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HYDROPONICS FODDER CULTIVATION

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Hydroponics comes from the Latin language, 'Hydro' means water and 'Ponos' means labour. Hydroponics is a technology of growing plants without soil but in water or nutrient rich solution for a short duration in an environmentally controlled house or machine.

What is Hydroponics Fodder?

Fodder mainly refers to coarse food for livestock, composed of entire plants, including leaves, stalks, and grain, of such forages as corn and sorghum. And when the fodder is cultivated by growing seed without any soil but in water or nutrient rich solution known as hydroponics fodder. Within six-seven days, the seeds are sprouted, the seedlings will be up to 30-35 cm tall and provide highly nutritious fodder.

Hydroponics fodder



Characteristics of Hydroponics Fodder

1. Highly rich in vitamins, minerals and enzymes
2. Highly digestible (85% to 90%)
3. It contains high moisture which prevents colic
4. High energy content
5. It is a high quality protein source

Advantages of Hydroponics Fodder Cultivation

1. Saves water: It consumes 98% less water than other conventional methods and the water is reused.
2. Reduced growth time: It takes only 8 days to develop from seeds to fodder which is very much less than conventional methods (45 days).
3. Marginal land usage: By this method 1000 Kg green fodder can be produced from 480 sqft area daily which is equivalent to conventional fodder produced in 25 acres of cultivable land which is 99% less land than from conventional methods.
4. It requires minimal manpower and time, only 2 to 3 hours work daily.
5. Reduce the need for equipments and fuel used to plant, grow, harvest, transport and store feed.
6. Optimal production cost
7. Reduced feed cost: Hydroponics fodder contains more crude protein as compared to conventional fodder. It reduces the feed cost spent on the concentrate feed.
8. More nutritious: As the fodder contains seed along with fodder, it has higher crude protein content than conventional green fodder. Hydroponics green fodder with seed and root (sprout mat) is highly rich in protein (10% to 17%) and ideal nutrients enriched fodder for livestock.
9. Hydroponics fodder is grown by completely natural method without any chemicals or pesticides.
10. Constant supply: Fodder can be produced round the year irrespective of seasons, natural calamities, man power, unavailability of land which promotes the sustainable agriculture and livestock production.

Which Seeds can be grown as Hydroponics Fodder?

- Yellow Maize
- Jowar

- Bajra
- Ragi
- Cowpea
- Horse gram
- Foxtail millet
- Sunhemp

Requirements for Hydroponics Fodder Production

- Certain area for production of green fodder daily
- Hydroponics machine
- Clean water
- Uninterrupted power supply
- Seeds with good germination capacity
- Good sanitation
- Two labours

Protocol for Hydroponics Fodder Cultivation

1. Seed storage and preparation:

- i) One day prior to seed washing dry the seeds under direct sunlight.
- ii) Remove the broken seeds and dirt clean the seeds properly.
- iii) Store the seeds in a dry and safe place.

2. Seed washing:

- i) Take the good quality seeds and wash the seeds with proper scrubbing by hand then keep it 5 minutes for settling.
- ii) Remove the light weight floating seeds.
- iii) Drain out water and again add water. Stir manually by wooden stick for 5 minutes, keep settling for 5 minutes.
- iv) Drain water and repeat the above steps until dirt and dead seeds remove completely.

3. Seed cleaning:

- i) Prepare 0.1% cleaning solutions in a plastic chamber.

- ii) Add washed seed to this prepared cleaning solution.
- iii) Stir manually by wooden stick for 5 minutes.
- iv) Keep for one hour and drain the cleaning solution.

4. Seed soaking:

- i) Prepare stimulant solution in the soaking chamber.
- ii) Add seeds from the above step to soaking chamber.
- iii) Close the lid and keep it for soaking for few hours.
- iv) After soaking drain the stimulant solution.

5. Seed germination:

- i) Place the 'after soaking seeds' within the fumigated gunny bags and keep it away from direct sunlight.
- ii) Keep the lid open and keep for germination for number of hours.
- iii) Sprinkle water on gunny bags every 2-3 hours so that gunny bags remain wet.
- iv) After given hours remove the seeds from gunny bag and take weight.
- v) About 35-40% increase in weight happen with 90+% seed germination.

