Available online at
www.agrospheresmagazine.com

ISSN: 2582 – 7022

Agrospheres:e-Newsletter, (2021) *2*(4), 63-65

Article ID: 225

Cotton Seed and Cake Main Ingredient of Animal Feed as Protein Source

Dinesk Kumar*, Suryapal Singh[1] and Harshita Singh[2]

*CCSHAU Hisar
[1]Guest Faculty, Shri Vishawkarma Skill University, Dudhola Palwal
[2]District Horticulture Officer, Department of Horticulture Haryana

*Corresponding Author
Dinesh Kumar*
E-mail:
thesupremenature@gmail.com

Article History
Received: 11. 04.2021
Revised: 20. 04.2021
Accepted: 24. 04.2021

INTRODUCTION

Cotton is an important fibre crop and plays an important role in national economy. Cotton contributes approximately 65% of raw material for textile industry. Over the decades India is practicing cotton cropping but in last few years India recorded significant quantitative and qualitative increase in cotton production. We use to imported lakhs of bales to meet our domestic requirement However, after Government launched special schemes like intensive cotton production programmes through successive five-year plans, that cotton production received the necessary impetus through increase in area and sowing of Hybrid varieties around mid-70s. We are self suffient in cotton production except at occasions of crop failure to white fly attack. Our cotton industry demand of cotton fibre is met with surplus of cotton seed. Since launch of Technology Mission on Cotton by Government of India in February 2000 significant achievements have been made in increasing yield and production through development of high yielding varieties, appropriate transfer of technology, better farm management practices, increased area under cultivation of Bt cotton hybrids etc. All these developments have resulted into a turnaround in cotton production in the country since last 6/7 years. The yield per hectare which was stagnant at about 300 kg/ha for so many years, jumped to 506 kgs in the year 2017-18 and had reached to the level of 566 kgs per hectare in the year 2013-14. Though the per hectare yield is still lower against the world average of about 762 kgs per hectare, the fundamental changes that are taking place in the realm of cotton cultivation in the country, are having the potential to take the current productivity level near to the world average in the near future.

The details regarding area, production and yield in the country for 2018-19 vis-à-vis 2019-20 are given here as under:

Year	Area in lakh hectares	Production in lakh bales	Yield kgs per hectare
2018-19*(P)	126.58	330.00	443
2019-20*(P)	125.84	360.00	486
Source: Cotton Advisory Board P-Provisional *As per CAB meeting 28.11.19			

To make the productivity Indian cotton comparable to other countries like USA and China there is need to give more stress on production of high yielding variety. Hybrids can be best utilizes avoiding hue and cry on BT cotton. There are organizations which are raising voice against BT cotton and their ill effects on feeding to animals without supportive research trials. Protein requirement of animals are essential. Protein deficiencies usually accompany energy deficiencies. They are not usually as severe and take the form of:

1. Reduced appetite in young animals.
2. Lowered feed intake.
3. Lack of muscle development.
4. A prolonged time to reach maturity.
5. In mature animals there is loss of weight and decreased milk production.

For all round development of body of animal, the animal requires the desired or optimal level of nutrients as per their bodily composition and production and reproduction status of animal. The animal needs energy, protein, fat, vitamins and minerals for their growth, maintenance and production. Lack or deficiency in any of these may lead to deficiency disorders. Some are essentially to be a part of their diet while others may be synthesized by rumen microbes.

Protein is essential integral of feed. Feed ingredient that contain more than 18% of their total weight as crude protein are classified as protein feeds. Protein is the primary requirement of young and growing animals. However, it may be secondary to energy needs of adults. Now a days the 80% money in animal husbandry is spent on feed. Proteins are costly vis a vis other feed ingredient. To make animal husbandry a viable and sustainable entrepreneur the balance is to be strike in all the feed inputs. Government has banned the feeding protein of animal origin in the form of fish meal and bone meal. These were the cheaper source being a bye product. Now the only alternative left is either plant origin or non protein nitrogen. Nature has provided us with vast range of flora and fauna which are rich in all the ingredients of animal requirement. These are either in vegetative form or in the form of seed and grains. These seeds and grains are act as nutraceutical and even pharmaceuticals for the animals. Although the majority of protein requirement of animals is met from the fodder consumed in bulk which are not the rich source of protein except in case of leguminous crops. The left-out demand id met from the seeds and cake of soyabean meal, cotton seed meal, groundnut meal, safflower meal, sunflower meal, rapeseed meal, linseed meal, sesamum meal and coconut meal. These are not only the rich source of oil(energy) but also protein. The farmers in specific area feed specific meals as per the easy availability and cost effectiveness. For example, in Malva region of Punjab and cotton belt of Haryana animals are offered ad lib cotton seed after boiling to reduce the effect of gossypol or cotton seed cake is offered to animal after soaking. Although it is very costly protein feed source yet the farmers in the region prefer with the notion that it not only increases milk production but fat contents too. Similarly, in the mustard growing belt mustard cake availability is abundant after extraction of oil for human consumption. This surplus mustard cake is fed to the animals beyond standard limits leading to the fertility problem in in animals. There are different methods of extraction of oils. These methods may affect the nutritive value and occasionally the

digestibility. The cotton seed nuts are to be cracked to improve the digestibility and remove the deleterious effect of gossypol. High temperature and pressure of expellers leads to denaturation of protein and ultimately reduced nutritive value. The high temperature may reduce the chances of ill effect of harmful component present in the seed.

Nutritive value of cotton seed cake depends on the type of method used to expel the oil. Modern machines are available to adjust the level of oil contents in the cakes. Desired temperature and pressure can be adjusted to make the required and desired product of your specification. Earlier expellers tend to denature the protein leading to reduced nutritive value. Protein contents of cotton seed cake vary from 22-42% depending on the methods of extraction applied. Decorticated cotton gives higher percentage of protein in cake and is more valuable to rest. Proximate analysis of cotton seed and cake as follow

Whole cottonseed is high in protein, fat, fiber and energy. This combination of nutrients in one feedstuff is unusual. Whole cottonseed with the lint still attached is white and fuzzy in appearance. It sometimes is called "fuzzy seed," and has the analysis shown below. Whole cottonseed from which the lint has been removed is called delinted seed, is black and smooth in appearance, and tends to be slightly higher in protein and fat than the fuzzy seed. Research at the Universities of California and Pennsylvania has shown that feeding whole cottonseed to milking cows can stimulate higher milk fat test and help maintain milk persistency. It should be fed at the rate of (1.8 to 3.1 kg) per cow per day. Mechanically delinted seed has the same effect as fuzzy seed. Whole cottonseeds do not need to be crushed or processed in any way before feeding.

Typical Analysis Cotton Seed

DM	CP	Fat	Crude Fiber	Neutral Detergent Fiber	Acid Detergent Fiber	Ca	P	TDN	Net Energy
93%	21%	17%	24%	41%	31%	0.14%	0.68%	91%	94.1Mcal /100Ibs

Cottonseed Meal Analysis

Ingredients	CP%	EE%	CF%	NFE%	Ash%	NDF%	ADF%	Lignin%	ME
Decorticated	41	9.2	6.3	37.8	8.2	28	20	6	2.8
Undecorticated	22.8	9.2	24.1	36.6	7.3	53.9	41.2	11.5	2.5

Feeding of cakes in animals is recommended up to 30%. This includes different cakes and cotton seed cake is recommended or included up to 15%. Higher percentage is not cost effective. While formulating the ration for animal's utmost care should be taken and animals should be fed according to their stage like growing, adult, lactating or pregnant. Feed requirements for different stages are different and animals must to fed accordingly to get the optimal output.

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