

## EFFECT OF FEEDING OF HYDROPONIC MAIZE FODDER ON MILK PRODUCTION AND ECONOMICS OF FEEDING OF CROSSBREED COWS

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### ABSTRACT

An experiment was conducted at Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur during 2023-2024. The average milk yield of experimental cows during the IV<sup>th</sup> week under the treatment T<sub>1</sub> (Green fodder 100% + Concentrated feed), T<sub>2</sub> (Green fodder (85%) + 15% hydroponic maize) and T<sub>3</sub> (Green fodder (75%) + 20% hydroponic maize) was 6.80, 6.81 and 6.83 lit day<sup>-1</sup>, respectively. While during I<sup>st</sup> week it was 6.40, 6.46 and 6.49 lit day<sup>-1</sup>. The milk yield significantly increased during IV<sup>th</sup> week under hydroponic supplemented group under treatment T<sub>2</sub> and T<sub>3</sub>. The milk yield was higher under treatment T<sub>3</sub> (6.83 lit day<sup>-1</sup>) than the treatment T<sub>2</sub> (6.81 lit day<sup>-1</sup>) and T<sub>1</sub> (6.80 lit day<sup>-1</sup>) during IV<sup>th</sup> week. The daily feeding cost of feed to experimental crossbred cows was Rs. 146, Rs.134.64 and Rs. 120.60, respectively under treatment T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>. Thus, it can be inferred that crossbred cows can be efficiently raised on feeding hydroponic green maize fodder containing diet as evident from higher milk yield.

(Key words: Milk yield, economics of feeding)

### INTRODUCTION

Milk is an important food item which contains almost all the nutrients required for human life by virtue of its composition, high nutritive value and digestibility. Milk has got prime important in diet of human being. Milk has got prime important in diet of human being. The total milk production of India was estimated at 236.35 million tonnes during the year 2023. Dairying in India is more impressive as compared to crop production, it involves a majority of the weaker section of the society of livelihoods (Kumar and Singh, 2008). Feeding of green fodder to milch animal not only improve the growth performance but also improve the milk production including quality of milk (Atkare *et al.*, 2023). Sorghum is important fodder crop for feeding ruminants in lean periods in Vidarbha region of Maharashtra. It is nutritious and can be fed as green as well as dry fodder (Ingle *et al.*, 2011).

The word hydroponic has been derived from two Greek word hydro means “water” and ponic means “working”. Thus, fodder produced by growing plants in water or nutrient solution but without using any soil is known as hydroponic fodder or sprouted grains of sprouted fodder. Hydroponic is produced in green house under controlled environment within a short period. Hydroponic green fodder plays an important role in conservation of soil, water and time. It requires only about 3-50% of water needed to produce some amount of forage produce under field condition (Al-karki and Hashimi, 2012). The hydroponic

green fodder production helps to solve this problem by producing food during drought and scarcity periods with acceptable feed yields and great value. It is noticed that there is great nutritional benefit provided by hydroponic fodder and it is suitable for all livestock including sheep, goat, cattle etc. Animals fed with hydroponic fodder showed improved growth and overall health status.

The present paper focused on effect of feeding hydroponic maize fodder on productive performance of crossbred cows with the objective to study the effect of hydroponic fodder on milk production and its economics of feeding.

### MATERIALS AND METHODS

The present investigation on Milk production and economics of feeding carried out in the laboratory of Animal Husbandry and Dairy Science section, College of Agriculture, Nagpur during year 2023-2024. In this experiment, feeding of hydroponic maize fodder to crossbred cows under different treatments were studied.

T<sub>1</sub> – Green fodder 100% + Concentrated feed

T<sub>2</sub> – Green fodder (85%) + 15% hydroponic maize

T<sub>3</sub> – Green fodder (75%) + 20% hydroponic maize

Recommended rate of concentrate and Ad-lib dry roughages were fed to the experimental animal.

Six lactating crossbred cows were selected and divided into two groups on basis lactating number. The daily milk yield animal<sup>-1</sup> was recorded by providing feed as

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per treatment during morning and evening. The record of each animal was kept separately and daily milk yield was calculated. The prices of different constituents of feed stuff approved as per university rates were considered for calculating  $\text{kg}^{-1}$  cost of feeding. The experiment was laid out in LSD i.e. Latin Square Design with 3 treatments and 7 replications.

