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HERBAL DRUGS AND THEIR EFFECT ON BIOCHEMICAL ATTRIBUTES OF CROSSBRED CALVES

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ABSTRACT

The present investigation was planned to see the efficacy of self compounded and marketed herbal drugs on some of the biochemical attributes of crossbred calves. Those crossbred calves of 4 to 6 months of age having similar body weights were divided in to three groups comprising three calves in each. Three different trials were conducted in Rainy, winter and summer seasons and each trial was continued for 2 months excluding pre-experimental period. During each trial blood sample were collected directly from the jugular vein in the morning hr at the interval of 0, 30 and 60 days. It was observed that blood glucose level was significantly ($p < 0.05$) higher in self compounded herbal drug (T2) group than marketed herbal drug (T3) and control groups (T1). A higher ($p < 0.05$) level of cholesterol was observed in group fed with self formulated herbal drug as compared to marketed herbal drug and control groups. No significant ($p < 0.05$) change was observed in total urea at day 0 and 30 but significant between 60 and 30 and 60 and 0 days of experiment. The SGOT was found significantly ($p < 0.05$) higher in self compounded herbal drug treated calves than marketed herbal drug treated and control groups at 0, 30 and 60 days of trials. A significant ($p < 0.05$) higher level of SGPT was observed due to administration of self formulated herbal drug as compared to marketed herbal drug and control groups. There was no significant ($p < 0.01$) changes in SGOT and SGPT level at 0, 30 and 60 days of experiment.

INTRODUCTION

Formulation of different indigenous herbs like Pudina (*Mentha piperita* Linn), Ajwain (*Trachyspermum ammi* (Linn) Sprague), Harada (*Terminalia chebula*), Kalmegh (*Andrographis paniculata*), Amla *(Phyllanthus emblica)*, Chirayita (*Swertia chirata* Buch Ham), Dry Zinger (*Zingiber officinale*) and Black Salt known for its various effects in the animal system which induced the phagocytic activity of leukocytes, potentiating the reticulo endothelial system and formation of antibodies. These herbs are a potent immune- stimulator by activating the natural killer (NK) cell activity (Suresh and Vasudevan, 1994), as well as an adaptogen that can increase tolerance to stress due to potent antioxidant property. Present emphasis is directed towards the search for herbal formulations that can be helpful in the rumen fermentation, growth performance and methane mitigation. Calves represent half of the progeny hence, reproductive efficiency of both indigenous and crossbred cattle irrespective of breed can be adjudged by the number of live calves produced. Compounded herbal drugs have positive effects on growth, feed intake and digestibility (Yadav *et al*., 2009). Supplementation of marketed herbal drug (*Ruchamax*) significantly improved rumen liquor profile, physical properties of rumen liquor and rumen biochemical parameters (Kolte *et al*., 2009). Supplementation of self formulated herbal drug and marketed herbal products significantly improved liver function, feed assimilation and digestibility of ration ultimately leading to gain in body weight as compared to untreated control group (Hadiya *et al*., 2009). The effect of neem oil and other herbal drugs on blood glucose level (Bombik *et al*., 2002; Jain, 2005; Islam *et al*., 2006), total protein level (Bombik *et al*., 2002; Ahmed *et al*., 2009; Sarker *et al*., 2010), cholesterol level (Hosoda *et al*., 2006) and SGOT and SGPT level (Ahmed *et al*., 2009) have significantly affected the aforementioned biochemical attributes. The immuno-modulating effects of several herbal formulations have been studied and a number of clinical and experimental trials have been conducted to evaluate the therapeutic properties of such herbal formulations. Thus, the present article deals with the comparative effects of self formulated herbal drug and marketed drugs in young calves on blood biochemical profiles.

MATERIALS AND METHODS

Twenty seven crossbred calves with body weight ranging from

Table 1: Composition of marketed herbal drug *(Herbstone)*

S.No.	Name of Herbs	Ratio used
1	Chirayita (Swertia chirata Buch Ham)	10%
2	Anola	10%
3	Harad Wadi	10%
4	Baheda	10%
5	Ajwain (Trachys permum ammi)	05%
6	Black salt	15%
7	Hara Kasis	02%
8	Khana Soda	03%
9	Comman Salt	05%
10	Base	30%
	Total	100%

58 to 65Kg were divided into 3 groups in three different seasons. The Table 1 shows the composition of marketed herbal drug; while in case of self formulated herbal drug, slight modification were brought in the composition of marketed herbal drug (*Herbstone*) *i.e.* Baheda, Hara Kasis, Khana Soda, and Comman Salts were replaced by Pudina, Kalmegh and Dry Zinger. Both drugs were administered @ 20g/kg ration for 60 days in each season. Pre experimental feeding of fifteen days was also done before starting the trial in each season. The blood samples were collected on 0, 30th and 60th day. Blood sampling on 0 day was done in growing calves to find the level of various biochemicals attributes at the start of each trial. In the experimental studies serum as well as plasma was harvested and stored at - 20°C until analyzed. The physiological responses were recorded routinely in the morning hours before blood collection till 60 days as per standard procedure. Blood glucose concentration was estimated by Trinder's method (Pileggi and Szustkiewicz, 1974) using diagnostic kits and concentration was expressed in mg of glucose per 100mL of blood. Total plasma protein was estimated by Biuret method (Tietz, 1986) and concentration was expressed as g per 100mL. SGPT (ALT) and SGOT (AST) were estimated by 2, 4-DNPH method given by Frankel and Reitman (1957). The total urea and cholesterol were measured by enzymatic methods and the values were expressed as mmol/L and mg/dL respectively.

