

## Studies on feeding home and readymade concentration on performance of heifers

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### ABSTRACT

The study was conducted for a period of 12 weeks. Twelve heifers were divided into three groups on the nearness of age and weight basis. Three treatments viz., T<sub>1</sub>- Readymade concentrate, T<sub>2</sub>- Dry fodder + green fodder + homemade concentrate-I, T<sub>3</sub>- Dry fodder + green fodder + homemade concentrate –II were studied. The proximate analysis of concentrate showed higher CP (25.26%) and EE (5.25%) in homemade concentrate-I while, homemade concentrate-II was higher in CF (12.01%). The daily dry matter intake per 100 kg body weight of heifers was higher in T<sub>2</sub> followed T<sub>1</sub> and T<sub>3</sub> treatments. Intake of DCP and TDN was higher in T<sub>1</sub> followed by T<sub>3</sub> and lowest in treatment T<sub>2</sub>. The highest total body weight gain in body weight of heifers was observed in treatment T<sub>2</sub>, followed by T<sub>3</sub> and lowest in treatment T<sub>1</sub>. Growth performance viz., height, length and chest girth of heifers was more in T<sub>2</sub> treatment as compared to T<sub>1</sub> and T<sub>3</sub> treatments. The cost/ kg body weight gain was lowest in T<sub>2</sub> than T<sub>1</sub> and T<sub>3</sub> treatment. It was concluded from the results that the feeding of homemade concentrate-I was economical for growth performance of heifers.

**KEY WORDS :** Homemade concentrate, Readymade concentrate, Heifers, Adlibitum, Crude protein , Digestible crude protein, Dry matter

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### INTRODUCTION

Growth is fundamental and common feature of all living being. Every animal is endowed at birth with certain capacity for growth and production and these inherited characters can be exploited to the fullest extent only with proper feeding and management to obtain adequate growth. Growth depends upon the genetic make up to the extent of only 30 per cent and feeding and management contribute remaining 70 per cent. Concentrate feeding plays an important role in growth, age at maturity, first conception, first calving in heifers.

The requirement for growth is more than that for maintenance. Since growth consists of an increase in the size of muscles, other soft tissue and skeleton. Large amount of proteins, minerals and vitamins must be provided

and also it is important that, dairy farmer should raise heifers of higher producing cows. Most of recent researches are diverted towards economical rearing of the calves with different feeding pattern the aim of this to have heifer which develop to a cow of optimum age and give maximum returns in respect of milk in her life time without utilizing traditional methods.

There are many firms in India which sell compounded livestock ration. However, due to lack of an efficient quality control system, it is difficult to say that this ration contains the required nutrients as per BIS or any other specified standard. There appears to be relationship between the effectiveness of different homemade and readymade feeding in eliciting a response, and the diet and nutritional demands of the animal.

Therefore, taking into consideration different homemade and readymade concentrate feedings, important role in growth of heifers, it was felt necessary to conduct investigation to study the effect and cost structure of different homemade and readymade concentrate feeding on growth performance of heifers.

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## MATERIALS AND METHODS

The Livestock Instructional Farm is located at Akola which is one of the districts of 'Vidarbha' region in Maharashtra state. Twelve heifers were selected for conducting the experiment such that 4 animals in each batch, on the basis of nearness to age and weight basis. These groups were randomly allotted to different treatments presented below. The DCP and TDN requirement were fulfilled by jowar straw, green fodder and concentrate mixture. Details of treatments are presented below:

T<sub>1</sub> –Dry fodder + green fodder + readymade concentrate

T<sub>2</sub> –Dry fodder + green fodder + homemade concentrate-I

T<sub>3</sub> –Dry fodder + green fodder + homemade concentrate-II

Ingredient of homemade and readymade concentrates					
Ingredient	Per cent	Ingredient	Per cent	Ingredient	Per cent
T <sub>1</sub>		T <sub>2</sub>		T <sub>3</sub>	
Sugar	100%	Wheat	40%	Crushed jowar grain	40%
		bran		Udid chuni	10%
		Tur chuni	20%	Crushed soybean grain	30%
		Cotton seed cake	20%	Cotton seed cake	20%
		Groundnut cake	20%		

The dry matter intake from feed was quantitatively monitored at weekly interval to assess the consumption of individual animal. It was done at the start of experiment and weekly interval throughout the period. Heifers were offered water thrice a day as to fulfill their requirement. Daily water requirement was recorded during the experiment period at the end.

