

# Comparative Study of Artificial Fodder Production (Hydroponic) and its Benefits

<sup>1</sup>Mukul Barwant, <sup>2</sup>Komal Barwant

<sup>1</sup>Department of Botany Sanjivani Arts, Commerce and Science College Kopargoan, Ahmednagar, Maharashtra, India

<sup>2</sup>Department of Mathematics Sadguru Gangagiri Maharaj College Kopargoan, Ahmednagar, Maharashtra, India

**Abstract:-** In animal cultivation feeding is an important part. Generally different types of fodder are used for the purpose feeding animal such green fodder, dry fodder and manufacturer fodder like indranil, hindustan processed feeds used for purposes of feeding. Now days by day number cows cultivation will be increase that ordinary old type of fodder is not sufficient for that purpose we have to developed new technique of fodder production such hydroponic fodder production. In this we see that maize hydroponic fodder production with comparative analysis of processed feed like Hindustan feed. We have analyzed the benefit the cattle which providing artificial as well as green fodder. Hydroponic fodder production is production of fodder without soil within 10-15 days. This fodder production done in any season anywhere in minimum labour and minimum time. The yield of hydroponic maize fodder from 1 kg to 7kg in this we study effect of fodder on cattle milk after feeding and before feeding. determine the quantitative as well as qualitative effect of cattles. This effect shows that when we feeding hydroponic fodder then qualitative character of milk will be increases such as protein, fat, and lactose sugar but quantitative character will be decreases. So that as comparison with other fodder it is more beneficial fodder than other, time saving, minimum labour and effective to increases the quality of milk

**Keywords:-** Maize Hydroponics, Waterless Fodder, Comparison with Ordinary Fodder.

## I. INTRODUCTION

Fodder is an important part for cattle farming. Most cattles are feeding a natural fodder such green fodder jawar, maize and alfalfa green part such as stem leaf. Sometime processed fodder are used in such husk, after harvesting raw material used as dry fodder. The artificial fodder produced by different like indranil, hindustan feeds are more demanded in market. During cattle farming cultivar has faced to problem such as production of fodder by small land holding, water scarcity, more labour, requirement of biofertilizer long time for the production of fodder. To avoid such problem we have to developed alternative method of fodder production. one of that techniques is hydroponic fodder production to avoid all those problem and solution on that cattle farming.

Hydroponics is types of fodder production in which soil less fodder are produced. In hydroponic fodder we take advantage of sprouting of seed. sprouting is nothing but emergence of radicle and plumule due to moisture condition. That's sprouts leads to seedling that can be used as fodder and that fodder is known as hydroponics fodder. The hydroponic fodder is great source of amino acids, digestive enzymes, proteins, vitamins, fibers & mostly carbohydrates. The hydroponic fodder most part is root mat root consisting different water minerals, protein, amino acid which are helpful. However, only a few reports are available on the feeding value of the hydroponics green fodder to dairy animals in India as the artificially grown barley fodder had 3.4% and 3.18% EE, respectively [Bull, R. C. 1969]. An experiment was conducted to find out the effect of feeding hydroponics maize fodder on digestibility of nutrients and milk production in lactating cows. Hydroponic plants having three times vitamins & minerals compared to plants grown in soil. [Shipard I. 2005]. The hydroponics fodder is one most important things is the free from pesticide and it do not used to chemical fertilizer. The hydroponic fodder production require 10-15 days. The hydroponic fodder production system produces fodder about 30 Kg /day so one hydroponic system can provide fodder for 3-4 cattle. Depending to the type of grain, the forage mat reaches between 15 to 30 cm high. Where the production rate ranged about 7 to 9 Kg of fresh forage corresponding to 0.9 to 1.1 Kg of dry matter [Barwant M. M., 2019]. The hydroponic fodder consumption is very less but it gives more milk yield in milking cow as well as goats, sheep, beef cattle's. Initial work was conducted with Hard Red Winter wheat. However, representative cultivars of each class of wheat were sprouted and analyzed for nutritive content. Development of sprouting procedures to produce a mold-free, wholesome product was the first challenge. The routine procedures for sprouting alfalfa and mung beans were found to be unsatisfactory for sprouting wheat [Miller, B. F. 1977]. Obtaining green nutritious fodder from dry matter such as dry mature seed by fodder. In maize fodder production example dry fodder 15 Kg / day, oil cake 4 Kg/day but Hydroponic fodder 10 Kg / day will sufficient. Eliminate use of soil, fertilizer, pesticides etc. This perspective after their dairy experiments he concluded that, it may increase milk production in cows that are not receiving high level of nutrients a high level of nutrients [Leitch, I. 1939]. The hydroponic fodder will grow in manmade environment as like greenhouse, which is having no requirement of soil media. Its requires only water media. In each hydroponic supplying water as per methods. In this project they used of time consuming

