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Review on Nutritive Value of Fodder Crops and Their Benefits in Cattles and Sheep

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Abstract: *A significant gap between the need for and supply of feed and fodder arises as the number of cattle rises. India is around 23.46 percent short on dry fodder, 62.76 percent short on green fodder, and 30 percent short on concentrate. It is widely acknowledged that giving animals green fodder is essential to a full diet. Green fodder must be a part of the livestock diet in order for the animals to perform productively and successfully during reproduction. As a result, dairy cows should be fed high-quality green fodder on a regular basis for sustainable livestock production. However, the primary obstacles to the production of green fodder are the shrinking amount of land available for its cultivation, water shortages, increased labour requirements, lack of year-round availability of green fodder of the same quality, the need for fertiliser, and seasonality. This article is basically shed light on nutritive values of some fodder crops with some remarkable chemical composition.*

Keywords-*Dry fodder, Green fodder, Sustainable live stock,*

I. Introduction

A crucial element in increasing output, making judicious use of feed, and maintaining animal health is providing animals with wholesome food. Furthermore, as legumes make up the majority of protein-producing crops, they are both particularly interesting for farmers who raise dairy cows and, more generally, for sustainability. When compared to soybean meals, grain legumes are better suitable as supplements to low-protein forages because they have higher rumen degradability and soluble protein fractions (albumins and globulins). As a result, there is growing pressure on livestock farmers globally to use as much homegrown feed as possible. Therefore, the problem could be resolved by growing grain legumes such as high-protein peas (Pisum sativum) and fodder beans (Vicia faba var. minor) on farms.

The current study's objective was to examine the inclusion of fodder beans and peas in the diets of dairy cattle and sheep. The feeding regimen varied based on each cow's physiological state and milk yield, and it was adjusted monthly based on the results of control milk yield, dry period, and health status.

II. Literature Review

Legume grains have a protein content of 22 to 35%, which may meet the nutritional needs of animals and improve the proportion of local protein sources in feed while lowering expenses. Despite this, using the wrong proteins in the wrong proportions might increase manufacturing costs and reduce efficiency. Field beans are a unique feed that can be used in place of more expensive protein and energy commodities like soybean meal since they have a reasonably high crude protein level and include a significant quantity of energy in the form of starch. Despite having a slower rate of protein and carbohydrate fermentation than some other typical feeds, field peas are highly digestive and highly fermentable in the rumen. The growing area under faba beans and peas can provide agricultural animals with the necessary amount of protein as well as increase the proportion of domestic protein-rich feedstuffs in the consumption of feed and reduce the production cost of livestock products, i.e. contribute to higher efficiency. As a result, fodder beans and peas can be used as an important forage legume to enhance feed values for dairy ruminants.

- **Nutritional value of fodder crops in cattles**

Agriculture-based foods called fodder crops are primarily cultivated to feed domesticated livestock. They are typically planted and nurtured in backyard gardens or agricultural fields. A vast range of feedstuffs, including silage, straw, hay, pelleted feed, oil meals, sprouted grains, legumes, and much more, are considered fodder. There are two types of fodder crops: seasonal and perennial. In the same agricultural year, temporary crops are sown and harvested once or more times. They consist of root crops grown for fodder as well as grasses, green cereals, legumes like pulses, and legumes. The term "permanent fodder crops" refers to crops that are sown or planted only once and cannot be replanted after each annual harvest. An important factor in the growth

and development of cattle is sufficient nutrition. Each nutrient, whether it be protein, fibre, or minerals, is crucial. They perform their functions in terms of metabolism, production, and energy provision for growth.

- **Basic feed types and their nutritional value:**

Based on physical structure and nutrient content, the feedstuff including fodder crops are classified into various groups. Most commonly available livestock feed can be included in the concentrates, roughages, and unconventional feed classifications.

CONCENTRATES

Concentrates are forms of animal feed that provide essential nutrients including fat, protein, and carbs in greater quantities. Additionally, they have relatively little crude fibre while being high in total digestible nutrients (TDN) and nitrogen-free extract (NFE). Cereal grains, seeds, molasses, oilseed cakes and meals, roots and tubers, and different by-products are the main feed items that fall under concentrate.