### Record of observations :

#### *Chemical analysis of feeds and fodder:*

Feed samples were collected for estimating DM, CP, CF, EE, NFE and total ash content. The dry matter percentage was determined as per the procedure recommended by BIS IS: 7874 (Part-I) 1975. Nitrogen percentage was estimated by Kjeldhal's method as per procedure recommended by BIS IS 7874 :( Part I) 1975 and crude protein percentage was calculated in multiplying the percentage of total nitrogen by 6.25. Crude fibre percentage was determined as per procedure recommended BIS IS :( 7874) (Part I) 1975. The ether extracts percentage was determined as per the procedure

recommended BIS IS: 7474 (part I) 1975. Total ash per cent was estimated as per the procedure recommended by BIS IS (7874) (Part I) 1976. The NFE was calculated by subtracting total sum of crude protein, crude fibre, ether extract and total ash from 100.

### Daily feed and water intake:

The heifers were given known quality of home and readymade concentrates with roughages. The daily feed consumption of the heifers was recorded twice in a week to assess the dry matter consumption by individual animal in different treatments. The daily intake of water for individual animal was recorded once in a week.

### Growth measurement :

The growth rate of heifers was estimated in terms of gain in body weight. Weekly body weights of individual heifer were recorded on a standard weighing balance 'AVERY' in morning before feeding and watering. The body measurements such as chest girth, body length and height were recorded weekly. The standard procedure was adopted for determining the body measurements as under. Chest girth was estimated from wither to wither point with the help of measuring tape. It was measured from shoulder point to pin bone point with the help of measuring tape. The heifer was standed on plane surface and the weight recorded from withers point to ground level.

### Statistical analysis:

The data were subjected to analysis statistically following the Completely Randomized Design for testing the differences between feed intake, body weight and body measurement as per the procedure recommended by Gomez and Gomez (1976).

## RESULTS AND DISCUSSION

The results obtained from the present investigation are presented below:

### Chemical composition of feed stuffs:

The chemical composition of home, readymade concentrate and roughages were analyzed for proximate principle. The average chemical compositions of different feed stuffs are presented in Table 1.

The readymade concentrate, homemade concentrate-I, homemade concentrate-II were containing on an average 90.13, 88.12, 89.17 per cent DM, respectively.

**Table 1: Chemical composition of feed stuffs on DM basis (%)**

Particulars	DM	CP	CF	EE	NFE	Total Ash
Readymade concentrate	90.13	17.32	11.84	2.67	64.27	3.90
Homemade concentrate -I	88.82	25.26	10.63	5.25	52.62	6.24
Homemade concentrate-II	89.17	19.23	12.01	2.89	61.58	4.29
Jowar straw	89.27	3.84	29.46	4.70	53.40	8.60
Green fodder	24.30	10.87	25.72	1.97	18.20	9.25

**Table 2: Average intake of feeds stuff under different treatment groups on DM basis (kg/day/heifer)**

Treatments	Concentrate	Jowar straw	Green fodder	Total
T <sub>1</sub>	1.00 (0.900)	1.00 (0.900)	2.00 (0.400)	4.00 kg (2.200)
T <sub>2</sub>	1.00 (0.900)	1.20 (1.090)	2.00 (0.400)	4.20 kg (2.380)
T <sub>3</sub>	1.00 (0.900)	1.10 (0.990)	2.00 (0.400)	4.10 kg (2.290)

Homemade concentrate- I was higher in CP (25.16 per cent) and EE (5.25 per cent) than homemade concentrate-II, and readymade concentrate. Homemade concentrate-II was higher in CF content (12.01%) and readymade concentrate was higher in NFE (64.27 per cent) content than homemade concentrate- I and II (Table 1).

Chemical composition of concentrate homemade-I has more or less feeding value as determined by Reddy and Reddy (1985). Reddy *et al.* (1988) observed that the chemical composition, (on DM basis) of conventional diet of concentrate mixture was CP (20.71), CF (5.32), EE (3.09), NFE (62.07), Total ash (8.81). These values of concentrate mixtures were similar to the present value of readymade concentrate. Nemade (2000) studied the chemical composition of concentrate mixture having DM (90.00), CP (22.71), EE (3.09), CF (5.32), NFE (62.07) and total ash (6.81).