Statistical analyses

The data were statistically analyzed using GLM procedure of SAS (1992). Duncan's test (1955) was applied in experiment to test differences. The following model was used:

$Y = \mu + Ti + Pn + TPin + eins$

Where:

Y = observed trait; μ = overall mean; Ti = effect of ith treatments (i th = T1, T2, T3) e = random error; Pn = effect of nth periods (nth = 0, 30, 60) TPin = interaction between Ti and Pn

RESULTS AND DISCUSSION

During the trials significant changes were observed in blood glucose levels of crossbred calves subjected to the treatments of self formulated herbal drug and marketed herbal drug as compared to control group and highest blood glucose level was observed at day 30 followed by day 60 (Table 2). Present results are in conformity with the findings of Bombik *et al.* (2002) and Islam *et al*. (2006) reported higher blood glucose level in herbal treated groups of calves than control one during early stage which subsequently reduced with advancement of age. These findings could be further substantiated from the fact that the thyroid hormones and cortisol level remain at peak during early period and they contributes towards the higher levels of blood glucose (Jain, 2005). Significantly ($p<0.05$) higher level of total protein was observed in self formulated herbal drug treated group as compared to marketed herbal drug and control groups during experiment. Similar results about total protein levels were also reported by Bombik *et al.* (2002) and Sarker *et al*. (2010). Serum cholesterol level was observed to be significantly ($p<0.05$) higher in self

Table 2: Biochemical attributes of crossbred calves at different interval amongst different treatment groups {Means with different superscript in a row differ significantly ($p<0.05$)}

