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Effect of feeding hydroponics maize fodder on haemato-biochemical parameters in Gir cows

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Abstract
A feeding trial of 120 days was conducted on 16 Gir cows distributed equally in four groups to study the effect of feeding of hydroponics maize fodder on haemato-biochemical parameters and fed different levels of hydroponics maize fodder. The animals in group T_1 (control) were fed a 4.5 kg concentrate mixture (CP 20%) and wheat straw ad lib. In group T_2, 75% of CP was met through concentrate mixture (4.1kg) and rest through hydroponics maize fodder (5.6kg) along with wheat straw ad lib. Were provided. While in group T_3, 11 kg hydroponics maize fodder and 2.75 kg concentrate mixture were given along with *ad lib.* Supply of wheat straw. In the T_4 group, the animals were fed 16 kg of hydroponics maize fodder, 1.375 kg concentrate mixture and *ad lib.* Wheat straw. The haemato-biochemical parameters studied i.e. haemoglobin, packed cell volume, blood glucose, total serum protein, blood urea nitrogen and serum creatinine were well within the normal range and there were non-significant differences among the treatment groups. In respect of blood profile concerns, the blood profile in all the groups were similar for Hb, blood glucose, total serum protein and blood urea nitrogen showing non-significant differences among them. Based on the results, the study revealed that hydroponics maize fodder fed all groups shows non-significant effect on all blood constituents in Gir cattle indicated that the cows were having more or less similar physiological status.

Keywords: hydroponics fodder, Gir cows, haemato-biochemical parameter

Introduction
Green fodder is an important component of animal husbandry. Maize is one of the most nutritious non-legume green fodders. The high acceptability of maize as fodder can be judged from the fact that it is free from any anti-nutritional components. Maize is quick growing, yields high biomass, and is highly palatable. It contains sufficient quantities of protein and minerals and possesses high digestibility as compared to other non-legume fodders. The technology of green fodder production is especially important in arid and semiarid regions. The hydroponic fodder system is an ideal solution in places where there is a limited land area for the growing of fodder or where pasture grazing is limited or nonexistent. It is also sustainable as it occupies a small land area, thus making it ideal for limited areas such as farms in India. Hydroponic fodder production is a technique for germinate fodder seeds such as barley, cowpea, sorghum, wheat, and maize etc. to sprout into a high quality, highly nutritious, disease free animal food in a hygienic environment free of chemicals like insecticides, herbicides, fungicides and artificial growth promoters [1, 2, 3]. Hydroponic fodder is a rich source of antioxidants in form of Beta-carotene, Vitamin A, E and C [4, 5]. It is rich in limiting amino acid, lysine [6]. Beside, sprouted grains are rich in enzyme and enzyme rich feeds are generally alkaline in nature, thereby improves the animal's productivity by neutralizing the acidic condition and developing a strong immune system [5, 7]. All these special features of hydroponic culture, in addition to others make it one of the most important agricultural techniques currently in use of green forage production in many countries especially in arid and semi-arid regions [8]. Therefore, an experiment was conducted to find out the effect of feeding hydroponics maize fodder on haemato-biochemical parameters in lactating Gir cows

Materials and Methods
Hydroponics maize (Zea mays) fodder was produced in a hydroponics chamber of Ayurvet Progreen Machine with a daily production potential of 240 kg fresh hydroponics maize fodder equipped with automatic irrigation. Clean seeds of maize were soaked in tap water for overnight and distributed in the growth chamber after germination for 24 hour on first day, the