### Feed intake:

The readymade concentrate, homemade concentrate-I, homemade concentrate-II, jowar straw and green fodder were provided to heifers in different groups to meet out the DCP and TDN requirement according to average body weight of heifers (Table 2).

It is clear from Table 2 that the feed intake in heifers were 4.00, 4.20 and 4.10 kg in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. The feed intake was higher in T<sub>2</sub> followed by T<sub>3</sub> and T<sub>1</sub> while, lowest in treatment T<sub>1</sub> (control). Rafiq *et al.* (2008) observed that there was significant difference in feed intake, nutrient intake and feed utilization efficiency. When the three groups of animal fed with Group A (fodder + 2 kg concentrates) and Group B (Fodder + 4 kg concentrates) ,group C (Fodder

only),they observed that as the quantity of concentrates increased the daily weight gain also increased

### Daily dry matter intake:

It is evident from the results of Table 3 that the average daily DM intake were 2.200, 2.380 and 2.290 kg per heifer in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatments, respectively. The corresponding DM intake per 100 kg body weight was 1.444, 1.956 and 1.888 kg per heifer in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. Higher intake of DM per 100 kg body weight was noticed in treatment T<sub>2</sub> and lowest in treatment T<sub>1</sub>. Dejene *et al.* (2005) observed that the concentrate level significantly (P<0.01) affected DMI of the whole ration. When the concentrate level increased from 0 to 2.0 kg/d/animal, total mean DMI went up from 2.68 to 3.55 kg/100 B.W. However, the increase, in concentrate level led to a significant (P<0.01) in DMI of green sorghum fodder.

**Table 3 : Average daily DM intake of heifers (kg)**

Treatments	Average body weight	Daily DM intake	Daily DM intake / 100 kg body weight
T <sub>1</sub>	119.250	2.200	1.444
T <sub>2</sub>	121.625	2.380	1.956
T <sub>3</sub>	121.260	2.290	1.888

### Daily nutrient intake:

It is evident from Table 4 that excess DM intake was less in T<sub>1</sub> than that of T<sub>2</sub> and T<sub>3</sub> treatments. Similarly, excess in DCP was more in T<sub>1</sub> while TDN excess was more in T<sub>1</sub> than that of T<sub>2</sub> and T<sub>3</sub>. Intake of excess DCP was 0.087, 0.067, 0.085 kg in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatments, respectively.

**Table 4 : Nutrient intake of heifers in relation to requirement under different treatments on DM basis of heifers (kg)**

Treatments	Requirement			Nutrient provided conc. + roughage			Excess (kg)		
	DM	DCP	TDN	DM	DCP	TDN	DM	DCP	TDN
T <sub>1</sub>	1.714	0.177	1.140	2.200	0.090	1.456	0.486	0.087	0.316
T <sub>2</sub>	1.820	0.189	1.210	2.380	0.122	1.500	0.560	0.067	0.290
T <sub>3</sub>	1.765	0.182	1.170	2.290	0.097	1.476	0.525	0.085	0.306

(Figures as per ICAR feeding standard)

**Table 5 : Average daily water intake per 100 Kg DM intake of heifers (lit.)**

Treatments	Initial intake of water (lit)	Final intake of water (lit)	Average intake of water (lit)	DM intake (kg)	Water DM ratio	Average water intake / day /100 kg BW (lit)
T <sub>1</sub>	8.25	9.55	8.90	2.200	4.04	7.46
T <sub>2</sub>	11.25	13.90	12.57	2.380	5.28	10.33
T <sub>3</sub>	9.75	12	10.87	2.290	4.74	8.96
'F' test	Sig.	Sig.	Sig.	NS	NS	Sig.
SE (m) ±	0.22	0.81	0.051	0.0251	0.0310	4.88
CD at 5%	0.67	0.94	0.15	-	-	0.12

**Table 6 : Growth performance of heifers under different treatments**

Treatments	Average daily gain in B.W. (kg.)	Average daily gain in height (cm)	Average daily gain in length (cm)	Average daily gain in chest girth (cm)
T <sub>1</sub>	0.27	0.045	0.090	0.115
T <sub>2</sub>	0.30	0.050	0.096	0.133
T <sub>3</sub>	0.29	0.047	0.094	0.118
F-test	Sig.	Sig.	Sig.	Sig.
SE (m)	0.13	0.12	0.24	0.42
CD at 5%	0.40	0.38	0.77	1.29

While excess TDN intake was recorded as 0.316, 0.290 and 0.306 kg in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> respectively. The results of present the study are in lines with Nagpal *et al.* (1980) who observed that dry matter consumption was maximum in group fed with concentrate.

