



TOPIC: IMPROVEMENT OF
POOR QUALITY ROUGHAGE

DEPARTMENT OF ANIMAL NUTRITION



WHAT IS ROUGHAGE:

It is defines as the feed that contain more than 18% crude fiber and less than 60% of TDN is called as roughage such as paddy straw, wheat straw, ragi straw, gram bhusa, bajra karbi, Jowar karbi.

POOR QUALITY ROUGHAGE:

__Poor or low quality roughages are usually low in proteins, high in lignin and poor in digestion

METHODS OF IMPROVING THE FEEDING VALUE OF POOR QUALITY ROUGHAGES

■ A) Supplementation with deficient nutrients :

. Objective: To correct nutrient imbalances and thereby create optimum rumen conditions for efficient microbial fermentation

■ . Methods:

■ Enrichment with urea and molasses

■ Ensiling with animal wastes such as faeces and urine

■ Supplementation with green fodders either leguminous or non leguminous, legume straws (sunhemp, horsegram, cowpea and gram straws)

B) Treatment:

The main objective of treating of a poor quality roughages is to increase it's digestibility and or voluntary intake so as to increase the intake of digestible energy

METHODS OF IMPROVING THE NUTRITIVE VALUE OF POOR QUALITY ROUGHAGES

PHYSICAL METHODS	CHEMICAL METHODS	PHYSICO CHEMICAL METHODS	BIOLOGICAL METHODS
1) Soaking	1) Alkali NaOH, Ca(OH) ₂ , KOH, NH ₄ OH.	Combination of both physical and chemical treatments	Enzymes
2) Chopping	2) Ammonia Gaseous, Aqueous, Urea-ammonia	Eg. NaOH/Pelleting; NaOH/Steam	Rot fungi
3) Grinding	3) Acids H ₂ SO ₄ , HNO ₃		Mushrooms
4) Pelleting	4) Salts Na ₂ CO ₃ , NaCl		
5) Wafering	5) Gases Chlorine, SO ₂		
6) Steam under pressure	6) Oxidizing agents H ₂ O ₂ , O ₃		
7) Irradiation			

PHYSICAL TREATMENTS

A) Soaking

- Soaking of wheat straw increased the dry matter intake and volatile fatty acid production but has no effect on the digestibility of nutrients
- Soaking of paddy straw removes some of the oxalates and may improve the nutritive value of straw and improve Ca retention more importantly.

B) Chaffing

- Chaffing of rice straw or maize stover increased the voluntary intake of these roughages
- By Chaffing the green fodder or dry fodder selective feeding and thus wastage of fodder can be avoided.
- Fodders are chopped uniformly into fine (0.5cm) or coarse (1-2cm) particles.

Advantages:

- *It Avoids wastage. It facilitates feeding of roughage and concentrates together in the form of complete feed*
- *Chopping of green fodder facilitates good silage making*
- *It facilitates mixing with other Ingredients of ration and checks the selective feeding*

- Easily handling and improves digestion

C) Steam under pressure

- It is the most effective method of feeding good quality straw
- It loosens the chemical bonds (lignin cellulose/ligno hemicellulose) through steaming at high pressure.

CHEMICAL TREATMENT

AIM:

- Increase lignin solubility or decrease the bonds between lignin and other cell wall constituents.

A) Treatment with NaOH:

- *_The product is also called as “fodder cellulose”.It is of 2 major types.*
- *Wet method(Beckmann’s method)*
- *Dry method*

Beckmann's method:

- *A chopped straw in 8-10 times its weight of 1.2 to 1.5% (W/V) solution of NaOH for atleast 4 hours*
- *The treated straw was drained and washed with large quantity of water until it is free from alkali*

. Dry method:

- *The straw is sprayed or sprinkled with NaOH while being mixed.*
- *4 to 6 kg of NaOH dissolved in 200 liters of water is adequate to wet 100 kg straw. The treated Straw is moist and has pleasant odour*
- *Intake of straw is increased by 30 to 40%.*
- *Digestibility is increased to 10-15 percentage units*

B) Treatment with calcium hydroxide:

- *Ensiling Ca(OH)_2 treated straw (4 kg Ca(OH)_2 /100 kg straw) with enough water to give 50% moisture in freshly treated Straw for 90 to 150 days results in higher fermentability of treated Straw.*
- *Longer incubation period gave higher treatment effect*

C) Treatment with urea

- *4 kg urea in 40 liters water is suitable for 100 kg straw*

BIOLOGICAL TREATMENT

1. ENZYME TREATMENT :

- *Cellulase solution is sprayed on straw at 25 mg/ 100 kg straw.*

2) FERMENTATION:

- *Chopped straw is pre treated with 3-5% NaOH, and steamed at 120 °c for 15 min , then fermented with bran type media cultured with cellulolytic microorganisms at 40-50 °c for 2 days*

3) *WHITE ROT FUNGI, MUSHROOMS AND OTHER MICROBES:*

- *Phanerochaete chrysosporium(65-75%) , Ganoderma applanatum and Coriolus versicolour (45%)*

Reference:

Reddy.D.V (2011), Improvement of poor quality roughages, Feed technology, Principles of animal nutrition and food technology, 2nd edition, published by Oxford and IBH publishing company Pvt, Ltd

