

## VAGINAL ELECTRICAL RESISTANCE DURING DIFFERENT PHASE OF ESTRUS CYCLE IN COWS AND HEIFERS

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ABSTRACT

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The present research study was conducted for detection of estrus and changes of vaginal resistance during different phase of estrus cycle and pregnancy with the help of electronic probe 'DRAMINSKI' heat detector in cows and heifer after the treatment of PGF<sub>2α</sub>. The result revealed that in cows the mean vaginal electric resistance (VER) was significantly low (230 W) during estrus, than proestrus (295 W), metestrus (262 W) and diestrus/ pregnancy (260 W) (P < 0.01). Also in heifers, the mean VER was significantly low (222.5 W) in estrus than proestrus (261.25 W), metestrus (274.5 W) and diestrus/ pregnancy (264.62 W) (P < 0.01). There is no significant differences between cows and heifers in VER of different phases of estrus cycle and pregnancy period.

**Key words:** Cattle, Estrus detection, Vaginal electric resistance

The accurate detection of estrus is the key to efficient reproduction and maintaining an optimal calving interval. Many difficulties are encountered in detecting estrus by visual observation alone, especially in large herds (Pelissier, 1972). Various aids for detection of estrus have been developed (Foote, 1975). During the past decade numerous studies have reported change in electrical resistance (ER) of mucus in vaginal wall associated with estrus in cattle (Kitwood *et al.*, 1993 and Hulsure *et al.*, 1995).

The electrical resistance tends to decline markedly at estrus and cows inseminated with low electric resistance have a highest pregnancy rate than those inseminated when electric resistance is high (Leidl and Stolla, 1976). However, there is considerable variation within and among cows in addition to cyclic changes, partly due to techniques of measurement and inflammation in some animals.

Therefore, it was proposed to undertake study for detection of estrus and changes of vaginal electrical resistance during different phases of estrus cycle and pregnancy with help of 'DRAMINSKI' heat detector in crossbred cows and heifers.

12 animals were selected for the present study, which were divided into two Groups i.e. Group-I (8 cows) and Group -II (4 heifers). The gynaeco-clinical examination of each experimental animals were carried out at time of selection. The selected animals were treated with single dose of injection of Lutalyse (Dinoprost tromethamine 25 mg) intramuscularly to those cows showing regular cycle activity with having active corpora lutea.

The detection of estrus is carried out by 'DRAMINSKI' heat detector probe. The 'DRAMINSKI' (PL-10-860 Olsztyn, OWOCOWA-17) estrus detector consist of an electronic control unit and a vaginal probe with probe connector for detection of estrus. In the procedure of reading first the animal was restrained in standing position in travis and the vulvar portion was scrubbed thoroughly by applying a clean wet paper towel. Then, holding the probe in one hand, the vulval lips of the animal were separated with the other hands

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thumb and fore finger and the probe inserted, continued until the pressure of cervical wall was felt and press the start button. The holding of the probe stationary near cervix for 5 seconds. The decimal point appearing above the hold indicator was noted then removal of probe and record reading (Patil, 2003).

The estrus detection reading were recorded daily in morning from first day of Lutalyse (PGF<sub>2</sub> alpha) injection to onset of estrus (this period was considered as proestrus), estrus, metestrus and diestrus / pregnancy period (upto 42 days) for study of changes in vaginal electric resistance (VER) in all crossbred cows and heifers.

The estrus was detected by using electronic DRAMINSKI probe along with visual observation and estrus symptoms. The cow or heifer exhibiting estrus and low VER was inseminated with progeny tested frozen semen.

The crossbred cows and heifers which does not show estrus after administering PGF<sub>2α</sub> injection and those animals which were detected non-pregnant with the help of ultrasound machine on day 25 were deleted from the experiment. The statistical analysis was carried out by using standard method of Snedecor and Cochran (1987).

The results revealed that, the average VER in proestrus period was 295 W and 261.25 W in Group I (cow) and Group II (heifers), respectively, which decreased on day of estrus, the average VER on the day of estrus was 230 W and 222.5 W in Group I (cow) and Group II (heifer), respectively. In earlier studies Aboul-Ela (1982) and Aizinbundas *et al.* (1972) reported that electrical resistance of vaginal mucus changes with the stages of estrus cycle. The lowest values of VER have been reported on the day of estrus, due to increase in volume and ionic content of vaginal secretion. The estrogen causes vaginal vasodilation which increases electric conductivity and decrease vaginal electric resistance. Patil (1987) and Hulsure *et al.* (1995) also stated that the measurement of VER has been utilized for detection of estrus.