techniques, water saving, low area, for the producing energy, vitamin rich fodder for animal which helpful for the productivity of milk and quality of milk. Herbs have the potential to grow up to 25% faster in hydroponic system compared to soil [ Naik P K and Singh N P. 2013].

The hydroponics fodder is beneficial fodder than the conventional fodder in various parameter such as minimum labors, high nutrition, alternative method and cost effective ,after feeding we can analysed that it helping to improve milk quality of cattle's such as protein ,fat, lipid, and lactose .it is one of the alternative method production of fodder it can developed anywhere any time of year with minimum water and more nutritive This effect shows that when we feeding hydroponic fodder then qualitative character of milk will be increases such as protein, fat, and lactose sugar but quantitative character will be decreases. So that as comparision with other fodder it is more beneficial fodder than other, time saving ,minimum labour and effective to increases the quality of milk.

## II. MATERIAL AND METHOD

### A. Material

Maize seed , Tap water , Hydroponic tray , Water irrigation system, Hydroponics irrigation system, with 2000 liter tap water with switch ,timer, ,supply of light, rack, hydroponics tray which having specialized constructed on the bass to production of fodder with two end there is outlet pore through which excess water go out the hydroponics tray size will be 60X30 cm .In each tray near about half kg of seed should filled .The well mature healthy clean seed select for the cultivation of hydroponics fodder After production of hydroponic fodder we should comparative analysis on the basis cattle milk quality after feeding and before feeding by milk loactometer

### B. Methods

Hydroponics fodder production done very simple and convenient techniques that is sprouting and developed into seedling and from that hydroponic fodder are produced We include different methods steps .All material are gathered then first prepare Hydroponics system with help of rack , hydroponics tray, tank of distilled water, irrigation system with fogger arrangement, timer which allow to start irrigation every two hours. Then we have to select seed which should healthy and undamaged .Seed should sold from the market . Then sorting of healthy seed then it soaked in tap water overnight then placed in the gunny bags for the sprouting those seed are sprouted that are transfred to hydroponics tray and water irrigation start with proper interval time by fogger the watering shoud give 7-10 days then our hydroponics fodder is ready for feeding for cattles. Then we do milk quality and quantity

of hydroponics fodder feeding cows and conventional fodder feeding cows

### ➤ Procedure

- Seetting Hydroponics Systme
- Selection of Seed
- Soaking Seed
- Sprouting
- Hydroponics fodder production

## III. RESULT AND DISCUSSION

The result of this experiment is firstly described in terms of productivity and that will measure in quantitative parameter .The production of hydroponic fodder from 1kg we near about gate 7-8 kg fodder or biomas .that production done in within two for that purpose tell that in minimum time, minimum cost it produced more quantitaiive fodder as compare any crop . when we discuss about single tray we use 500 gm of seed give yeild near about 3500 gram of biomass.In two tray 1kg seed are used from that we gate yield is about 7kg .The root mat size near about 5-10 cm and crop height is 20-30 cm .For the comparative study we should select two cow no.1 cows continuously feeding of ordinary fodder and cow no 2 feeding with our nutritious fodder .Take analysis of four days analysis milk smple two cows to determine milk quantity, milk sugar content, milk protein, milk fat and milk lactose that explain table no 1 Analysis of two cows feeding different types of fodder with milk quality by lactometer and fig no1graphical representation cows feeding with ordinary fodder milk Quality and quantity and fig no 2 graphical representation cows feeding with Hydroponic fodder milk Quality and quantity .

