

Low cost-hydroponic fodder

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Fodder availability throughout the year is essential to maintain any livestock enterprise. Landless farmers face acute shortage of fodder and intermittent periods of fodder shortage leads to long standing losses in production and reproduction. Hydroponics, the science of soilless agriculture caters to the needs of landless farmers to produce nutritious green fodder with less water and no land. This system is especially useful to small farmers with one or two milch animals. This paper aims at describing a low cost hydroponic system developed at UIIC, LFC, TANUVAS, Chennai to produce hydroponic green maize fodder.

Key words: Fodder, Hydroponics, Livestock equipment

FODDER IS an integral part of any livestock production system. The cyclicity of monsoon and seasonal changes leads to variation in the availability of fodder. Farmers are left with abundant fodder during monsoon but for a good livestock production system, it is important to

ensure quality green fodder throughout the year. Temporary starvation due to less fodder can lead to long standing losses in production and health of the animal. Hydroponic fodder production is one such technology to increase green fodder production by vertical farming which

requires almost no land, very less water and little manpower. The term 'hydroponics' was derived from the Greek word 'hydro' meaning water and 'ponos' meaning labour and is the science of soilless farming. In this technology plant growth is controlled by water and sunlight.



Low cost hydroponic unit with green maize fodder.

Hydroponic fodder

Fodder production using hydroponic technology is usually done with maize seeds while other cereals such as sorghum, bajra are also suitable. Maize seeds after water treatment is placed in the hydroponic unit which provides optimum moisture, relative humidity and sunlight for the growth of fodder. The sprouted seeds are ready for use in the form of nutritious hydroponic fodder in 8 days. Nutritional composition of maize hydroponic fodder is presented in Table 1 and crude protein is found to be higher than green maize.

Low cost hydroponic machine

The University Innovation and Instrumentation Centre (UIIC), Livestock Farm, Complex, TANUVAS, Chennai - 51 has come out with low-cost hydroponic devices which can produce hydroponic fodder in various

quantities ranging from 20 to 40 kg/day. The 20 kg/day machine is suitable for farmers and is available at a cost of ₹ 22500/device. The machine has the following

Part	No
Metal Frame woven with green cloth with racks	8
Exhaust Fan	1
Tray	6
½ hp motor	1
PVC container 120 l	1
Irrigation system	1
Timer	1

component parts;

The metal frames have suitable racks to hold six germination trays in eight rows. HDPE hose with fogger mists is used for spraying of water and maintain humidity. The metal frames are woven with green cloth (Agro-shadenet grade 90) to allow optimum light. The motor provides sufficient pumps water from the storage drum with water pressure sufficient enough for fogging.

Standard operating procedure

- Locate the machine in a shaded place away from direct sunlight preferably under a tree.
- Fill the drum with water.
- Switch on the exhaust fan and timer. Timer is set for one minute every hr from 6 am to 7 pm.
- Drum should not be empty at any point of time.
- Now load the trays with germinated seeds into the machine as follows.
From each tray loaded with one kg

Fodder production

Day	Activity
0	• Select good quality, well dried yellow maize seeds. • Winnow to remove chaff and other dust. • Dry seeds under sun for 12 hrs.
1	• Weigh the required quantity of seeds (1 kg/tray). • Wash seeds in tap water to remove remaining chaff and dust. • Soak seeds in water for 20 hrs.
2	• Drain excess water. • Pack soaked seeds in gunny bags for germination (20 hrs). • Sprinkle water periodically over the gunny bag to maintain optimum moisture.
3	• Load germinated seeds onto 6 different hydroponic fodder trays at the rate of 1 kg per tray (dry weight). • Place seed loaded trays into the lowest row of hydroponic machine. • Sprinkle water every hr for about 1 minute automatically with the help of timer.
4-10	• Shift trays to the immediate upper row after 24 hrs. • Load the next set of trays with seeds in the lowest row. • Continue sprinkling of water.
11	• Harvest hydroponic fodder for feeding livestock from the topmost (8th) row. • Add one set of tray every day in the lower most rows. • Other trays should be changed one row upwards.

Note: Water sprinkling time may be adjusted according to the environmental temperature. In very hot places the frequency of water sprinkling can be reduced and in cool/moderate places the frequency can be increased. The general timer is usually set for sprinkling water every 1 hr for 1 minute. Exhaust fan should be kept running throughout. Occasional rest for 15 minutes may be given for better life.

Table 1. Proximate composition of hydroponic green maize

Parameter (%)	Hydroponic maize fodder
Moisture	83.42
Dry Matter	16.58
Crude Protein	12.44
Ether Extract	2.65
Crude Fibre	9.49
Total Ash	2.77
NFE	72.65

seed, we can expect 3-4 kg green fodder and thus six trays will yield 18 to 24 kg green hydroponic fodder, which is sufficient to meet the need of two milch cows/20 goats. Cattle

can be fed with 12-15 kg hydroponic fodder per day while sheep and goat can be fed with 1-2 kg green fodder.

The hassle free and easy to operate mechanism will help small holder livestock farmers with no land for cultivation or irrigation facilities. During summer they can use the device for production of fodder and feed their livestock throughout the year without loss in production.

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Jai Kisan, Jai Vigyan

- A total of ₹ 788.33 crores have been sanctioned for opening six new agricultural colleges for eastern India under Central Agricultural University, Imphal, and a new Central Agricultural University in Meghalaya.
- For the establishment of two new agricultural research institutes in Asom and Jharkhand, a sum ₹ 100 crores is allocated.
- First academic session of the Rani Lakshmibai Central Agricultural University has been allocated for four new agricultural colleges in Datiya and Jhansi.
- An Memorandum of Understanding was signed for transforming the Rajendra Central Agricultural University, Pusa, Samstipur, Bihar. A proposal of ₹ 400 crores is submitted in EFC.
- Post-Graduate Institute of Horticulture is being established in Amritsar, Punjab.
- Foundation stone of the Indian Institute of Agricultural Biotechnology is laid at Ranchi for promoting agricultural biotechnology.