Parameters	1st Trial (Rainy season)			2nd Trial (Winter Season)			3rd Trial (Summer Season)		
	0 Day	30 Day	60 Day	0 Day	30 Day	60 Day	0 Day	30 Day	60 Day
Control group (T_1)									
Glucose (mg%)	49.63 ± 0.95^{cd}	49.35 ± 0.90^{cd}	48.19 ± 0.63^{d}	53.76 ± 0.94^{bc}	53.47 ± 0.94^{bc}	52.78 ± 0.96^{c}	49.24 ± 1.26^{ab}	48.65 ± 1.20^{bc}	47.93^{bcd}
Proteins (g%)	7.17 ± 0.32^{c}	7.06 ± 0.24^{c}	7.01 ± 0.22^{c}	6.60 ± 0.23	6.50 ± 0.26	6.97 ± 0.22	6.79 ± 0.20	7.00 ± 0.12d	7.06 ± 0.21^{d}
Cholest (mg/dL)	69.48 ± 2.77^{a}	64.96 ± 2.80^{a}	68.27 ± 2.06^{a}	43.82 ± 18.41^{b}	67.31 ± 2.12^{a}	66.66 ± 0.95^{a}	75.14 ± 0.72^{c}	72.81 ± 2.66^{c}	71.48 ± 1.44^{c}
Urea (mmol/l)	5.03 ± 0.04^{a}	5.26 ± 0.28^{a}	5.21 ± 0.11^{a}	4.70 ± 0.23^{ab}	4.74 ± 0.16^{ab}	5.22 ± 0.06^{a}	4.75 ± 0.26^{ab}	3.89 ± 0.10^{b}	5.19 ± 0.11^{a}
SGOT (U/l)	41.69 ± 1.65^{ab}	40.00 ± 1.01^{ab}	41.00 ± 2.00^{ab}	39.11 ± 0.51^{a}	41.04 ± 0.82^{a}	40.23 ± 0.89^{a}	45.40 ± 1.35^{c}	45.18 ± 3.07^{c}	47.56 ± 0.40^{c}
SGPT (U/l)	13.49 ± 0.88^{b}	13.66 ± 0.50^{ab}	13.67 ± 0.56^{ab}	12.63 ± 0.48^{b}	13.46 ± 0.34^{ab}	13.40 ± 0.32^{ab}	14.30 ± 0.20^{cd}	14.15 ± 0.22^{d}	14.40 ± 0.15^{cd}
Self Compounded Herbal drug (T_2)									
Glucose (mg%)	53.32 ± 1.20^{ab}	53.60 ± 1.64^{ab}	52.37 ± 1.52^{abc}	55.35 ± 0.39^{ab}	56.09 ± 0.06^{a}	53.95 ± 0.47^{abc}	48.70 ± 0.71^{bc}	50.22 ± 0.64^{a}	47.31 ± 0.78^{cd}
Proteins (g%)	9.00 ± 0.01^{a}	9.01 ± 0.03^{a}	9.16 ± 0.04^{a}	8.95 ± 0.09^{a}	9.02 ± 0.07^{a}	9.31 ± 0.03^{a}	9.10 ± 0.11^{b}	9.17 ± 0.13^{b}	9.72 ± 0.02^{a}
Cholest (mg/dL)	69.93 ± 5.09^{a}	72.81 ± 1.90^{a}	74.37 ± 5.19^{a}	79.16 ± 0.54^{a}	71.68 ± 3.39^{a}	70.50 ± 2.77^{a}	83.17 ± 1.30^{a}	79.94 ± 1.33^{ab}	82.36 ± 2.33^{a}
Urea (mmol/l)	3.79 ± 0.16^{b}	4.14 ± 0.25^{b}	4.43 ± 0.28^{ab}	4.49 ± 0.36^{b}	4.35 ± 0.33^{b}	4.28 ± 0.24^{b}	4.08 ± 0.26^{ab}	4.37 ± 0.34^{ab}	4.35 ± 0.35^{ab}
SGOT (U/l)	30.68 ± 1.02^{b}	45.46 ± 2.10^{a}	47.00 ± 2.19^{a}	50.90 ± 0.95^{a}	35.04 ± 15.06^{a}	50.33 ± 1.12^{a}	51.77 ± 1.74^{ab}	50.77 ± 1.48^{ab}	53.33 ± 0.44^{a}
SGPT (U/l)	14.68 ± 0.33^{ab}	14.82 ± 0.30^{a}	14.71 ± 0.23^{ab}	13.71 ± 0.49^{ab}	14.01 ± 0.29^{ab}	14.17 ± 0.28^{a}	15.05 ± 0.07^{abc}	15.23 ± 0.19^{ab}	15.56 ± 0.22^{a}
Marketed herbal drug (T_3)									
Glucose (mg%)	51.98 ± 1.02^{abcd}	54.36 ± 0.79^{a}	50.33 ± 1.26^{bcd}	54.36 ± 0.76^{abc}	55.19 ± 0.61^{ab}	53.20 ± 0.24^{bc}	47.82 ± 0.61^{bcd}	48.51 ± 0.33^{bc}	46.43 ± 0.50^{d}
Proteins (g%)	7.96 ± 0.03^{b}	7.95 ± 0.02^{b}	8.11 ± 0.06^{b}	8.06 ± 0.07^{b}	8.16 ± 0.07^{b}	8.22 ± 0.01^{b}	8.17 ± 0.07^{c}	8.22 ± 0.10^{c}	8.55 ± 0.03^{c}
Cholest (mg/dL)	73.66 ± 1.20^{a}	71.51 ± 0.90^{a}	63.09 ± 7.79^{a}	65.18 ± 0.55^{a}	69.92 ± 0.65^{a}	67.54 ± 1.54^{a}	81.21 ± 0.54^{a}	78.87 ± 1.95^{ab}	78.00 ± 1.73^{ab}
Urea (mmol/l)	4.03 ± 0.07^{b}	3.99 ± 0.56^{b}	4.10 ± 0.12^{b}	5.03 ± 1.14^{ab}	4.24 ± 0.40^{b}	4.29 ± 0.38^{b}	4.62 ± 0.51^{ab}	4.56 ± 0.26^{ab}	4.97 ± 0.43^{ab}
SGOT (U/l)	43.48 ± 2.19^{ab}	43.83 ± 1.59^{ab}	43.25 ± 2.68^{abc}	32.81 ± 13.90^{a}	48.77 ± 0.77^{a}	48.15 ± 1.95^{a}	49.87 ± 0.84^{abc}	52.32 ± 1.74^{ab}	50.89 ± 1.96^{ab}
SGPT (U/l)	13.95 ± 0.56^{a}	14.68 ± 0.26^{ab}	14.06 ± 0.55^{ab}	13.61 ± 0.41^{ab}	14.41 ± 0.41^{a}	13.61 ± 0.50^{ab}	14.90 ± 0.43^{abcd}	14.72 ± 0.25^{bcd}	14.82 ± 0.43^{abcd}

formulated herbal drug treated group as compared to marketed herbal drug and control groups. However, no change was observed in cholesterol level at 0, 30th and 60th days. Hosoda *et al*. (2006) reported similar levels of blood cholesterol in their study. The level of total urea was significantly ($p < 0.05$) higher in control group followed by marketed herbal drug and self formulated herbal drug treated calves. The level of total urea remained similar ($p > 0.05$) between 0 and 30th days but these levels were significantly differs during 60 and 0 day and 60 and 30 day. There was not much alteration ($p < 0.05$) in the SGOT and SGPT concentration at 0, 30th and 60th days. The findings of present investigation on total protein, SGOT and SGPT were in accordance to Ahmed *et al*. (2009). The level of SGOT and SGPT were higher in self formulated herbal drug treated calves followed by marketed herbal drug treated group and then control group's calves, which indicates the normal hepatic functions. Lastly, it can be concluded that self formulated and marketed herbal drugs influenced the biochemical parameters of blood under normal range which ultimately indicates that visceral organ like pancreas, liver and kidneys are normally functioning.

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