6. Loading the seeds in trays:

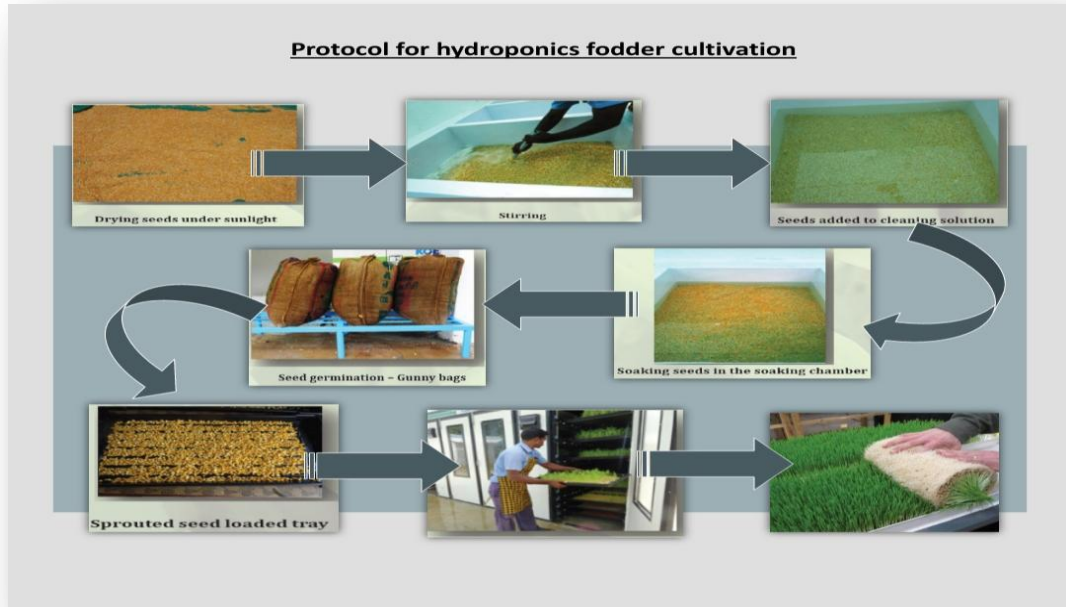
- i) The germinated seeds are loaded in a clean dry tray and distributed evenly. Put them in sprout section (lower section where the height between two rows is around 5 inches) of machine.

7. Shifting of trays:

- i) Shift trays to next level daily so that it moves one step ahead in the growth cycle.
- ii) Take the last tray out from every row and put it back on the front side of the same row.
- iii) Ensure that all trays receive sufficient water.
- iv) If left side of the tray (in any tray) shows growth more than right side (or vice-versa) then rotate the trays such that left side comes to the right side and right side of the tray goes to the left side.

8. Harvesting (Day 9):

- i) Trays on the 8th day it is ready for harvesting on next day.
- ii) Take out the fodder mats from trays to feed livestock
- iii) Wash the tray in cleaning solution before reusing it for next cycle.



Importance of Hydroponics Fodder in Animals as a Source of Feed

Hydroponics fodder sprouts are tender and young, the equivalent of fresh green grass. They are more palatable and nutritious to all types and classes of livestock. On a dry matter basis, hydroponic fodder compares favourably with other nutritious feed-stuffs. The fodder is suitable for meat animals also like sheep, goat, horses, rabbit, pig and poultry. Hydroponics fodder helps young ones to faster weight gain, improves the carcass quality. In adults it helps to increase litter size, increase fertility and ensure the high conception rate. In lactating animals, fodder increase the lactation period, helps in higher milk yielding and the milk contains high fat percentage. In case of poultry 7 days old hydroponics fodder is little bit tough to digest. 4 days old fodder is best for poultry digestion. If fodder fed after 7 days, the farmer fed to chicken with any dry commercial feed in flour form is good. Usually mix it up at a ratio of 100g of hydroponic fodder to 30g of commercial feed. The chicken has responded well to this, with a faster weight gain, larger eggs and certainly no constipation. All this with the added advantage of reducing the feeding cost.

Hydroponics fodder as a source of animal feed



| Sl. No | Type of hydroponic fodder | Day of growth | Moisture % | % Dry matter basis | | | | |
|--------|------------------------------|---------------|------------|--------------------|-------|------|-------|-------|
| | | | | CP | CF | EE | TA | NFE |
| 1. | Maize | 8 | 76.75 | 10.55 | 5.51 | 4.62 | 1.80 | 77.52 |
| 2. | Horse gram | 4 | 90.18 | 30.26 | 13.00 | 2.06 | 5.43 | 49.25 |
| 3. | Sun hemp | 4 | 77.07 | 38.73 | 13.11 | 4.64 | 4.48 | 39.04 |
| 4. | Cowpea | 4 | 77.93 | 27.84 | 6.51 | 1.93 | 4.88 | 58.84 |
| 5. | Bajra | 4 | 74.80 | 9.22 | 4.16 | 4.57 | 1.49 | 80.56 |
| 6. | Ragi | 4 | 87.86 | 10.62 | 8.80 | 2.52 | 2.95 | 75.11 |
| 7. | Foxtail millet | 4 | 75.08 | 14.69 | 12.11 | 5.38 | 3.59 | 64.23 |
| 8. | Jowar | 8 | 90.06 | 13.27 | 13.39 | 4.99 | 2.98 | 65.37 |
| 9. | Moth bean | 8 | 94.37 | 38.83 | 18.91 | 2.63 | 6.61 | 33.02 |
| 10. | Saamai (Little millet) | 8 | 83.60 | 13.46 | 15.74 | 4.75 | 8.11 | 57.94 |
| 11. | Varagu (Kodo millet) | 8 | 80.97 | 8.87 | 15.21 | 3.15 | 4.08 | 68.69 |
| 12. | Kuthiraivaali (Sanwa millet) | 8 | 86.40 | 10.70 | 19.61 | 4.39 | 11.60 | 53.70 |

Proximate analysis was done as per methods of AOAC, 2000.

Table 1: Nutritional composition of hydroponics fodder at different stages of growth

Conclusion

Hydroponics is a technology for soil less growth of plants, taken up in a big way by the dairy and poultry farmers, especially, by those who have less land as well as scarce conditions for fodder production. It can be concluded that hydroponics fodder can be used as an ideal source of green fodder for livestock, poultry and other meat animals, effective in improving growth performance, digestibility, milk yield, reduces the feeding cost.

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