

AZOLLA: A wonder fern for feeding livestock

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Introduction

Azolla, a floating fern that hovers on water, collaborates with nitrogen-fixing blue-green algae to fix atmospheric nitrogen. Its frond comprises a saprophyte with a floating rhizome, small overlapping bi-lobed leaves, and roots. Widely utilized as a biofertilizer in wetland rice cultivation, Azolla plays a crucial role in addressing the shortage of feed and fodder for dairy animals in India, the largest milk producer. The deficit in fodder is compensated by resorting to commercial feed, elevating the overall cost of milk production. The quest for alternatives to traditional green fodder and concentrates has led to the discovery of Azolla, a promising solution offering sustainable livestock feed.

Azolla boasts higher crude protein and essential amino acids, making it a pertinent choice for livestock, poultry, and fish farming. Additionally, it is abundant in vitamins such as Vitamin A and B12, along with minerals like calcium, phosphorus, potassium, magnesium, and others. Bioactive substances and biopolymers are also present in Azolla, while its low lignin content ensures easy digestion



for animals.

Chemical composition of Azolla

NUTRIENT	PERCENTAGE OF DRY MATTER
Crude protein	21-24
Crude fiber	9-12
Ether extract	2.5-3
Ash	10-12
Nitrogen free extract	45-47
Calcium	0.7-1.1
Phosphorous	0.8-1.2
Lysine	0.98
Methionine	0.34
Cystine	0.18

How much to feed

Requirements for proper growth:

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How much to feed

Requirements for proper growth:

ANIMAL	AMOUNT PER DAY
Adult cow, buffalo, bullock	1.5–2.0 kg
Goat	300–500 g
Pig	1.5–2.0 kg
Layer/broiler	20–30 g
Rabbit	100 g

Azolla is indigenous to ponds, ditches, and wetlands in warm temperate to tropical regions worldwide. Thriving in partial shade, it depends on light for photosynthesis. Ideally, Azolla necessitates 25% to 50% of full sunlight for optimal growth. Water stands as the fundamental requirement for Azolla's growth and propagation, with the plant being highly sensitive to water scarcity. It is imperative to maintain an adequate water level, with a minimum of 4 inches in the pond, to ensure the proper development of Azolla.

How to cultivate Azolla?

An optimal setting for Azolla cultivation is a shallow freshwater pond. The step-by-step process for Azolla production is elucidated as follows: **Selecting the Pond Location** Choose a location close to the house for convenient and regular pond monitoring. Ensure the availability of a nearby water source for consistent water supply. Ideally, the site should be partially shaded, or artificial

shade can be introduced to minimize water evaporation. The pond's floor area should be devoid of pointed stones, roots, and thorns that could puncture the sheet, leading to water leakage.

Pond Size and Construction:

The pond's size is contingent on factors such as the number of animals, the quantity of supplemental feed needed, and resource availability. For smallholders, an area measuring 6 by 4 feet can yield approximately one kilogram of supplemental feed per day. The chosen area must be cleaned and levelled. Following the placement of a durable plastic sheet in the pond, all sides should be securely fastened by placing bricks along the walls.



Upon inoculating the culture, it is essential to adequately cover the pond with a net to offer partial shade and prevent leaves and other debris from falling into the water. Thin wooden poles or bamboo sticks should be positioned over the pond walls to provide support for the shade net.

Method of Azolla Production:

Method begins by mixing 10-15 kg of sifted fertile soil with 5 kg of cow dung, creating a slurry. Spread this mixture evenly in the pit or pond, with the water level filled to three-fourths of the pond size, maintaining this level consistently. A pond measuring 6 × 4 feet requires approximately 1-1.5 kg of fresh Azolla culture. Following the inoculation of the culture, cover the pond with a green net to provide partial shade and prevent leaves and debris from falling into the water.

After 10-15 days, the Azolla will fill the pit or pond due to its rapid growth, allowing for the daily removal of one kg for animal feeding. Every 15 days, apply 2-5 kg of buffalo dung and 100 g of superphosphate for enhanced Azolla growth. Regularly remove any litter or aquatic weeds observed in the pond. It is necessary to empty the pond every six months and restart cultivation with fresh Azolla. In cases of contamination by pests and diseases, clean the affected pit by removing the previous Azolla biomass and water, and then perform a fresh inoculation with a pure culture of Azolla.

Harvesting and feeding of azolla to livestock:

The completion of Azolla growth in the pond typically takes about two to three weeks, depending on factors such as the initial culture quantity, environmental conditions, and

nutritional inputs. Once fully grown, Azolla can be harvested daily, and the biomass can be collected from the pond's surface using plastic sieves. From an area measuring 6 x 4 feet, approximately 800 to 900 grams of fresh Azolla can be produced.

Livestock can be fed Azolla in either its fresh or dried form. It can be administered directly or mixed with concentrates for various animals such as cattle, poultry, sheep, goats, pigs, and rabbits.

