

## Study of estrogen, progesterone and glucose level in cows during overt and silent estrus

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### I. INTRODUCTION

Significant economic losses result from increased days open because of failure to detect estrus. Studies (Callahan, et al., 1971; Kesler, et al., 1977) suggest that the endocrine balances required to support normal estrus cycles and for the reestablishment of fertility are restored gradually after calving. Silent estrus, or the lack of behavioral estrus expression, is a common occurrence (50 to 80%) at the first postpartum ovulation. However, the incidence of silent estrus decreases in the second and third estrous cycles (Bulman, 1980 ; Labhsetwar, et al., 1946; Morrow, et al., 1966). Expression of estrus in cattle is dependent on sufficient secretion of endogenous E2 to provoke the standing response (Carrick and Shelton, 1969). Estrogen plays a key role in the regulation of endocrine and behavioral events associated with the estrus cycle. E2 plays a pivotal role in the induction of estrus behavior and ovulation (Pfaff, 2005). In many experiments that are performed to study the female reproduction, estrus is artificially induced by administering E2 (Fabre-Nys et al., 1993). Estrogen plays a central role in triggering the gonadotropin surge and ovulation as well as in facilitating the estrus behavior, and thus estrogen indirectly synchronizes mating and ovulation. The patterns of GnRH synthesis and pulsatile release from the hypothalamus are mainly regulated by E2 (Smith and Jennes, 2001) and progesterone (Richer et al., 2005 ;Zalanyi, 2001). E2 stimulates LH synthesis, but at levels below a certain threshold value it inhibits the release of LH. Above this threshold, the inhibitory effect on LH release switches to stimulatory effect (Reinecke and Deuffhard, 2007), which results in the LH surge. Progesterone plays an essential role in various reproductive functions, including regulating the length of the estrous cycle, maintaining pregnancy. Progesterone is high during the luteal phase and in pregnancy, however the levels decline if the animal fails to conceive. Progesterone has been implicated in inhibiting estrogen secretion and ovulation (Echternkamp et al. 1973 and Henricks, 1971). Blood glucose appear to be one of the key nutrients affecting cyclicity in farm animals and a minimum level of 40-60 mg/ml is required to maintain the physiological processes of the body (Duke, 1970). According to Dowine and Gelman (1976), low blood glucose may be associated with infertility. Estrus is negatively affected by alterations in blood metabolites and hormone profiles including glucose, insulin, IGF-I, non-esterified fatty acids,  $\beta$ -hydroxybutyrate (Wathes *et al.*, 2007). Nadiu and Rao



(1982) and Dutta et al., (1988) reported significantly lower serum glucose level in an-oestrus than normally cycling animals. The aim of the present study is comparative between hormonal level and glucose (energy) in overt and silent oestrus cows.

**Key word: Estrogen, Progesterone, Glucose, oestus**

## II. MATERIALS METHODS

sixty cows were obtained in estrus condition during the artificial insemination process and after taking the case history from the owner about the estrous signs that appeared on the cows, as well as through observation, the cows were divided into two groups, the first group (43) cows, which showed clear signs such as mounting and bellowing as well as vaginal secretions, while (17) cows did not show signs except only vaginal secretions. 10 ml of blood was withdrawn from (20) cows included (11) cows appear overt estrous and (9) cows don't appear estrous signs. After that, the serum was separated by a centrifuge and kept at 20 °C until the hormonal and glucose examination was carried out through the Cobase411 and Rx dystona system.

## III. RESULTS

Table 1: Signs of estrus in normal and silent estrus cows.

Estrus status	Estrus signs	Cows numbers	%
Overt Estrus	Bellowing only	7	11.66
	Mounting only	3	5
	Mounting and vaginal discharge	6	10
	Bellowing , mounting and vaginal discharge	21	35
	Bellowing and vaginal discharge	6	10
Silent Estrus	Vaginal discharge only	17	28.34
Total		60	100

Table (2): The concentration of serum estradiol, progesterone and glucose in cow during silent and overt estrous.

Hormone	Overt oestrus N(11)	Silent oestrus N(9)	LSD value
Glucose	56.82± 2.68	59.42± 2.71	4.062 NS
Esterdiol (E2)	20.51± 0.76 a	14.40± 0.66 b	3.207 *
Progesterone	0.91± 0.08 a	0.25± 0.008 b	0.287 *
<b>Means with the different letters in same row differed significantly. * (P&lt;0.05).</b>			

#### IV. DISCUSSION

The present study recorded estrous symptoms appear on the cows which represented overt estrous included seven cows (11.66%) appear only bellowing , three cows (5%) appear only mounting, six cows ( 10%)appear mounting and vaginal discharge , twenty one cows (35%) appear bellowing , mounting and vaginal discharge, six cows (10%) appear bellowing and vaginal discharge and silent estrous with little of vaginal discharge seventeen cows (28.34%) , these results disagreement with Boer, et al.,(2009) show estrous symptoms which represented mounting (56%). Also the present study disagreement with Bhattacharyyal et al., (2017) which recorded Bellowing about (92.67%). The mean concentration of serum glucose in overt and silent estrous cows on estrus day in table (2 ) were 56.82± 2.68 and 59.42± 2.71g/dL respectively. The results indicate no significant variation at (p<0.05) between serum glucose level of overt and silent heat, this results agreement with Duke, (1970) that recorded a minimum level of 40-60 mg/ml is required to maintain the physiological processes of the body .Estradiol levels were 20.51± 0.76 and 14.40± 0.66 respectively while progesterone level were 0.91± 0.08 and 0.25± 0.008 respectively. Both oestradiol and progesterone concentration in serum varied significantly (p< 0.05) between overt and silent estrous . The present study is appear the estradiol and progesterone levels in overt heat is higher than silent heat, therefore, the oestrus symptoms were clear in overt than silent heat .The pattern of changes of estradiol and progesterone level in both types of oestrus was disagreement with the finding of Dipankar et al.,(2020) were reported the estradiol was 39.34±1.11 and 40.13±0.64 pg/ml in overt and silent heat respectively, while progesterone level 0.32±0.04 and 0.33± 0.03ng/ml respectively.

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