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Prostaglandin F2α Profiles in Dairy Buffaloes

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Abstract

The purpose of my paper is to address the profiles of prostaglandin F2 α in buffaloes during various phases of growth and reproduction. The PGF2 α levels were monitored by a direct RIA technique without extraction [1]. The female buffalo calves and heifers were selected from the experimental herd of ICAR-NDRI. All animals were kept and divided in different age groups of days (D) and months (M) in neonatal, postnatal, prepubertal, pubertal, weaned, un weaned, seasons, cyclic, non cyclic and early pregnancy groups. Blood samples were drawn and collected from different age groups of buffalo heifers and buffaloes on D1-3(n=67), D4-30(n=16), M1-3(n=43), M3-6(n=15), M6-9(n=25), M9-12(n=28),M12-15(n=20), M15-18(n=13), M18-21(n=23), M21-24(n=34), M24-27(n=21), M27-30(n=17) and above 30 months of age and also from heifers which did not exhibit first estrus (n=45), exhibited estrus (n=31) and pregnant heifers (n=15). Twelve more buffalo heifers were monitored at Day 01, 02 (at 12 hours interval), and on alternate days up to day 15 of estrus and daily from day one to day 22 following insemination. In addition a separate group of three buffaloes were monitored daily for a period of 5 days before estrus, 4 hourly during estrus, two hourly on day one of estrus and daily on day 2 and day 3 post estrus to find out the changes in the PGF2 α profiles during pre ovulation, ovulation and post ovulation phases and to pin point the time of ovulation. The data were critically analyzed by the least square technique to study the effect of age, weaned, unweaned, body weight, seasons, pregnancy and ovulation.

Keywords : Neonatal; Puberty; PGF2 alpha; Estrus; Ovulation; Weaned; Radio immunoassay pregnancy

PGF2 α profiles during neonatal and pre pubertal life

The newly born calves up to the age of day 3 had a higher concentration of 2.31ng/ml (n=58) in comparison to pre pubertal, cyclic, non cyclic and pregnant groups (0.69-1.84ng/ml, n=283).

PGF2 α profiles during peripubertal life

The buffalo heifers above the age of M30 and not exhibited estrus had a mean concentration of 0.77±0.24ng/ml (n=35). The levels sharply increased to 1.49±0.27 (n=27) in the cyclic heifers. However, the levels fell to 0.82±0.41 (n=12) during the early pregnancy period. The cyclic and non cyclic heifers showed great variations with a slight higher levels in cyclic heifers.

PGF2 α profiles in weaned and un weaned buffalo heifers

The weaned buffalo calves above the age of D1 to D30 had a higher concentration of 2.20 to 2.74ng/ml and a higher level of 3.22±0.99ng/ml during peripubertal periods in comparison to unweaned calves (0.58 to 1.38ng/ml).

PGF2 α profiles during different seasons

The levels were at a lower level during winter, slightly higher during summer and further higher in hot humid season.

PGF2 α profiles as influenced by body weight

The concentration was found inversely proportional to the body weight and age as it was significantly higher in neonates.

PGF2 α profiles during estrus and ovulation phases

The PGF2α levels increased significantly ($P<0.05$) from day 1 at 05.00h to day 3 of estrus. However, all the major peaks were observed at the end of estrus and before ovulation on day +1 at 1500h and 1700h.

PGF2 α profiles in non pregnant buffaloes

Least square analysis of variance was used to evaluate variability PGF2 α levels after inseminations in non pregnant heifers. The levels fluctuated between 0.24±0.77ng/ml to 0.65±0.28 with a peak level on day 16. However, the levels increased gradually from Day 0 to day 16 and decreased on Day 20 of insemination However, analysis of variance of levels between days of insemination and between pregnant and non pregnant buffaloes did not reveal any significant difference during luteal phases of reproduction.

Profiles in pregnant buffaloes

A similar pattern in levels of PGF2 α was observed with a little variation among days of inseminations without any significant difference. The analysis of variance also revealed no significant

difference between days of inseminations in pregnant and non pregnant buffaloes.

The results of this study seemed quite interesting as the levels found in neonates were quite high to the levels of pre pubertal and peripubertal life. Moreover, during the exhibition of first estrus the levels were found on higher side with a decrease in pregnant heifers indicating that a higher concentration was required to bring the buffalo heifers in cyclic and a lower level to maintain pregnancy. The higher levels of PGF 2 α in neonates were also indicative of fetal origin and a poor metabolic clearance in neonates. The higher concentration of PGF2 α found during the age of 30 months perhaps were not allowing the development of CL and probably responsible for delayed maturity. Since not much work reported earlier in buffaloes except [1-5]. It is difficult to substantiate these findings. However, a similar pattern of levels were reported in children [6] in sows [7,8], in ewes [9-11] and in goats [12]. However, [13] indicated that gonads of both sexes were capable of producing prostaglandins starting not later than days 30 of intrauterine life and the bovine embryos near to implantation time (32-35 days) had an enzymatic capacity to produce PGF. This study further suggests taking more trials to study PGF2 α in dairy animals to augment growth and reproduction.

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