In that we can see that the result quality and quantitative effect of hydroponic fodder . The milk quantity is same not more change before feeding and after feeding hydroponic fodder cow give 5.10-5.50 liter there no far change milk quantity. Milk sugar content before feeding it ranges from 8-8.2mg/l while when feeding hydroponics fodder it shows 9-9.5 mg/l. The milk protein contest shows before feeding 3.5-4.5 mg/l while hydroponics fodder feeding cows milk shows protein 5.0-75mg/l. The lactose result shows that before feeding hydroponic fodder 6.4-6.7 mg/l while after feeding hydroponics fodder milk lactose are ranges from 6.9-10.5 mg /l .The milk fat result before feeding hydroponic fodder is 3-3.9 mg/l and after feeding there is no change fat .the application of those result on ultimately price of milk when qualitative character decrease the price of milk also decrease for during experiment we say when we feeding hydroponic fodder quality milk is increase .

Contents	Cattle 1 [before feeding hydroponic fodder]				Cattle 2 [after feeding hydroponics fodder]			
	7/8	8/8	9/8	10/8	11/8	12/8	13/8	14/8
<b>Date</b>	7/8	8/8	9/8	10/8	11/8	12/8	13/8	14/8
<b>Milk</b>	5.10	5.9	5.11	5.20	5.10	5.15	5.30	<b>5.50</b>
<b>Sugar</b>	8.1	8.0	8.2	8.1	8.3	9.0	9.3	<b>9.4</b>
<b>Degree</b>	27	28	27	28.5	29	30	31	<b>33</b>
<b>Protein</b>	3.7	4.4	4.3	4.5	5.0	5.6	6.2	<b>7.5</b>
<b>Lactose</b>	6.6	6.7	6.5	6.6	6.9	7.2	7.9	<b>10.5</b>
<b>Fat</b>	3.0	4.1	3.9	3.3	3.9	3.7	3.6	<b>3.7</b>

Table 1:- Analysis of two cows feeding different types of fodder with milk quality by lactometer

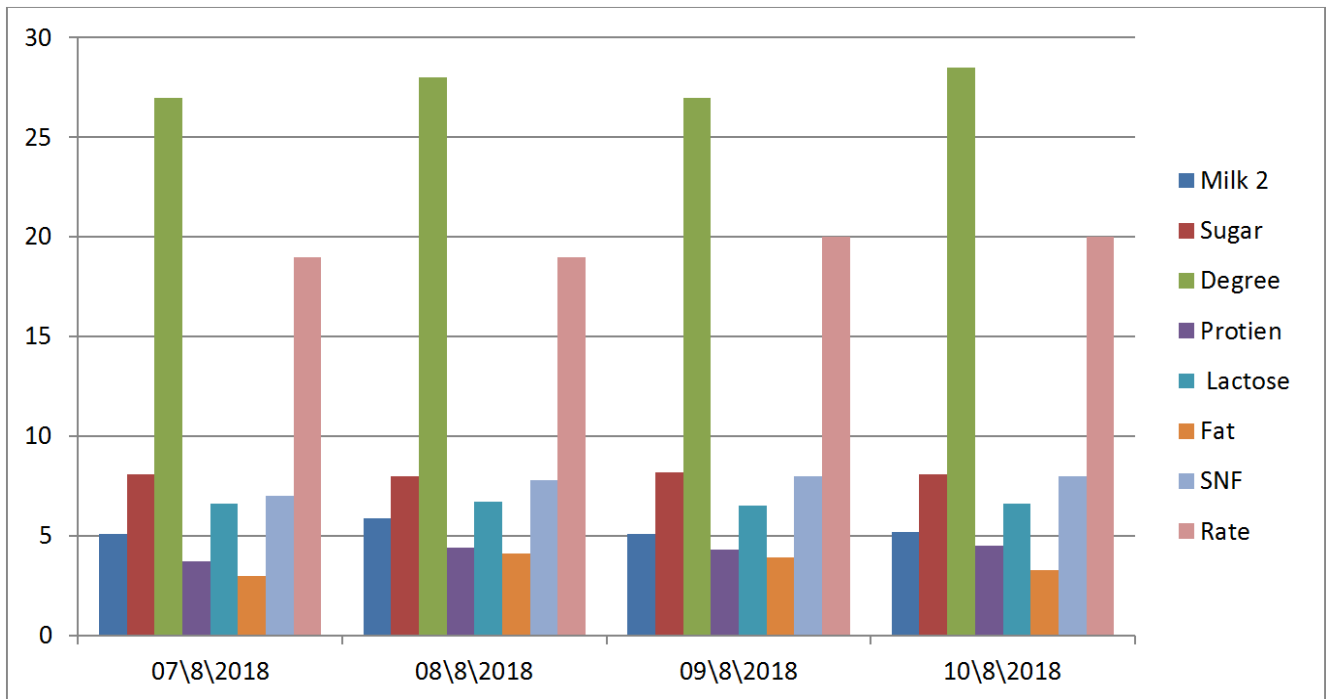


Fig 1:- Graphical representation cows feeding with ordinary fodder milk Quality and quantity

