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Submitted : 12-11-2017

Accepted : 25-02-2018

Published : 08-04-2018

## Vaginal Electrical Impedance of Cervico-Vaginal Mucus in Relation to Fertility in Crossbred Cows and Heifers

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### Abstract

A study was carried out on crossbred cows (n=20) and heifers (n=20) belonging to the Dairy farm of College of Veterinary Science and Animal Husbandry, Mhow and clinical cases of progressive farmers brought for AI to the Teaching Veterinary Clinical Complex and at the doorstep of farmers in nearby villages. All the animals were examined for vaginal electrical impedance (reading of draminski) on day 0, 7<sup>th</sup> and 45<sup>th</sup> of AI. Pregnancy was confirmed by rectal palpation after 2 months of insemination. There was highly significant (P<0.01) difference in the electrical impedance of cervico-vaginal mucus (CVM) at day 0, 7<sup>th</sup> and 45<sup>th</sup> in conceived animals (87.27±1.12, 106.29±0.99 128.63±1.05 reading of draminski) with increasing trend, whilst in non-conceived animals, the value on day 7<sup>th</sup> was significantly (P<0.01) higher than at day 0 and 45<sup>th</sup> which did not differ significantly (102.30±1.32 vs. 85.12±0.81 and 87.43±1.20 reading of draminski).

**Key Words:** Crossbred cows, Heifers, Oestrus, Cervico-vaginal mucus, Vaginal electrical impedance.

### Introduction

Oestrus, the most visible phase of the oestrous cycle is characterized by nervousness, bellowing and mounting, stands to be mounted by another cow, reduced feed intake and milk production. Lack of determination of oestrus signs lowers bovine productivity and fertility resulting in significant economic loss to the dairy industry. Vaginal electrical impedance (VEI) is used to detect oestrus and to determine the timing of ovulation in cattle, buffalo, horse, sheep, goat and pig. The principle behind VEI measurement is to measure changes in the ionic balance of vaginal mucosa (Bowers *et al.*, 2006). This study was planned to determine the fertility with vaginal electrical impedance in crossbred cows and heifers.

### Materials and Methods

The study was carried out on crossbred cows (n=20) and heifers (n=20) belonging to the Dairy farm of College of Veterinary Science and Animal Husbandry, Mhow and clinical cases of progressive farmers brought for AI to the Teaching Veterinary Clinical Complex and at the doorstep of farmers in nearby villages. All the animals included in this study were apparently healthy, cycling and having no palpable reproductive abnormality on two consecutive rectal palpations, 10 days apart, and were negative to white side test to rule out subclinical endometritis. All the animals were examined for

vaginal electrical impedance on day 0, 7<sup>th</sup> and 45<sup>th</sup> of AI. The values of VEI were recorded three times at an interval of five minutes using draminski heat detector and the average was calculated as reading of draminski. Pregnancy was confirmed by rectal palpation after 2 months of insemination. The data was analyzed as per the standard statistical method by employing completely randomized design (Snedecor and Cochran, 1994).

## Results and Discussion

The present study was conducted with the objectives of establishing the use of heat detector by monitoring vaginal electrical impedance (VEI) to detect oestrus, ovulation and early pregnancy. Vaginal electrical impedance of cervico-vaginal mucus (CVM) in conceived and non-conceived crossbred cows and heifers at day 0, 7<sup>th</sup> and 45<sup>th</sup> is presented in Table 1. The VEI values differed highly significantly ( $P < 0.01$ ) at day 0, 7<sup>th</sup> and 45<sup>th</sup> in conceived animals in both cows and heifers, with increasing trend from oestrus to pregnancy, whilst in non-conceived animals, the values on day 7<sup>th</sup> was significantly ( $P < 0.01$ ) higher than at day 0 and 45<sup>th</sup> and the latter two values were almost same in both cows and heifers.

**Table 1: Mean ( $\pm$ SE) vaginal electrical impedance of cervico-vaginal mucus in conceived and non-conceived crossbred cows and heifers**

Animals	Groups	Per cent	Vaginal electrical impedance (reading of draminski)		
			Day 0	Day 7	Day 45
CB cows (n=20)	Conceived	75.00 (15)	87.32 $\pm$ 1.30 <sup>c</sup>	107.10 $\pm$ 1.33 <sup>b</sup>	130.21 $\pm$ 1.19 <sup>a</sup>
	Non-conceived	25.00 (5)	85.32 $\pm$ 0.81 <sup>b</sup>	103.99 $\pm$ 1.94 <sup>a</sup>	87.99 $\pm$ 1.33 <sup>b</sup>
CB Heifers (n=20)	Conceived	60.00 (12)	87.21 $\pm$ 2.00 <sup>c</sup>	105.27 $\pm$ 1.50 <sup>b</sup>	126.66 $\pm$ 1.74 <sup>a</sup>
	Non-conceived	40.00 (8)	84.99 $\pm$ 1.25 <sup>b</sup>	101.24 $\pm$ 1.77 <sup>a</sup>	87.07 $\pm$ 1.82 <sup>b</sup>
Overall (n=40)	Conceived	67.50 (27)	87.27 $\pm$ 1.12 <sup>c</sup>	106.29 $\pm$ 0.99 <sup>b</sup>	128.63 $\pm$ 1.05 <sup>a</sup>
	Non-conceived	32.50 (13)	85.12 $\pm$ 0.81 <sup>b</sup>	102.30 $\pm$ 1.32 <sup>a</sup>	87.43 $\pm$ 1.20 <sup>b</sup>

Figures in parentheses indicate number of animals.

Mean with different superscript within a row differ significantly at 1% level.

The mean values of vaginal electrical impedance (reading of draminski) of cervico-vaginal mucus in conceived and non-conceived cows were corroborated with the findings of Tasal *et al.* (2005) in cows and heifers, whereas comparatively higher indices were reported by Patil and Pawshe (2011) and Malakar (2014) in cows and by Juyena *et al.* (2015) in buffaloes. However, comparatively lower values were reported in Indian buffaloes by Gupta and Purohit (2001) and in dairy cattle by Tadesse *et al.* (2011).

## Acknowledgement

Authors are thankful to Vice Chancellor, NDVSU, Jabalpur and Dean, College of Veterinary Science and AH, Mhow for providing facilities to undertake this study.

**Conflict of Interest:** All authors declare no conflict of interest.

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