HAEMOGLOBIN AND PLASMA BIOCHEMICAL PROFILE OF REPEAT BREEDER CATTLE ON THE DAY OF ESTRUS COULD PLAY A ROLE IN EXHIBITION OF ESTRUS AND SUBSEQUENT PREGNANCY OUTCOME

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ABSTRACT

On the day of induced estrus, jugular vein blood samples were collected from healthy repeat breeder cattle (n=45) for the estimation of haemoglobin, glucose, cholesterol and total protein, followed by pregnancy diagnosis on day 45 post-insemination. There was no difference ($p<0.05$) in haemoglobin, plasma cholesterol and plasma total protein in animals showing weak, intermediate or intense estrus, however, plasma glucose was high ($p<0.05$) in animals exhibiting intense estrus compared to their counterparts exhibiting intermediate estrus. Between pregnant and non-pregnant counterparts, plasma total protein was high ($p<0.05$) on the day of induced estrus in the former, whereas other blood/plasma parameters were similar ($p>0.05$). In brief, plasma biochemical profile of repeat breeder cattle on the day of estrus could play a role in exhibition of estrus and subsequent pregnancy outcome.

Keywords: Biochemical constituents, Cattle, Estrus, Haemoglobin, Pregnancy

Haematological and plasma biochemical constitutents like glucose, cholesterol and total protein provide reliable information regarding the health and general body condition of dairy animals (Cetin *et al.,* 2009). Keeping this in view, the present study was designed to study the impact of haemoglobin and plasma biochemical profile on the intensity of estrus and conception rate in repeat breeder cattle.

The study was conducted on apparently healthy repeat breeder cattle (n=45) which were estrus synchronized using intravaginal progestational device based Co-Synch protocol. The animals under treatment were observed for the intensity of estrus using estrous score card. The jugular vein blood samples collected on the day of estrus were subjected to estimation of haemoglobin, glucose, cholesterol and total protein. Pregnancy was confirmed by rectal examination on day 45 post-insemination. Haemoglobin was estimated using Sahli's method and plasma concentrations of glucose, cholesterol and total protein were estimated using commercial diagnostic kits (Beacon Diagnostic Pvt. Ltd; Navsari). The statistical analysis was carried out using Graph Pad Prism software version 5.

In repeat breeder cattle of present study, haemoglobin concentrations were similar ($p>0.05$) irrespective of the status of estrus intensity or pregnancy outcome (Table 1). However, plasma glucose on the day of estrus was high ($p<0.05$) in cattle exhibiting intense estrus as compared to intermediate estrus (Table 1). Nevertheless, a previous study reported that lower plasma glucose was associated with lower conception rate and higher number of services per conception (Pedroso *et al*., 1982). In the present study, there was no such difference in pregnancy outcome with respect to blood glucose status on the day of estrus ($p>0.05$, Table 1). Furthermore, plasma cholesterol on the day of estrus was similar ($p>0.05$) in repeat breeder cattle with respect to estrus intensity or subsequent pregnancy outcome (Table 1). A previous

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Table 1: Relationship of haemoglobin and plasma biochemical parameters with the intensity of estrus and conception rate in repeat breeder cattle

Parameters	**Intensity of estrus**		
	Weak (n=4)	**Intermediate** (n=27)	**Intense** (n=14)
Haemoglobin, g/dl	10.25±0.75	9.97±0.26	10.19±0.34
Glucose, mg/dl	59.72±2.00^{ab}	54.76±3.27^{b}	68.47±2.1^{8}a
Cholesterol, mg/dl	123.60±11.94	143.20±11.54	119.00±8.03
Total Protein, g/dl	7.84±1.43	6.24±0.30	5.71±0.26
Pregnancy status			
	Pregnant (n=18)	**Non-Pregnant** (n=27)	
Haemoglobin, g/dl	9.83±0.21	10.21±0.29	
Glucose, mg/dl	60.13±3.19	58.85±3.15	
Cholesterol, mg/dl	138.80±11.29	130.60±10.20	
Total Protein, g/dl	9.83±0.21^{b}	6.38±0.32^{a}	

p<0.05, Mean value having different superscript within the same row differ significantly

study has reported positive correlation between total cholesterol and reproductive function in crossbred cattle under Indian conditions (Nair *et al.,* 1987). Plasma total protein in repeat breeder cattle was similar (p>0.05) on the day of estrus with respect to estrus intensity, however, the subsequent pregnancy outcome was better in cattle having higher total plasma protein (p<0.05, Table 1). In fact, the deficiency of certain amino acids required for the biosynthesis of gonadotropins and gonadal hormones due to low level of plasma protein might impact fertility outcome (Vohra *et al.,* 1995).

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