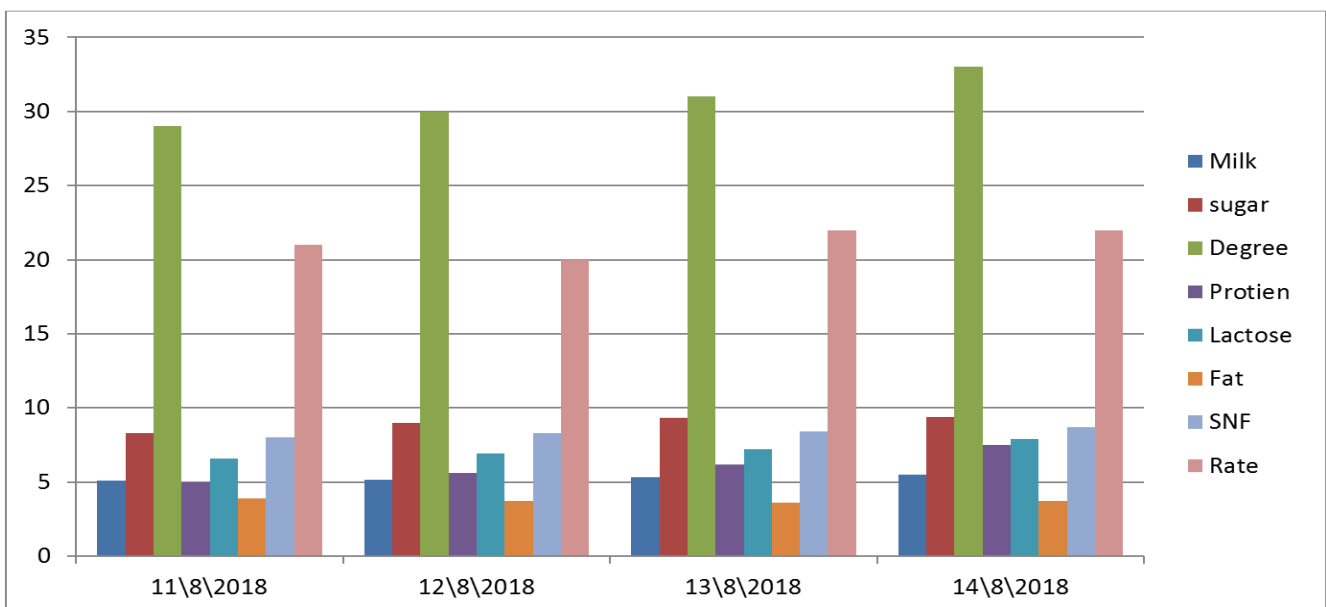


Fig 2:- Graphical representation cows feeding with Hydroponic fodder milk Quality and quantity



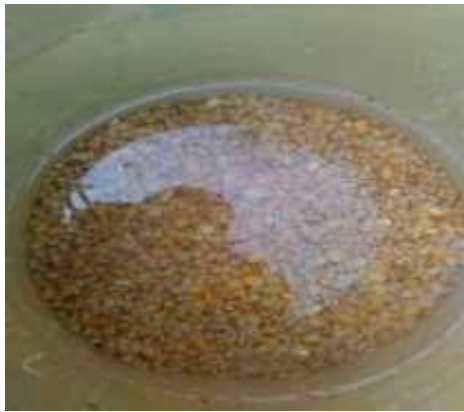


Fig 3:- Seed soaked in water.



Fig 4:- Soaked seed in gunny.



Fig 5:- First day on tray 27/7



Fig 6:- Second day on tray 28/7.



Fig 7:- Third day on tray 29/7.



Fig 8:- Fourth day on tray 30/7.



Fig 9:- Fifth day on tray 31/7.



Fig 10:- Sixth day on tray 1/8.



Fig 11:- Seventh day on tray 2/8



Fig 12:- Root.



Fig 13:- Eighth day on tray



Fig 14:- Root mat.



Fig 15:- Feeding of cattle.



