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### RSEARCH PAPER

# Macro mineral profile in cyclic and non-cyclic animals *vis* a *vis* conceiving and non-conceiving animals

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## ABSTRACT

A preliminary examination of the reproductive status of the animals was carried out and the animals based on their reproductive status were divided in two groups, normal cycling (n=12), exhibiting normal physiological estrus evidenced by the presence of graffian follicles, while the animals that did show any sign of estrus since last 2 to 3 months and had a smooth non-functional ovary (based on two rectal palpation carried out at an interval of ten days) formed the non-cycling (n=10) group of animals. Blood collection was made at different intervals of time (following the day of artifical insemination) and the plasma was separated out and was stored at -20°C. Out of the total 12 cycling animals,7 animals conceived while 5 animals did not conceive. The average values for phosphorus (mg%) observed in cyclic and anoestrus animals were  $6.84 \pm 0.13$  and  $7.23 \pm 0.18$ , respectively. No significant differences (P> 0.05) was observed between groups and weeks except for cyclic and anoestrus animals at the first interval. Values (Mean  $\pm$  SE) for calcium (mg%) in cycling and anoestrus animals were  $8.88 \pm 4.51$  and  $9.79 \pm 0.25$ . Significant differences (P< 0.05) were observed for calcium between cyclic and anoestrus animals. Mean $\pm$  SE values for magnesium (mg%) for cyclic and non cyclic animals were  $3.27 \pm 0.18$  and  $3.02 \pm 0.00$ , respectively. Magnesium values did not differ significantly between the groups.

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Relationships between reproduction and minerals have been recognized long back. In general sense, essential minerals are required for reproduction because of their cellular roles in metabolism, maintenance and growth. However, these nutrients may also have specific role and requirement in the reproductive tissue. Recent works in dairy cattle suggest that borderline nutrient deficiency may be manifested as impaired fertility before other clinical symptoms are apparent. This study was aimed to investigate the macro and micro mineral profile in cycling and non-cycling and also conceiving and non-conceiving animals.

# MATERIALS AND METHODS

A total of 22 cows, 8-10 years in their 3 to 5 parity were selected at Nandini Hospital Pajarapole, Surat for this study. After thorough clinical and per rectal examination of all animals for their reproductive status twice 10 days apart, they were divided in two groups *viz.*, cyclic and non-cyclic/ anoestrus. All animals were fed common feeds and fodders uniformly as per routine farm feeding schedule.

### Group I (Normal cyclic) :

These animals (n=12) were not given any treatment,

but 5 were followed regularly form day of insemination till two months post breeding when pregnancy was confirmed per rectum.

# Group II (Non-cyclic/Anoestrus cows-GnRH treatment) :

Those cows (n=10) that failed to exhibit any sign for previous 2-3 months and had smooth non-functional ovaries were supplemented with mineral mixture (Ovel Vet) @ 50g/day/head for 15 days and then treated with 0.02 mg GnRH (Receptal,5 ml) i/m. They were regularly followed afterwards and the animals coming in estrus were served. Pregnancy was confirmed on non-return cases per rectum 60 days post A.I.

### Blood collection and analysis

Blood samples were collected through jugular venupuncture from each experimental animal in a glass vial (10ml capacity) containing heparin as an anticoagulant. Aliquots from each sample were made and stored in small vials of 1.8 ml each. (Sodium fluoride was used as preservative and Merthiolate was used as an antifungal agent). The plasma was stored at -20°C till analysis of parameters was carried out. The estimation of plasma glucose, total protein, cholesterol and triglycerides was carried out using standard kits and an auto analyzer.

# **RESULTS AND DISCUSSION**

The average values for phosphorus (mg %) observed in cyclic and anoestrus animals were  $6.84 \pm 0.13$  and  $7.23 \pm 0.18$ , respectively and within the cyclic group, the values in conceiving and non- conceiving animals were  $7.12 \pm 0.19$  and  $6.44 \pm 0.15$ , respectively. In the present study, no significant difference was observed between conceiving and non-conceiving as well as cyclic and anoestrus group of animals. Phosphorus values recorded in the present study were higher than those recorded in cycling and anoestrus crossbred animals (Ramakrishna, 1997; Tandle *et al.*, 1997; Nair *et al.*, (1987) and cows (Kumar *et al.*, 1986). Values (mean  $\pm$  SE) for calcium (mg%) in cyclic and anoestrus animals were 8.88  $\pm$  4.51 and 9.79  $\pm$  0.25 while in conceiving and non-conceiving animals 9.09  $\pm$  0.25 and 8.59  $\pm$  0.38, respectively. Significant differences (P< 0.05) were observed for calcium between cyclic and anoestrus animals. In the present study, the values of calcium observed were in agreement with those observed in cycling crossbred (Ramakrishna, 1997). While the values recorded were lower than those reported in cyclic and delayed matured heifer (Behera *et al.*, 1993) and cows (11.5  $\pm$  0.3 and

