the vagina, fixed at the level of the mid cervix and the discharge aspirated using the syringe. Collected discharges were transported to the laboratory in a sterile screw capped vial within 30 min of collection to measure stretchability of cervico-vaginal discharge by spinbarkeit test. All the animals were inseminated with frozen semen, 12 h after the onset of oestrus and pregnancy of non-returned animals was determined by rectal examination on day 45 post AI.

Results and Discussion

Mean spinbarkeit value of cows in comfortable phase (14.20 ± 0.54 cm) was significantly lower than those in the phase of heat stress (16.8 ±1.03 cm). This was contradictory to the previous findings that spinbarkeit values were lower during heat stress, due to reduced plasma oestradiol concentration (Wolfenson *et al*., 1997).

Mean spinbarkeit values of conceived and non conceived animals in Group I were 16.56 ± 0.65cm and 12.80 ± 0.50 cm respectively. The corresponding values of group II animals were 17.60 ±1.43cm and 16.53 ± 1.31cm. Significantly higher spinbarkeit values were obtained in conceived animals of the both the groups. This was in agreement with Doddamani and Honnapagol (2005), who reported higher spinbarkeit values among conceived animals. In contrast with the present finding, Tsiliagianni *et al.* (2000) observed no significant difference between conceived and non conceived animals. Higher spinbarkeit value among the

Table1. Comparison of mean spinbarkeit values of oestrual mucus in conceived and non-conceived cows during comfortable and heat stress phase

Group	conceived animals		non-conceived animals		Overall mean spinbarkeit Value
	no. of animals in percent	spinbarkeit value (cm)	no. of animals in percent	spinbarkeit value (cm)	
Group I (comfortable phase) (n=24)	37.5%	16.56 ± 0 .65^{a}	62.5%	12.80 ± 0.50^{b}	14.20 ± 0.54^{A}
Group II (Heat stress phase) (n=20)	25%	17.60 ± 1.43^{a}	75%	16.53 ± 1.31^{b}	16.8 ± 1.03^{B}

Mean with different superscripts (a and b) within a row differ significantly (p<0.05)
Overall mean with different superscripts (A and B) within a column differ significantly (p<0.05)

animals which conceived subsequently might be due to higher oestradiol level maintained by these animals at the time of oestrus, which would have ensured preovulatory LH surge, better sperm transport and the resultant pregnancy.

Conclusion

Significantly higher spinbarkeit values were noticed among the animals which conceived subsequently, irrespective of whether they were in phase of comfort or of heat stress stress, which suggests that higher spinbarkeit values indicates better chances of conception among cows.

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