trays containing soaked seeds were put on the top most row of the rack and then these were shifted to their respective places every day till they reached seventh day. Inside the growth chamber, the plants were allowed to grow for 7 days and then on eight day, these were harvested and fed to the animals. The Sixteen lactating graded Gir cows (380±10.5 kg), in early lactation (30 to 60 days and 2-3 lactations) period and same milk yield (6.5-7 kg/day) procured from Gir project, University of Veterinary and Animal Sciences, Bikaner and randomly distributed in four treatment groups. Cows were housed in well ventilated, hygienic and protected sheds. Cows were housed in well ventilated, hygienic and protected sheds. The animals in group T_1 (control) were fed a 4.5 kg concentrate mixture (CP 20%) and wheat straw ad lib. In group T_2, 75% of CP was met through concentrate mixture (4.1kg) and rest through hydroponics maize fodder (5.6kg) along with wheat straw ad lib. were provided. While in group T_3, 11 kg hydroponics maize fodder and 2.75 kg concentrate mixture were given along with *ad lib.* Supply of wheat straw. In the T_4 group, the animals were fed 16 kg of hydroponics maize fodder, 1.375 kg concentrate mixture and *ad lib.* Wheat straw. Daily allowance of concentrate and roughage were offered to meet their nutrient requirements [9]. The animals were given measured quantity of experimental feed and ad lib water in every morning. Various haemato-biochemical parameters were investigated at the end of experiment to judge the physiological status of health of the animals. Blood was collected from jugular vein with all aseptic precautions using 20 gauge needles to avoid rupture of corpuscles, damage of leucocytes and to allow flow of blood smoothly with a minimum of vacuum. For haematological examination, disodium salt of Ethylene Diamine-Tetra-Acetic Acid (EDTA) was used as an anticoagulant @ 1 mg/ml of blood. The blood, so drawn was collected in sterilized test tubes containing adequate amount of anticoagulant. Haematological studies were performed soon after collection of blood. For separation of serum, blood was collected in second tube, without anticoagulant, and kept in slanting position. These tubes were incubated for 1 h at 370C. Blood clots were broken and tubes were centrifuged at 2500 rpm for 30 minutes. The serum was pipetted out in small Pyrex tubes and kept for further analysis of total serum protein, blood glucose and blood urea nitrogen. Haemoglobin was estimated by Automatic Coult Counter. Blood serum parameters *viz*. total protein, blood glucose and blood urea nitrogen were estimated by Automatic Biochem Analyzer of Schiapparelli Biosystems, INC, using standard WIPRO kits. The data obtained in the experiment were analyzed using statistical procedures as suggested by and significance of mean differences was tested by [10] Duncan's New Multiple Range Test (DNMRT) as modified by [11].

Results and Discussion

The data of Haemoglobin in different treatment groups are presented in (Table-1, Fig.1). The statistical analysis of data (Table-2) showed a non-significant effect of feeding hydroponics maize fodder in all treatment groups on Haemoglobin percentage. The mean values of Haemoglobin were found to be 13.14, 13.75, 13.20 and 13.32 g/dl in T_1, T_2, T_3 and T_4 treatment groups, respectively. The results corroborate well with the findings of Marsico *et al.* [12], Micera *et al.* [13], and Verma *et al.* [14] on goat, sheep and calves, respectively on the feeding of hydroponics fodder. The overall mean values of blood glucose concentration (mg/dl) were found to be 43.49 in T_1, 43.75 in T_2, 43.06 in T_3 and 43.06 in T_4 groups, respectively (Table-1, Fig.2). The statistical analysis of data did not reveal any significant effect feeding of hydroponics maize fodder (Table-2). The results of the study indicated that hydroponics maize fodder did not affect blood glucose. The results corroborate well with the findings of Marsico *et al.* [12] and Micera *et al.* [13] on goat and sheep, respectively on feeding of hydroponics fodder. The overall mean values of blood urea nitrogen concentration in T_1, T_2, T_3 and T_4 treatment groups were found to be 23.90, 23.88, 23.63 and 23.80 mg/dl respectively (Table-1, Fig.3). The statistical analysis of data as shown in indicated no effect of feeding of hydroponics maize fodder on blood urea nitrogen as blood urea nitrogen concentration did not differ significantly among different treatment groups (Table-2). The mean values of blood urea nitrogen concentration in various treatment groups were within the normal range of 6.0 to 27 mg/dl for cows [15]. The findings of the present investigation are in line with the results of Marsico *et al.* [12], Micera *et al.* [13], and Verma *et al.* [14] on feeding of hydroponics fodder on goat, sheep and calves, respectively. The average mean values for total serum protein were found to be 6.51, 6.75, 6.48 and 6.56 g/dl in T_1, T_2, T_3 and T_4 treatment groups, respectively (Table-1, Fig. 4). The statistical analysis of data revealed non-significant effect of replacement of CP of concentrate with hydroponics fodder on total serum protein (Table-2). The mean values of total serum protein concentration in various treatment groups were within the normal range of 5.7 to 8.1 g/dl for cows [15]. The results corroborate well with the findings of Marsico *et al.* [12], Micera *et al.* [13], and Verma *et al.* [14] on the feeding of hydroponics fodder on goat, sheep and calves, respectively. To sum up the aforementioned, the above study revealed non-significant effect of feeding of hydroponics maize fodder on haemato-biochemical parameter in Gir cows.

