

A comparative study on polyacrilamide gel electrophoretic pattern of serum protein fractions during normal and sub-oestrous cycle of crossbred cattle of Asom

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Cyclicity of animals is associated with quantitative and qualitative alterations of different enzymic and hormonal proteins. Investigations carried out in regard to the quantitative changes in the major serum protein fractions during pregnancy in cattle and buffaloes, suggested that pregnancy zone protein (PZ), alpha-I-foetoprotein, pregnancy specific beta-I-glycoprotein, steroid binding beta globulin, and others are associated with pregnancy and such bio-chemical phenomenon (Sarmah *et al.* 2001). There is a paucity of information about blood protein fractions in relation to different stages of oestrous cycle. Keeping these in view the present work was designed to compare electrophoretic patterns of cyclic protein fractions in serum during sub-oestrous and normal oestrous cycle of crossbred cattle of Asom.

Only ten confirmed postpartum normal cyclic and ten sub-oestrous crossbred cows of Asom were selected to study electrophoretic pattern in serum protein. Blood samples were collected on day 0, 5, 10, 15 and 20 (day 0 of next cycle) after confirmation of ovarian condition for subsequent estimation of total proteins in serum and the concentration of total proteins was estimated by using quality kit. The serum samples were subjected to non-dissociating polyacrilamide gel electrophoresis (Davis 1964) at 8.50% gel concentration. The relative mobility and relative proportion of different protein bands were calculated as per Sarmah *et al.* (1993).

The mean total protein concentrations were recorded as 8.55 ± 0.25 mg/dl, 8.98 ± 0.34 g/dl, 8.41 ± 0.42 g/dl, 8.35 ± 0.25 g/dl, and 8.85 ± 0.23 g/dl on day 0, 5, 10, 15, and 20 of normal oestrous cycle. The corresponding values were 8.63 ± 0.26 g/dl, 8.76 ± 0.35 g/dl, 8.49 ± 0.28 g/dl, 8.39 ± 0.13 and 8.85 ± 0.22 g/dl during sub-oestrous cycle. The protein fractions, relative mobility (Rm) and relative proportion (Rp%) of these fractions in serum are presented in Table 1. In serum

of both of the normal oestrous cycle and sub-oestrous cows six protein bands representing albumin, α - globulin, α_2 - globulin, β_1 - globulin, β_2 - globulin and γ - globulin were clearly marked in the whole region of electrophoretic columns with clear presence of the said protein fractions on the day of oestrus of both types of cycles almost as like that of cyclic Asom local goats (Bonia *et al.* 2008) excepting little variation of appearance of other bands on day 5, 10, and 15 of both cycles studied while Sarmah *et al.* (2001) failed to detect α_1 -globulin in non-pregnant cows. The study revealed that the total portion of globulin was higher at different days of both types of cyclic cows particularly on the day of oestrus. The electrophoretic pattern of haemoglobin of yaks revealed two protein bands in polyacrilamide gel whereas the electrophoretic pattern of haemoglobin showed single band in non-descript local cattle of Asom (Sarma *et al.* 2009). However, there was no significant difference of protein fractions in serum samples of these 2 groups of cyclic cows at different days of observation. Zulu *et al.* (2002) reported relationship among insulin-like growth factor-I, blood metabolites and postpartum ovarian function in dairy cows while Zoragoza *et al.* (2004) studied electrophoretic pattern to quantify urinary excretion of immunoglobulin in bitches with pyometra while Maniwa *et al.* (2005) suggested that proteins in bovine cystic follicular fluid (FF) clarified pathology and etiology of bovine ovarian follicular cysts (BOFC) and concluded that they may play important roles in the pathogenesis of BOFC and furthermore, the 8 proteins found in the FF, which could be used as biomarkers for ovarian cysts. The literature to support the present observation was not found.

Quantitative difference in relative proportions were observed at different days of cycles of the study but no conclusive depiction was found; but difference of appearance of protein fractions at different days of the cycles might be due to variation of proteins of enzymes and hormones involved during different days of cycles of the experimental cows. So, the biological significance of appearance of different protein fractions with variations of relative movement and relative

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Table1. Relative mobility (Rm) and relative proportion (Rp) of protein bands in serum of oestrous cycle of normal and sub-oestrous condition of crossbred cattle of Asom during polyacrylamide gel electrophoresis

On days	Relativity of protein bands		Protein fractions					Albumin	Total protein (g/dl)
			γ -globulin	β -2 globulin	β -1 globulin	α -2 globulin	α -1 globulin		
During oestrous cycle (on day)	0	Rm (Av.)	0.05	0.15	0.51	0.61	0.68	0.89	8.55±0.25
		Rp %	15.50	40.50	11.53	13.75	14.50	17.50	
	5	Rm (Av.)	0.40	0.14	0.52	0.62	0.67	0.88	8.98±0.34
		Rp %	15.40	39.45	12.40	12.50	13.80	17.20	
	10	Rm (Av.)	0.05	0.15	0.62	0.65	0.71	0.77	8.41±0.42
		Rp %	15.50	40.20	11.52	12.60	14.53	17.20	
	15	Rm (Av.)	0.04	0.14	0.55	0.65	0.67	0.87	8.35±0.25
		Rp %	14.50	40.50	12.50	12.52	14.65	17.25	
	20	Rm	0.05	0.15	0.52	0.61	0.62	0.89	8.85±0.23
		Rp %	15.80	40.80	11.66	14.80	14.72	12.80	
Duringsub-oestrous cycle (on day)	0	Rm(Av.)	0.05	0.15	0.49	0.62	0.70	0.89	8.63±0.26
		Rp %	15.52	40.10	11.85	13.80	14.50	17.50	
	5	Rm (Av.)	0.05	0.14	0.51	0.65	0.65	0.82	8.76±0.35
		Rp %	15.52	39.50	12.52	12.25	13.85	17.11	
	10	Rm	0.04	0.14	0.55	0.59	0.64	0.78	8.49±0.28
		Rp %	14.89	40.15	11.58	12.50	12.50	17.25	
	15	Rm (Av.)	0.05	0.15	0.54	0.61	0.62	0.85	8.39±0.13
		Rp %	14.65	40.20	12.54	12.58	12.58	17.40	
	20	Rm (Av.)	0.05	0.15	0.52	0.60	0.64	0.64	8.85±0.22
		Rp %	15.75	41.75	11.84	13.75	14.52	16.80	

proportion during different days of both types of cycles might be cyclic and species specific to the postpartum crossbred cows under the agroclimatic condition of Asom. Further studies are needed to clarify types of variations and stages of reproduction including the examination of the source of these proteins, their interaction, relationship between these proteins and ovarian physiology and pathology in relation to ovarian cycles in species of animal concerned.

SUMMARY

The present work was carried out to study variation of cyclic protein fractions in serum of crossbred cattle of Asom during sub-oestrous condition and normal oestrous cycle. The blood samples were collected on day 0, 5, 10, 15 and 20 (day 0 of the next cycle). The total protein concentration was estimated by using standard method. The samples were subjected to non-dissociating polyacrylamide gel electrophoresis. The comparative study of variation of different protein fractions during different days of sub-oestrous and normal cyclic cows revealed presence of six protein bands representing albumin, α_1 -globulin, α_2 -globulin, β_1 -globulin, β_2 -globulin and γ -globulin were marked with no much difference. The variation of result might be due to cyclic phenomenon and it could be explained as species specific under agroclimatic condition of Asom.

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