

Azolla – A Source of Animal Nutrition to Reduce Feed Cost

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SUMMARY

Animal feed cost is the major expense in livestock farming. Finding inexpensive animal nutrient source will make the animal products affordable to the common man and poor people. Any reduction in animal feed cost will make the livestock farming as a more profitable and viable one. Azolla is an inexpensive source of animal nutrition. Azolla can be cultivated using simple methods in short span of time. Higher biomass yield, nutritional quality, lesser production cost makes Azolla as an important source of animal nutrition for reducing animal feed cost.

INTRODUCTION

Azolla is a water floating fern most commonly found in tropics and subtropics. This small water floating fern is found in stagnant fresh water bodies. Seven species of Azolla are under the family *Salviniaceae*. *Azolla pinnata*, *Azolla microphylla* and *Azolla filiculoides* are common species in Indian conditions. In the frond cavities, Azolla contains an endosymbiont, *Anabaena azollae* Strasburger, a nitrogen fixing cyanobacterium - *Anabaena-azollae*. The cyanobacterium living in the cavity of Azolla leaf, can fix high amount of atmospheric dinitrogen due to presence of symbiotic algae in the leaves.

Nutrient Content in Azolla

Azolla contains good content of nitrogen. This acts as a source of protein in animal feed. The total protein content in Azolla varies from 25 to 30 %. Apart from rich protein content, azolla also contains minerals, chlorophyll, carotinoids, amino acids, vitamins and fiber. This makes azolla an excellent source of animal nutrition.

Azolla as Animal Feed

Several research studies conducted has revealed the potential of azolla as source of nutrition for livestock. Azolla could be used as feed ingredient for milch animals, goat, sheep, pig, duck, fish and poultry. Inclusion of azolla as animal feed for milch animals results in increased milk yield and improvement of milk quality through increase in solid not fat (SNF) content. Azolla is a potential feed ingredient for broilers. Inclusion of azolla at lower ratio in poultry feed results in better performance, increase in feed conversion ratio (weight gain per kg of animal feed) and improvement in egg production per bird. Pigments (Xanthophyll and carotenoids) present in azolla improves egg quality and pigmentation of eggs. Inclusion of azolla in poultry feed improves vitamin A content in eggs as pigments of azolla acts as vitamin 'A' pre cursor. Azolla can be used as cheap and inexpensive source of fish feed when dried and processed as powder or granules. Use of azolla as feed for ducks in China is very common practice since 1960s. Azolla is also a good source protein for increased weight gain in goat farming.

Azolla in Animal Feed - Limitations

Since azolla contains rich source of protein, azolla cannot be used as sole source of nutrition in animal feed. Azolla can be used as feed supplement in poultry and milch animals at the ratio of not greater than 5 % w/w on dry weight basis to the whole volume of animal feed. Increase in feed ratio of azolla more than 5% on dry weight basis may bring in digestion problems to the animals. Higher quantity of azolla in animal feed can be tried only after studying case by case for individual animal species. Azolla can be used in animal feed as fresh green feed and as dried feed material. Fully grown azolla can be harvested and dried under sunlight to reduce excess moisture. Azolla dried to moisture content of less than 12 per cent can be very well stored for long periods without loss in nutritional quality. Dried azolla can also be processed further by milling and making as coarse powder or making powdered azolla as granules to increase feed preference in animals.

Use of Azolla other than Animal Feed

Azolla is wide spread used as green manure in paddy field through out the world. Azolla is capable of growing as dual crop in paddy fields under open field conditions. Sowing azolla during paddy transplantation will make the azolla to grow along with paddy in a shorter period of time. Sowing 500kg to 1000 kgs of azolla per acre in the paddy field during transplantation will result in dual cropping of azolla with paddy. In this method, around 30 to 45 tonnes of azolla per ha can be harvested in 45 days of time. During second weeding in paddy field, cultivated azolla can be incorporated in soil through manual puddling. Through this method apart from controlling weeds, incorporation azolla in soil will improve soil organic matter content and soil nutrient levels.

Culturing Azolla

Azolla can be cultivated as mono crop for use as animal feed. Azolla requires 20 to 30°C and moderate sunlight as found in temperate regions or partial sunlight in tropical conditions. For culturing azolla, shallow ponds with at least two inches height of the soil in the bottom is required. Water depth in the pond need to be maintained between 6 to 12 inches of height. Once in a week, 500 grams of cow dung and 50 grams of super phosphate need to be mixed with water per square meter area. Initially, 500 grams of azolla per square meter of pond need to be released. About 50 per cent of grown-up azolla can be harvested once in a week. In tropical conditions, when directly exposed to full sunlight, growth of azolla is severely affected. For mono cropping of azolla in tropical conditions, green house or shade net house is required. Under greenhouse conditions, the doubling time of azolla ranges from 5 to 7 days. Culturing azolla under greenhouse condition will maintain uniform growth and yield of Azolla though out the year (Raja and Anitha, 2017). The expected yield per square meter will be 1.5 to 2 kgs for a cropping cycle of 5 to 7 seven days. Considering the rapid growth rate and heavy biomass yield per square meter of cropping area, azolla could be well used as source of inexpensive protein source in animal feed.

REFERENCES

Raja, P. and B. Anitha. Screening and selection of suitable species and adoptive methods for high altitude culturing of azolla. Extended abstract published in 5th international conference on sustainable utilization of tropical plant biomass, bioproducts, biocatalysts & biorefinery, Nov 17-18, 2016. BPE, 35-37