Table 1: Average Values of Haemato-Biochemical Parameters in different treatment groups

Parameters	Treatment groups				SEM
	T_1	T_2	T_3	T_4	
Hb (g/dl)	13.14	13.75	13.20	13.32	0.169
Blood glucose (mg/dl)	43.49	43.75	43.06	43.06	0.478
Blood urea nitrogen (mg/dl)	23.90	23.88	23.63	23.80	0.223
Total serum protein (g/dl)	6.51	6.75	6.48	6.56	0.155

Table 2: Anova of Haemato-Biochemical Parameters

Parameters	Source of variation	d.f.	MSS	F Value	Level of sig.
Haemoglobin	Treatment	3	0.300	0.649	NS
	Block	3	1.519	3.289	NS
	Error	9	0.461		
Blood glucose	Treatment	3	0.464	0.126	NS
	Block	3	1.495	0.408	NS
	Error	9	3.661		
Blood urea nitrogen	Treatment	3	0.061	0.076	NS
	Block	3	1.049	1.318	NS
	Error	9	0.796		
Total serum protein	Treatment	3	0.058	0.152	NS
	Block	3	0.249	0.646	NS
	Error	9	0.385		

NS = Non-significant

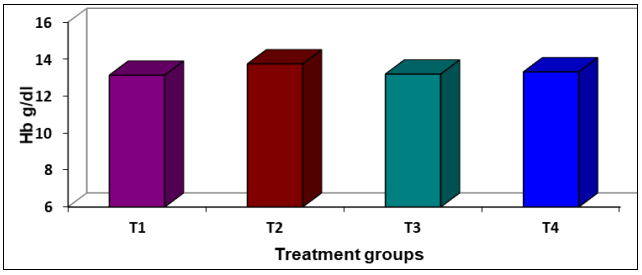

Fig 1: Effect of Hydroponics Maize Fodder on Hb

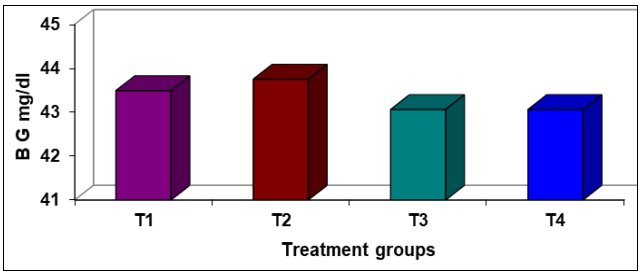

Fig 2: Effect of Hydroponics Maize Fodder on Blood Glucose

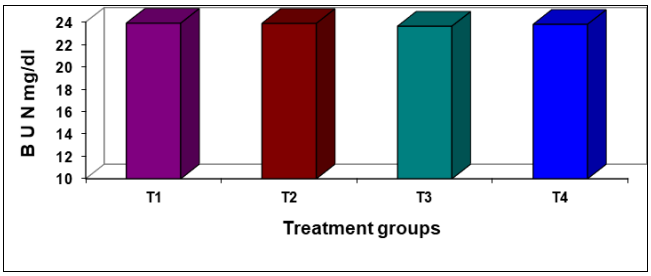

Fig 3: Effect of Hydroponics Maize Fodder on Blood Urea Nitrogen

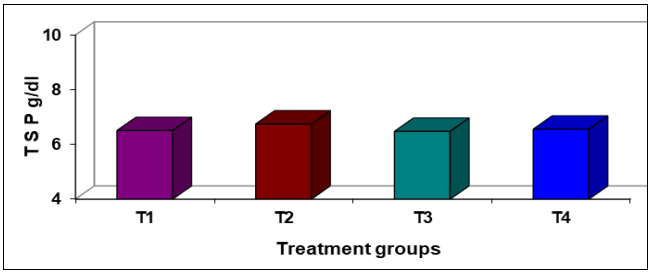

Fig 4: Effect of Hydroponics Maize Fodder on Total Serum Protein

References

1. Jensen MH, Malter AJ. Protected agriculture: a global review, World Bank Technical Paper 1995, 253.
2. Al-Hashmi MM. Hydroponic green fodder production in the Arabian Gulf Region. Msc. Thesis, Faculty of Graduate Studies, Arabian Gulf University, Bahrain 2008.
3. Al-Karaki GN, Al-Momani N. Evaluation of some barley cultivars for green fodder production and water use efficiency under hydroponic conditions. Jordan Journal of Agricultural Science 2011;**7**:448-456.
4. Cuddeford D. Hydroponic grass. In Practice **11**(5), 211-214.