#### Water intake:

Data of Table 5 indicate the the average water intake per 100 kg body weight was observed to be 7.46, 10.33 and 8.96 litre per heifer/ day in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. The heifers from T<sub>2</sub> group drunk more water (12.57 lit) than that of T<sub>3</sub> (10.87 lit) and T<sub>1</sub> (8.90). This trend showed that the heifers of T<sub>2</sub> group has higher water intake than T<sub>1</sub> and T<sub>3</sub> treatments. The differences in the water intake between T<sub>2</sub> and T<sub>3</sub> groups were significant. The DM intake to water ratio was non-significant among the treatments.

The DM to water intake ratio obtained was in closer agreement with Roy *et al.* (1989) who observed that the DM to water intake ratio ranged from 3.2 to 3.6 litre. Kumar *et al.* (1987) observed that the plane of nutrition had a significant effect on water intake in calves which ranged from 4.14 to 5.09 kg / DM intake.

#### Growth performance of heifers:

Growth performance of heifers on concentrate feeding was judged on the basis of body weight gain and gain in body measurements such as chest girth, body length and height as recorded in Table 6.

Average daily gain in body weight was higher in treatment T<sub>2</sub> (0.30g) followed by T<sub>3</sub> (0.29g) and T<sub>1</sub> (0.27g). Results of present study are in closed agreement with Karemore *et al.* (1995) who observed that average daily gain were 0.28, 0.31 and 0.33 kg, respectively.

Average daily gain in height (cm) was higher in treatment T<sub>2</sub> (0.050) followed by T<sub>3</sub> (0.047) and T<sub>1</sub> (0.045). Rafiq (2008) made an attempt to study the growth rate of growing buffalo heifers by feeding different rations and observed per day growth rate of buffalo heifers as 0.558, 0.659 and 0.354 kg in groups A, B and C, respectively.

Average daily gain in length (cm) was higher in treatment T<sub>2</sub> (0.096) followed by T<sub>3</sub> (0.094) and T<sub>1</sub> (0.090). Similar results were observed by Deshmukh and Chavan (1980) who recorded increase in daily body length 0.18 to 0.16 cm in male and female calves, respectively.

Average daily gain in chest girth (cm) was higher in treatment T<sub>2</sub> (0.133) followed by T<sub>3</sub> (0.118) and T<sub>1</sub> (0.115). Deshmukh and Chavan (1980) recorded daily increase in chest girth as 0.20 and 0.19 in male and female calves, respectively.

#### Cost of feeding:

Prepared home and readymade concentrate price/kg

T<sub>1</sub> - Rs. 9.72 /kg

T<sub>2</sub> - Rs. 9.80 /kg

T<sub>3</sub> - Rs. 9.40 /kg

Jowar straw - Rs. 2.00 /kg

Green Fodder - Rs. 1.00 /kg

**Table 7: Cost structure of feeding**

Sr.No.	Particulars	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
1.	Concentrate fed during experimental period (kg)	84	84	84
	Total cost of concentrate provided during experimental period (Rs.)	816.48	823.2	789.6
2.	Dry fodder (Jowar straw) over experimental period (kg)	84	100.8	92.4
	Total cost of roughages (Rs.)	168	201.6	184.8
3.	Green fodder over experimental period (kg)	84	84	84
	Total cost of green fodder (Rs.)	84	84	84
4.	Total cost of feed (Rs.)	1068.48	1108.80	1058.40
	Total weight gain (kg)	23	25.75	24.53
	Cost/ kg body weight gain (Rs.)	46.45	43.06	43.14

Feed cost per kg body weight gain in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was Rs.46.45, 43.06, 43.14, respectively which indicates cost per kg gain of weight and can be reduced by feeding homemade concentrate-I. The cost /kg body weight gain was lowest in homemade concentrate-I over other concentrate feeding (Table 7).

### Conclusion:

Growth rate of heifers fed on homemade concentrate-I was higher than that of homemade concentrate-II and readymade concentrate. The performance in respect of weight, length, height, chest girth gain was higher in T<sub>2</sub> feeding group over T<sub>1</sub> and T<sub>3</sub> treatments. The cost /kg body weight gain was lowest in homemade concentrate- I over other concentrate feeding.

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