Fig 16:- Quality 7/8 before feeding HMF.





Fig 17:- Quality 13/8 after feeding HMF.



Fig 18:- Quality 14/8 after feeding 9/8.

#### IV. CONCLUSION

Our aim was to setup a model hydroponic apparatus which could be easily built by any Indian farmer in order to meet the fodder needs of his cattle. The overall results hydroponic fodder production is beneficial fodder as compare to other. It is cost effective fodder production. Which are beneficial for poor as well as rich farmer. It can be concluded that hydroponics fodder maize was more nutritious than the conventional fodder maize in terms of available organic matter, crude protein, ether extract and nitrogen free extract content. Hydroponics fodder can be grown in low cost in green house with locally home grown grain. Production fodder in low cost green house is an effective. Hydroponics fodder is cost effective fodder for cattle. After quantitative and qualitative measurement we concluded that fodder is increase quality and quantity of milk. We concluded that hydroponics fodder is cost effective fodder.

#### REFERENCES

- [1]. Withrow, R. B., and Withrow, A. P. (1948). Nutri-culture. Lafayette, Indiana, Agricultural Experiment Station, Purdue University.
- [2]. Mayer, A. M. (1989). The germination of seeds.
- [3]. " Leitch, I. (1939). Sprouted fodder and germinated grain in stock feeding." Technical Communication 11: 3-63.
- [4]. Barwant M. M, Bombe M, Bhagwat M. (2019) Commercial maize hydroponics fodder production Journal of Agricultural Science and Research.
- [5]. Butler, J. D., and Oebker, N. F. (1962). Hydroponics as a hobby. Urbana, Illinois, University of Illinois.
- [6]. College of Agriculture, Extension Service in Agriculture and Home Economics.
- [7]. Kruglyakov, Yu. A., 1989. Construction of equipment for growing green fodder by a hydroponic technique. Traktory-I Sel'skokhozyaistvennyye Mashiny, 6: 24-27.
- [8]. Bautista, S. H. 2002. Producción de Forraje Verde Hidropónico de Trigo Triticum Aestivum L. para el Antemimiento de Conejos Criollos Oryctolagus Cuniculus.
- [9]. Bull, R. C. and Peterson, C. F. 1969. Nutritive Value of Sprouted Wheat for Swine and Poultry. J. Anim. Sci., (Suppl.), 28 (6): 856. Thesis. Universidad Autónoma de Guerrero (UAG) Chilpancingo, Guerrero, México.
- [10]. Cuddeford, D. 1989. Hydroponic Grass. In Practice, 11 (5): 211-214.
- [11]. Singh, B., J. L. Chaudhary and L. Gupta. 2009. Effect of feeding different levels of green maize on the performance of heifers. Indian J. Anim. Nutr, 26: 151-155.
- [12]. Whyte, K. C. (1973). The Complete Sprouting Cookbook. San Francisco, Troubador Press.
- [13]. Naik P K and Singh N P. 2013. Hydroponics fodder production: an alternative technology for sustainable livestock production against impending climate change. Model Training Course on Management Strategies for Sustainable Livestock Production against Impending Climate Change. Pp. 70-75. 18-25 November 2013. Southern Regional Station, National Dairy Research Institute, Adugodi, Bengaluru, India.
- [14]. Naik P K and Singh N P. 2014. Production and feeding of hydroponics green fodder. Indian Farming 64 (6): 42-44.
- [15]. Al-Ajmi, A., A. Salih, I. Kadhim and Y. Othman, 2009. Yield and water use efficiency of barley fodder produced under hydroponic system in GCC countries using tertiary treated
- [16]. sewage effluents. Journal of Phytology, 1 (5): 342-348. 10.
- [17]. Pandey H N and Pathak N N. 1991. Nutritional evaluation of artificially grown barley fodder in lactating crossbred cows. Indian Journal of Animal Nutrition 8 (1): 77-78.
- [18]. Mukhopad, Yu., 1994. Cultivating green forage and vegetables in the Buryat Republic. Mezhdunarodnyi Sel'skokhozyaistvennyi Zhurnal, 6: 51-52.
- [19]. Shipard I. 2005. How Can I Grow and Use Sprouts as Living Food. Stewart Publishing.
- [20]. Miller, B. F. (1977). Effects of sprouting on nutritional value of wheat. National Conference Wheat Utilization Research, Tuscon, Arizona.