

EFFECT OF FEEDING OF HYDROPONICS MAIZE FODDER ON HAEMATO-BIOCHEMICAL PARAMETERS IN RATHI COWS

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ABSTRACT

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Sixteen dairy Rathi cows of similar age, body weight were distributed in four groups of 4 animals each in order to study the effect of feeding of hydroponics maize fodder on haemato-biochemical parameters. The study was conducted for 120 days. The animals in group T₁ (control) were fed 4.5 kg concentrate mixture (CP 20%), 4 kg groundnut straw and wheat straw *ad lib*. In group T₂, 75% of CP was met through concentrate mixture (3.375 kg) and rest through hydroponics maize fodder (7.0 kg) along with 4 kg groundnut straw and *ad lib* wheat straw were provided. While in group T₃, 14 kg hydroponics maize fodder, 2.25 kg concentrate mixture and 4 kg groundnut straw were given along with *ad lib* supply of wheat straw. In T₄ group, the animals were fed 21 kg of hydroponics maize fodder, 1.125 kg concentrate mixture, 4 kg groundnut straw 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.

Key words: Cows, feeding, haemato-biochemical parameters, hydroponics fodder, maize

Introduction

Feeding of good quality green fodder to dairy animals could play an important role in sustainable dairy farming. Besides, the non-availability of land, more labour requirement for fodder cultivation, more growth time, unavailability of same good quality feed round the year, requirement of manure and fertilizer, the uncertain rain fall, scarcity of water and natural calamities due to climate change are the major constraints and problems for green fodder production by the livestock farmers. Furthermore, the non-availability of constant quality of fodder round the year aggravates the limitations of the sustainable dairy farming. Due to the above constraints of the conventional method of fodder cultivation, hydroponics technology is coming up as an alternative to grow fodder for farm animals (Naik *et al.*, 2011; Naik, 2012; Naik *et al.*, 2013). Therefore, an experiment was conducted to find out the effect of feeding hydroponics maize fodder on haemato-biochemical parameters in lactating Rathi 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 480 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 experimental 16 dairy Rathi cows (almost same body weight 340-360 kg, in 2nd to 3rd lactation period and same milk yield 5-6 kg/day) were distributed on the basis of milk production and body weight into four groups of four animals and each

subjected to different treatments. Cows were housed in well ventilated, hygienic and protected sheds. The animals in group T₁ (control) were fed 4.5 kg concentrate mixture (CP 20%), 4 kg groundnut straw and wheat straw *ad lib*. In group T₂, 75% of CP was met through concentrate mixture (3.375 kg) and rest through hydroponics maize fodder (7.0 kg) along with 4 kg groundnut straw and *ad lib* wheat straw were provided. While in group T₃, 14 kg hydroponics maize fodder, 2.25 kg concentrate mixture and 4 kg groundnut straw were given along with *ad lib* supply of wheat straw. In T₄ group, the animals were fed 21 kg of hydroponics maize fodder, 1.125 kg concentrate mixture, 4 kg groundnut straw and *ad lib* wheat straw. Daily allowance of concentrate and roughage were offered to meet their nutrient requirements (ICAR, 1985). 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 37°C. 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, blood urea nitrogen and serum creatinine. Haemoglobin and PCV were estimated by Automatic Coult Counter. Blood serum parameters *viz.* total protein, serum

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Table 1: Chemical composition of experimental feed (% DM basis)

Attributes	DM	OM	CP	EE	CF	NFE	TA	NDF	ADF	HC
Concentrate mixture	89.0	89.32	20.0	4.0	10.0	55.32	10.68	36.13	20.82	15.31
Hydroponics maize fodder	17.10	97.20	18.37	3.50	7.30	68.03	2.80	35.30	17.08	18.22
Wheat straw	92.02	88.64	3.34	1.45	36.67	47.18	11.36	74.27	50.65	23.62
Groundnut straw	91.20	89.30	8.36	1.24	40.40	39.30	10.70	51.60	43.60	8.00

Table 2 :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)	8.83	8.82	8.85	8.86	0.06
PCV (Per cent)	29.75	29.00	29.25	29.50	8.45
Blood glucose (mg/dl)	57.75	57.25	57.50	57.75	5.00
Blood urea nitrogen (mg/dl)	19.50	19.00	19.25	19.25	1.86
Total serum protein (g/dl)	7.60	7.73	7.83	7.68	0.03
Serum creatinine (mg/dl)	1.28	1.23	1.20	1.30	0.01

creatinine, 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 Snedecor and Cochran (1994) and significance of mean differences was tested by Duncan's New Multiple Range Test (DNMRT) as modified by Kramer (1957).

Results and Discussion

The nutrient content of the concentrate mixture is as per the BIS specifications of the compounded cattle feed. The composition of conventional groundnut straw and wheat straw were within the normal range and similar to the reports of earlier workers (Banerjee, 1988; Verma *et al.*, 2015 and Misra *et al.*, 1996). The chemical composition of hydroponics maize fodder was similar to that given by Naik *et al.* (2014) except crude protein value which was higher in the present study. The hydroponics maize fodder looked like a mat of 20-30 cm height consisting of germinated seeds embedded in their white roots and green shoots (Naik *et al.*, 2011, Naik *et al.*, 2013).

The values of haemato-biochemical parameters *viz.* haemoglobin, PCV, blood glucose, total serum protein, blood urea nitrogen and serum creatinine were similar in all treatment groups and there were non significant differences among the treatment groups. The levels were within normal range and no adverse effect on health of cows was observed. Similar results were reported by Marsico *et al.* (2009) and stated that integration with hydroponically germinating oat in partial substitution of the traditional feed in the diet of goat did not significantly affect biochemical and haematological parameters. Micera *et al.* (2009) evaluated the effect of sprouted oats in Comisana sheep and found that supplementation of oats in diet of sheep did not

affect the biochemical and haematological parameters. Further, Verma *et al.* (2015) studied the effect of feeding hydroponics barley (*Hordeum vulgare*) fodder on blood metabolites in Haryana male calves and found similar blood parameters in all three treatment groups. The levels were within normal range and no adverse effect on health of calves was observed.

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