COMPARATIVE STUDY ON CULTIVATION OF AZOLLA USING THREE DIFFERENT DUNG MATERIALS

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ABSTRACT

A study on cultivation of azolla was conducted in University Research Farm, Tamilnadu Veterinary and Animal Sciences University (TANUVAS) to use azolla as a feed supplement to livestock and poultry and as a biofertilizer. Three dung materials such as dung of cow, pig and goat were utilized separately to make a slurry in cultivation of azolla for this comparative study. Among these, the highest yield of 27 kg of azolla production on 15 th day of inoculation in pig dung pit followed by cow dung pit (25 kg) and goat dung pit (9 kg) was observed. Results of proximate analysis of three different azolla samples showed that the azolla which was produced from pig dung has the highest crude protein content (33.09%) than the other two azolla samples, whereas nitrogen free extract of azolla samples using pig dung, cow dung and goat dung are 37.34 %, 39.65% and 43.66% respectively.

Key words: Azolla, Pig dung, Proximate analysis and Nitrogen content

INTRODUCTION

Azolla is a floating fern that belongs to the family, Azollaceace. Azolla is also known as mosquito fern or duck weed. The cyanobacteria Anabaena azollae present as a endo symbiont in this fern fixes atmospheric nitrogen in soil. Azolla has a high nitrogen fixing ability (Ventura, et al. 1992). Azolla is a bio fertilizer (Bocchi and Malgioglio, 2010) for cultivable land and enhances the growth of the plant. Azolla has 25 to 35 percent protein and makes it a highly effective feed for livestock and it reduces feed cost for farmers. Livestock can easily digest azolla due to its low lignin content. For cattle 1.5 to 2 kg of azolla can be given per day. For sheep and goat 300 to 500 grams can be given per day. Dry azolla flakes are a potential feed ingredient for broilers (Singh and Subudhi, 1978) and green azolla is a good feed for fish.

With these multinumber of uses, the present study was carried out to assess the nutritive value and maximum production of azolla using three different dung materials.

MATERIALS AND METHODS

Cultivation of azolla was done as described by Pillai et al. (2005). The area was leveled and bricks were lined horizontally in a rectangular fashion under the shadow of tree. A pit of 2 m x 2m x 20 cm of length, width and height respectively was prepared and the sides of the pit were raised to enable the water to stand up to 10 cm of height.

Pit was made under the shade of a tree to retain the atmospheric temperature between 25 and 32 degrees celcius. The pit then was covered with plastic gunnies to prevent the growth of roots of nearby trees and seepage of water. Silpauline plastic sheet was spread over the plastic gunnies without any fold. (Silpauline sheet is a polythene tarpaulin which is resistant to ultra violet radiation in sunlight).

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Once the pit was ready, about 10 – 15 kg of sieved soil was uniformly spread over the silpauline sheet. Slurry made of 2 kgs of dung sample and 30 grams of superphosphate mixed in 10 litres of water was poured onto the sheet. More water was poured on to raise the water level to about 10 cm. About 1 kg of fresh and pure culture of azolla was inoculated into the water. Seed stock was maintained separately treated and with pesticides and fungicides. 2 kg of dung and 25 grams of Azophos were made into slurry in 2 litres of water and added once in 7 days to keep the azolla in rapid multiplication and to maintain the daily yield of 1-2 kg per pit.

Bio-mass was removed on alternate days to avoid overcrowding. Plant was allowed to enter maturity stage or sporulation stage by periodic application of cow dung slurry and super phosphate. Temperature was retained below 300C and the light intensity was maintained by providing shade net. pH of the medium was between 5.2 to 5.8. Humidity was between 65 and 80%.

The pit was covered approximately above 7 feet with a shade net to prevent the leaves falling from the tree. Samples of azolla were collected and subjected to proximate analysis according to standard methods of A.O.A.C,(2000).

RESULTS AND DISCUSSION

Azolla was completely filled all three pits after 15 days (shown in Fig 1, 2 and 3). The yield of azolla with pig dung, cow dung and goat dung were 27 kg, 25kg and 9 kg respectively on 15 th day. Among these the highest yield was observed in pig dung pit. Results of Proximate analysis of three azolla are shown in table 1.

Azolla is considered as the most economic and efficient feed substitute and a sustainable feed for livestock (Tamizhkumaran and Rao, (2012). Azolla doubles its weight in 3 days. From a start of 1 Tonne/hectare, it can reach a fresh weight of 15 – 20 T/ ha in about 20 days (Khan, 1983).

Alvasen (2007) reported that pig manure has more nitrogen content (3.7%) than manures of cow (30.5%) and goat (28%). Odedina et al. (2011) said that phosphorous percentage is more in pig manure (2.16%) followed by manures of cattle (0.88%) and goat (0.84%). Hence increased phosphorous and nitrogen content of pig manure might be the reason for the highest yield of azolla in our study

Proximate analysis revealed that azolla sample from pig manure has high crude protein whereas azolla sample from goat dung has high crude fibre. This is in accordance with finding of VanHove and Lopez (1982) who noted that the crude protein content of azolla might vary from 13 to 34.5 %. Nutrient composition of azolla can be changed with the strain of azolla and environmental conditions such as temperature, light intensity and soil nutrient.

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Table 1

Composition of samples of azolla prepared using three different dung materials

In Percentage	Moisture	Crude Protein	Crude fibre	Ether Extract	Total Ash	NFE
Azolla-Cow dung	89.22	30.67	9.56	5.32	14.80	39.65
Azolla-Pig dung	92.06	33.09	11.32	4.02	14.23	37.34
Azolla-Goat dung	59.79	23.84	13.26	3.91	15.33	43.66

Fig.1 Cow dung-Pit

Fig.2.Pig dung – Pit

Fig.3.Goat dung - Pit