Grains

Grains have a high energy content but a low level of fibre. They come from plants that produce grain, its seeds. Either grains are fed alone or in combination with meals high in protein. Before being fed to the ruminants, some of them are additionally processed. Vitamin E and phosphorus are both somewhat abundant in all cereals. The range of their crude protein content is 8–12%.The most widely utilised grains include corn, sorghum, wheat, barley, rice, millet, oats, and rice. The tougher outer layers of cereal grains (including wheat bran and rice bran), maize gluten meal, rice polish, brewer's grain, and other milling byproducts are only a few examples of the byproducts of these crops that are used as feed.oil meals, oil cakes, and oilseeds (high protein feed)

Crops called oilseeds are raised for their high-quality oil, which is extracted from the seeds. The oil extracted from these seeds is largely consumed by humans, while the leftover oilseed meal and cake are sold for use as animal feed.A meal cooked from oil cakes is known as an oil cake, which is the gritty residue left behind when oilseeds are drained of their oil. These foods are a rich source of energy, fibre, and protein. Large-scale examples of oilseed crops include canola, flax, coconut, cotton, and coconut.

Molasses

Molasses are mostly a by-product of the sugar beet industry. The most popular molasses for feeding cattle are those made from cane, beet, and citrus. Citrus molasses is made from the juice of citrus fruits, while cane, beet, and beet molasses are the residue left over after sugarcane is refined. A superior source of carbs is molasses. They are also a good source of pantothenic acid and niacin. Molasses' TDN content ranges from 50 to 75 percent.

Tubers and roots

Farm animals are fed on turnip, sugar beet, fodder beet, and other root crops. They contain a lot of moisture but little crude protein and little crude fibre.

The plants use tubers, which are larger plant structures, to store nutrients. The majority of tubers are full of carbs and a good source of energy. Cattle can be fed tubers like potatoes, sweet potatoes, tapioca, and carrots.

ROUGHAGES

Hay, straw, grasses, legumes, tree leaves, stovers, husks, and seed hulls are examples of roughages. They have a lot of fibre but little simple carbs. Legumes are a good source of calcium and magnesium among several roughages. Depending on the plant species, these feed products have a wide range of protein, vitamin, and mineral content.

When there is not enough pasture for an animal to graze or when grazing is not possible owing to poor conditions, the majority of the roughages are used as fodder.

UNCONVENTIONAL FEED

Feed ingredients that are unconventional are those that aren't typically used to feed cattle. They consist of food wastes and agricultural byproducts like tea wastes, plant leaves, sweet corn cannery waste, bakery wastes, seeds, fruits and their wastes, and vegetables and their wastes. These feed items can be excellent sources of energy and protein. Food wastes including apple trash, mango seed kernels, coconut pith, and tapioca byproducts are just a few of the unusual feeds used to provide cattle energy. Various plant seeds and seed cakes are sources of protein.

RESEARCH WORK AND METHODOLOGY

The feeding regimen changed based on the physiological state and milk yield of each cow, and it was adjusted each month in accordance with the outcomes of the dry period, control milk yield, and health status. The amount of feedstuffs, dry matter (DM), net energy for lactation (NEL, MJ), amount of crude protein, and macro-Chemical tests were performed on a total of fifteen samples, including beans (n = 5), peas (n = 5), and soybean meal (n = 5), when developing the feeding diets. Based on the control milk yield sheets, the total milk yield, average milk fat and protein content for each cow were recorded. Every day, milk outputs in cow groups were controlled; once a month, milk yields in individual cows were controlled.

The chemical composition of some fodder crops:

Indicator	Beans	Peas	Soybean meal
Dry matter %	90.44	90.80	87.45
Crude protein%	29.97	25.08	51.68
Starch %	43.51	48.58	7.65
Crude fiber%	9.5	7.27	4.57
NDF%	15.79	22.60	13.99
ADF%	11.36	9.65	7.01
NEL	7.7	8.84	7.95
Crude ash%	3.62	3.32	1.90
Ca%	0.14	0.10	0.47
P%	0.68	0.47	1.21

III. Conclusions

1. According to the results of the chemical analysis of legume grains, peas and field beans had high dry matter contents, at 90.78% and 90.44%, respectively. The highest crude protein concentration was found in soybean meal (50.61%), followed by fodder beans (29.97%), and peas (25.04%) of dry matter. Peas and beans had the highest and lowest starch contents, respectively, with 48.54% and 43.29% of dry matter in soybean meal.
2. Overall, it can be said that peas had the lowest concentration of essential amino acids, while soybean meal and fodder beans had the most.
3. Although the daily milk yield declines for the trial groups were smaller 2.22 kg, 2.10 kg, and 0.26 kg, respectively, compared with the initial stage of the experiment and the control group, the cow productivity indicators declined for all the groups, which was normal during the lactation period.

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