In the metestrus period, VER was further increased in both the groups. In Group I and Group II, the average vaginal electric resistance were 262 W and 274.5 W, respectively, which remains nearly constant in the metestrus period. Noonan (1971) stated that during metestrus period corpus luteum grows rapidly from the granulosa cells of the ruptured follicle. The corpus luteum is largely under of progesterone production by inhibiting secretions of follicle stimulating hormone by pituitary gland.

During diestrus / pregnancy period, the average VER in Group I and Group II, were 260.58 W and 264.62W, respectively. The present results are in conformity with earlier report of Leidl and Stolla (1976) who reported that the VER of pregnant cows and heifers during first trimester and pregnancy has also been shown to have a high resistance due to influence of progesterone. Edward and Levin (1974) and McCaughey and Patterson (1981) emphasized that the measurement of changes in VER of mucosal surface vestibular epithelium can be useful aid in confirmation of estrus and early pregnancy diagnosis.

As per VER in different stages of estrus cycle, the results revealed that, in Group I (cow), the average VER was significantly low in estrus stage than proestrus, metestrus and diestrus / pregnancy period in cows ( $P < 0.01$ ). In Group II (heifer), the average VER was significantly low in estrus stage than proestrus, metestrus and diestrus / pregnancy period in heifers ( $P < 0.01$ ). However there was non-significant differences between cows and heifers in VER in different stages of estrus cycle and pregnancy period.

It was concluded that the VER changes with the stages of estrus cycle and pregnancy period. VER was decreased rapidly in vagina during estrus as mucus secretion increases associated with estrus.

#### REFERENCES

- Aboul-Ela, M.B. (1982). Proc. buffalo, Seminar on Reproduction and meat production, Tanuka (A.P.), India w.e.f. 15-17<sup>th</sup> Jan, 1982: 529 (C.F. S.K.

- Agrawal and O.S. Tomar, (1998). Reproductive technology in buffalo. Indian Veterinary Research Institute.:22-23.
- Aizinbudas, L.B., Karazya, R., Lindzius, L., Narvaishas, K. and Jurgaitis, A. (1972). The electrical resistance and mucus membranes under normal and pathological conditions. Proc. 2<sup>nd</sup> Conf. Pathophysiology. Baltic Repub. And Bielorussian SSR (Vinlnius – Kauras) : 3-4.
- Edwards, D. and Levin, R.J. (1974). An electrical method of detecting the optimum time to inseminate cattle, sheep and pigs. *Vet. Rec.* **95**:416-420.
- Foote, R.H. (1975). Estrus detection and estrus detection aids. *J. Dairy Science.*, **58**:248-256.
- Hulsure, M.S., Pargaonkar, D.R. and Bakshi, S.A. (1995). Studies on use of electronic probe estrone to detect heat in cows and to monitor optimum time for insemination. *Indian J. Anim. Reprod.*, **16**(2):107-108.
- Kitwood, S.E., Phillips, C.J.C. and Wiese M. (1993). Use of a vaginal mucus impedance meter to detect estrus in the cow. *Theriogenology.*, **40**:559-569.
- Leidl, W. and Stolla, R. (1976). Measurement of electrical resistance of vaginal mucus as an aid for heat detection. *Theriogenology.*, **6**:237.
- McCaughey, W.J. and Patterson, A.D. (1981). Vaginal electrical resistance in cows (i) measurements in isolated reproductive tracts (ii) Relationship to milk progesterone. *Veterinary Research Communications.* **5**(1):73-84.
- Noonan, J.J., Schultz, A.B. and Ellington E.F. (1975) *J. Anim. Sci.* **41**:1084-1089 (C.F. S.K. Agrawal and O.S. Tomar, 1998. Reproductive technology in buffalo. Indian Veterinary Research Institute. :22-23).
- Patil, M.S. (1987). A study on pH, spinnbarkeit and electrical resistance of cervical mucus in normal and repeat breedings cow with special reference to intra uterine antibiotic treatment. M.V.Sc. Thesis Submitted to KKV, Dapoli, 1981.
- Patil, S.R. (2003). Ultrasonographic imaging to monitor early pregnancy diagnosis and embryonic development in crossbred cattle. M.V.Sc. Thesis submitted to MAFSU, Nagpur, 2003.
- Pelissier, C.L. (1972). Herd breeding problems and their consequences. *J. Dairy Science.* **55**:385.
- Snedecor, G.W. and Cochran, W.G. (1989). *Statistical Methods*, 8<sup>th</sup> Edn. Iowa State University Press, Ames, Iowa 50010.

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