## RESULTS AND DISCUSSION

### Milk production

The average milk yield of experimental cows during the IV<sup>th</sup> week under the treatment T<sub>1</sub> (Green fodder 100% + Concentrated feed), T<sub>2</sub> (Green fodder (85%) + 15% hydroponic maize) and T<sub>3</sub> (Green fodder (75%) + 20% hydroponic maize) was 6.80, 6.81 and 6.83 ( $\text{lit day}^{-1}$ ), respectively. While during I<sup>st</sup> week was 6.40, 6.46 and 6.49 ( $\text{lit day}^{-1}$ ). The milk yield of experimental cows during the II<sup>nd</sup> week under the treatment T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 6.63, 6.68 and 6.68 ( $\text{lit day}^{-1}$ ), respectively. During the III<sup>rd</sup> week the milk yield of experimental the cows under treatment T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 6.74, 6.75 and 6.76 ( $\text{lit day}^{-1}$ ), respectively. The milk yield significantly increased during IV<sup>th</sup> week under hydroponic supplemented group i.e., T<sub>2</sub> and T<sub>3</sub>. The milk yield was higher under treatment T<sub>3</sub> (6.83  $\text{lit day}^{-1}$ ) than the treatment T<sub>2</sub> (6.81  $\text{lit day}^{-1}$ ) and T<sub>1</sub> (6.80  $\text{lit day}^{-1}$ ) during IV<sup>th</sup> week.

Naik *et al.* (2014) noticed that concentrate feed supplement with hydroponic maize fodder (HMF) had higher milk yield ( $4.64 \pm 1.2 \text{ kg day}^{-1}$ ) than the dairy cattle offered only with the green fodder ( $4.08 \pm 0.11 \text{ kg day}^{-1}$ ).

Upreti *et al.* (2021) also concluded that the milk yield was increased with the inclusion of hydroponic fodder. The higher milk yield could be due to the higher concentration of minerals in hydroponic fodder.

### Economics of feeding

The data on cost of feeding indicated that day<sup>-1</sup> cost of feed and fodder was more under T<sub>1</sub> (Green fodder 100% + Concentrated feed) (146 Rs.day<sup>-1</sup>). Lowest feed cost recorded under treatment T<sub>3</sub> (Green fodder (75%) + 20% hydroponic maize) (120.69 Rs day<sup>-1</sup>). The milk yield was higher under the treatment T<sub>3</sub> (Green fodder (75%) + 20% hydroponic maize) (6.67  $\text{lit day}^{-1}$ ) and lowest in treatment T<sub>1</sub> (6.63  $\text{lit day}^{-1}$ ). The cost of milk production litre<sup>-1</sup> was highest in T<sub>1</sub> (Green fodder 100% + Concentrated feed) (22.02 Rs lit<sup>-1</sup>) and lowest under treatment T<sub>3</sub> Green fodder (75%) + 20% hydroponic maize) (18.08 Rs lit<sup>-1</sup>).

Naik *et al.* (2013) reported that feeding of hydroponics to milking cows increased in milk yield by 0.5-2.5  $\text{lit}^{-1}\text{animal}^{-1}\text{day}^{-1}$  and earned net profit of Rs. 25-50 due to feeding of hydroponic fodder to their dairy animals.

Likewise, Naik *et al.* (2014) stated that feeding of HMF to lactating cows increased the cost of milk production of lactating cows leading to 40 per cent increase in net profit of Rs. 12.67  $\text{cow}^{-1}\text{day}^{-1}$ . Swati *et al.* (2015) also reported on feeding of hydroponic barley to calf. The higher cost of feeding recorded under green fodder and 22 % barley green fodder -T<sub>2</sub> (Rs. 30.70) followed under green fodder and 24 % barley green fodder -T<sub>3</sub> (Rs. 35.00) and under green fodder -T<sub>1</sub> (Rs. 29.60), respectively.

**Table 1. Average weekly milk yield of experimental cows under different treatments**

Treatments	Weeks				
	Initial	I	II	III	IV
T <sub>1</sub>	6.40	6.58	6.63	6.74	6.80
T <sub>2</sub>	6.46	6.58	6.68	6.75	6.81
T <sub>3</sub>	6.49	6.61	6.68	6.78	6.83
SE (m) ±	0.02	0.03	0.02	0.01	0.01
CD @ 5%	0.06	0.09	0.06	0.03	0.03

**Table 2. Economics of feeding**

Feed	Treatment					
	T <sub>1</sub>		T <sub>2</sub>		T <sub>3</sub>	
	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Amount (Rs)
Soybean straw (1.5 Rs.kg <sup>-1</sup> )	504	756	462	693	441	661.5
Green fodder (3 Rs kg <sup>-1</sup> )	1680	5040	1428	4284	1260	3780
Concentrate feed (25.70 Rs.kg <sup>-1</sup> )	252	6476.4	226.8	5828.76	189	4857.3
Hydroponics maize fodder (4 Rs.kg <sup>-1</sup> )	—	—	126	504	210	840
Total cost of the feed per animal	—	12272	—	11309.76	—	10138.3
Total feed(kg day <sup>-1</sup> )	29	146	26.70	134.64	25	120.60
Milk yield lit day <sup>-1</sup>	6.63	—	6.65	—	6.67	—
Cost of feed and fodder lit <sup>-1</sup>	—	22.02	—	20.24	—	18.08

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