Table 1 : Mean and standard error values for inorganic phosphorus at different intervals for cyclic and non-cyclic animals								
Category of animals	Intervals							
Category of annuals	Ι	II	III	IV	V	VI	VII	
Conceiving	11.32	8.14	9.52	8.38	8.70	9.05	8.54	
(C)	±	±	±	±	±	±	±	
$9.09 \pm 0.25$	0.711	0.54	0.52	0.61	0.43	0.97	0.09	
Non-conceiving	8.85	9.85	9.49	8.34	8.46	7.38	7.74	
(NC)	±	±	±	±	±	±	±	
$8.59 \pm 0.38$	1.1	1.04	1.23	1.22	0.61	0.46	1.33	
Overall cyclic	10.29	8.85	9.51	8.36	8.60	8.35	8.20	
$G_1=C+NC$	±	±	±	±	±	±	±	
$8.88 \pm 4.51$	0.69	0.56	0.562	0.59	0.34	0.62	0.53	
Anoestrus	9.73	9.86	10.01	10.10	10.19	9.62	9.02	
(G <sub>2</sub> )	±	±	±	±	±	±	±	
$9.79 \pm 0.25$	0.81	0.82	0.60	1.15	0.40	0.31	0.27	
G <sub>1</sub> Vs G <sub>2</sub>	N.S.	N.S.	N.S.	N.S.	**	N.S.	N.S.	
C vs NC	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	

NS-Non significant

Table 2 : Mean and standard error values for calcium at weekly intervals for cyclic and non cyclic animals							
Category of animals				Intervals			
Category of animals	Ι	II	III	IV	V	VI	VII
Conceiving	6.20	7.58	7.41	7.15	7.52	7.27	6.72
(C)	±	±	±	±	±	±	±
$9.09 \pm 0.25$	0.67	0.64	0.51	0.26	0.51	0.35	0.48
Non- conceiving	6.520	$5.320 \pm$	6.640	6.180	6.620	6.620	$7.240 \pm$
(NC)	±	0.096	± 0.213	±	±	±	0.102
$8.59 \pm 0.38$	0.804			0.349	0.335	0.146	
Overall Cyclic	6.33	6.64	7.08	6.75	7.15	7.00	6.94
$G_1=C + NC$	±	±	±	±	±	±	±
$8.88 \pm 4.51$	0.49	0.49	0.32	0.24	0.34	0.23	0.28
Anoestrus	8.090	$7.120 \pm$	$7.370 \pm$	7.470	6.980	7.340	6.270 ±
(G <sub>2</sub> )	±	0.766	0.579	±	±	±	0.422
9.79±0.25	0.456			0.400	0.332	0.377	
$G_1 vs G_2$	*	N.S	N.S	N.S	N.S	N.S	N.S
C vs NC	N.S	N.S	N.S	N.S	N.S	N.S	N.S

N.S.-Non significant

Table 3 : Mean and standard error values for magnesium at weekly intervals for cyclic and non-cyclic animals								
Category of	Intervals							
animals	Ι	II	III	IV	V	VI	VII	
Conceiving	3.20	3.42	3.21	3.52	3.91	2.02	3.51	
(C)	±	±	±	±	±	±	±	
3.23±0.18	0.422	0.545	0.330	0.69	0.54	0.19	0.43	
Conceiving	3.97	2.50	2.61	2.90	4.71	3.55	3.06	
(NC)	±	±	±	±	±	±	±	
$3.32 \pm 0.21$	0.37	0.12	0.23	0.68	0.57	0.84	0.40	
Overall cyclic	3.52	2.93	2.96	3.22	4.24	2.66	3.28	
G <sub>1</sub> =C+NC	±	±	±	±	±	±	±	
3.27±0.14	0.30	0.033	0.22	0.482	0.40	0.416	0.29	
Anoestrus	2.83	3.11	2.19	2.33	3.14	3.56	3.96	
(G <sub>2</sub> )	±	±	±	±	±	±	±	
$3.02 \pm 0.13$	0.39	0.28	0.25	0.27	0.23	0.26	0.43	
G <sub>1</sub> vs G <sub>2</sub>	N.S	N.S	N.S	N.S	*	N.S	N.S	
C vs NC	N.S	N.S	N.S	N.S	N.S	*	N.S	

N.S.-Non significant

 $9.8\pm0.5$  mg per cent, respectively for cyclic and anoestrus cows (Dabas et al., 1987) and higher than those reported in cyclic crossbred (Nair et al., 1987; Vadnere and Singh, 1989). In the present investigation, significantly higher levels of Ca were observed in anoestrus animals as compared to cyclic animals. Mean± SE values for magnesium (mg %) for cyclic and non cyclic animals were  $3.27 \pm 0.18$  and  $3.02 \pm 0.00$ , respectively. In the cyclic animals, the values for magnesium for conceiving and non - conceiving animals were  $3.23 \pm 0.18$  and  $3.32 \pm$ 0.21 respectively. Magnesium values did not differ significantly between the groups.No significant differences have been reported in the serum Mg levels of cycling and anoestrus cows (Dindorkar and Kohli, 1979) in the cows having regular and irregular estrus cycles (Yildiz and Ocal, 2001) and the magnesium level in the blood and the pregnancy rates (Forshell et al., 1991). No significant difference for Mg values was observed between the conceiving and the non-conceiving as well as between the cyclic and noncyclic animals. The values of magnesium recorded in the present study are comparatively higher than those recorded in Rathi cows by Aminuddin et al. (1984) and Chauhan et al. (1992).

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