5. Chung T, Nwokolo EN, Sim JS. Compositional and digestibility changes in sprouted barley and canola seeds. Plant Foods for Human Nutrition 1989;39:267-278.
6. Shipard I. How Can I Grow and Use Sprouts as Living Food. Stewart Publishing, Australia 2005.
7. Chavan J, Kadam SS. Nutritional improvement of cereals by sprouting. Food Science and Nutrition 1989;28:401-437.
8. Sneath R, Mclntosh F. Review of hydroponic fodder production for beef cattle. Queensland Government, Department of Primary Industries, Dalby, Queensland 2003.
9. Al-Karaki GN. Utilization of treated wastewater for green forage production in a hydroponics system. Emirats Journal of Food and Agriculture 2011;23:80-94.
10. ICAR. Nutrient requirements of livestock and poultry. 1st ed. ICAR Publication and Information Divisions, New Delhi 1985.
11. Snedecor CW, Cochran WG. Statistical method. Lowa state University Press, Ames, USA 2005.
12. Kramer CY. Extension of multiple range tests to group correlation adjusted means. Biometrics 1957;13:13.
13. Marsico G, Micera E, Dimatteo S, Minuti F, Vicenti A, Zarrilli A. Evaluation of animal welfare and milk production of goat fed on diet containing hydroponically germinating seeds. Italian Journal of Animal Science 2009;8(2s):625-627.
14. Micera E, Ragni M, Minuti F, Rubino G, Marsico G, Zarrilli A. Improvement of sheep welfare and milk production fed on diet containing hydroponically germinating seeds. Italian Journal of Animal Science 2009;8(2s):634-636.
15. Verma Swati, Singh Anand, Kalra Anup, Saxena Mohan. Effect of Feeding Hydroponics Barley (*Hordeum vulgare*) Fodder on Nutrient Utilization, Growth, Blood Metabolites and Cost Effectiveness in Hariana Male Calves. Indian Journal of Animal Nutrition 2015;32(1):10-14.
16. Radostits OM, Blood DC, Gays CC. Veterinary Medicine. 8th edn. Bailliere Tindall, London 2012.