

BIHAR ANIMAL SCIENCES UNIVERSITY

BIHAR VETERINARY COLLEGE, PATNA

Department of Animal Nutrition

Class: M.V.Sc.

Course No.: ANN-609, Unit-I

Date: 31.10.2020 & Time: 10.0-11.0 AM

**Use of non-traditional feeds – By-products of agricultural,
industrial, food processing units and forest by-products**

(Part-2)

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Unit - 1

Point to be discuss.....

- Use of non-traditional feeds – By-products of agricultural, industrial, food processing units and forest by-products.
- Evaluation by chemical and biological methods.
- Formulation of economical rations.
- Level of inclusion of various non conventional feeds in livestock ration.

What are Nonconventional feeds ?

“It refers to all those feeds that have not been traditionally used for animal feeding either by farmers or by feed manufacturers in commercial feeds” .

These include the agricultural and industrial by products used in animal feeds at certain percentages depending on their palatability, nutritional value and toxic factors / anti- nutritional factors.

Need of Nonconventional feeds

- **As India has 2.4% world's geographical area**
- **And with 16% of world's human**
- **India inhabit 15% of world's livestock and poultry population**
- **Thus increasing demand of feed and fodder lead to development of new strategies of nutrition**

Scenario

- **At present the country is facing a net deficit of**
 - ✓ **35.6 percent green fodder**
 - ✓ **10.95 percent dry fodder**
 - ✓ **44.0 percent concentrate feeds.**

IGFRI.2010

Cont.....

Fodder demand and supply scenario in the country (million Tonnes)

Year	Demand		Supply		Deficit		Deficit as %	
	Dry	Green	Dry	Green	Dry	Green	Dry	Green
2010	508.9	816.8	453.2	525.5	55.72	291.3	10.95	35.66
2020	530.5	851.3	467.6	590.4	62.85	260.9	11.85	30.65
2030	568.1	911.6	500.0	687.4	68.07	224.2	11.98	24.59
2040	594.9	954.8	524.4	761.7	70.57	193.0	11.86	20.22
2050	631.0	1012.7	547.7	826.0	83.27	186.6	13.20	18.43

Project availability, requirement & deficit of CP and TDN (Million tonnes)

Year	Requirement		Availability		Deficit (%)	
	CP	TDN	CP	TDN	CP	TDN
2000	44.49	321.29	30.81	242.42	30.75	24.55
2005	46.12	333.11	32.62	253.63	29.27	23.86
2010	60.04	347.8	42.95	271.3	28.47	21.99
2020	62.58	362.5	47.18	290.5	24.60	19.87
2030	67.01	388.2	53.09	320.2	20.78	17.52
2040	70.19	406.6	57.61	342.8	17.92	15.69

Role during scarcity

• The use of nonconventional feed resources and agroindustrial byproducts as well as drought resistant vegetation in combination with urea and molasses can be used for meeting the immediate nutritional requirement under condition of scarcity.

• About 60-80% Requirement of dry matter by animal is fulfilled by roughages. Whose demand can be fulfilled by collecting 'Crop residues, dry grasses from forests, fallen tree leaves etc.' and feeding to animals.

• As the cost of transportation and processing are higher they first compressed at the place of availability densified by mixing bran molasses, minerals etc then delivered.

Example of complete feed during scarcity

Ingredient	%
Banyan tree leaves	50
Maize grain	27
Groundnut cake	14
DORB	7
Minerals+Salt	2
Vitamin AD2	

Nutrient	%
CP	17
DCP	8
TDN	42

Characteristics of Nonconventional feeds

- 1.The field crops that generate valuable non conventional feeds are excellent source of carbohydrates for ruminants Ex: Tapioca ,sugarcane & Feeding these fermentable carbohydrates is advantageous because of their ability to utilize NPN compounds in presence of energy**
- 2.They are mainly organic and can be in a solid , slurry or liquid form**
- 3.Their economic value is less than the cost of collection and transportation for use thus referred as wastes**
- 4.Some feeds contain toxic factors and have deleterious effect on animals. For example :
Castor bean meal , neem seed cake**
- 5. These are by products of food production systems that have not been used , recycled or salvaged**

6.Regarding the feeds of crop origin the majority are bulky and of poor quality cellulosic materials with a high crude fiber and lignin content.

7.They have considerable potential as feed materials. In case of feeds their value can be increased if processing techniques are employed.

Example of concentrate mixture using Unconventional feedstuffs

Ingredient	%
Jowar	10
Mangoseed kernel	10
Decoiled rice bran	25
Decoiled salseed meal	5
Safflower	5
Silk cottonseed cake	15
Cottonseed cake	20
Molasses	7
Mineral mixture	2
Salt	1

Classification of Non conventional feeds

Energy Sources

- 1.Vilayati babul pods
- 2.Apple waste
- 3.Cocoa pods
- 4.Coconut pith
- 5.Kusum cake
- 6.Mango seed kernel
- 7.Rain tree pods
- 8.Tamarind seed powder

Protein Sources

- 1.Ambadi cake
- 2.Corn gluten meal
- 3.Corn steep liquor
- 4.Dhaincha seeds
- 5.Guar meal
- 6.Isabol gola and Isabol lali
- 7.Jowar cake and gluten
- 8.Niger seed cake
- 9.Rubber seed cake
- 10.Subabul seeds
- 11.Sun hemp seeds

Miscellaneous Sources

1. Sugarcane tops
- 2.Babul pods and seeds
- 3.Banana root bulbs
- 4.Citrus By products
- 5.Jackfruit Waste
- 6.Palm male tree
- 7.Panewar seeds
- 8.Potato waste
- 9.Seaweeds bagasse
- 10.Azolla
- 11.Tea Waste
- 12.Tomato Waste



Processing of NCFR to complete feeds and Total mixed ration

- Before feeding Non conventional feedstuffs they must be well processed- (chaffing, grinding(8 mm) and pelleting) and mixed into a uniform blend that discourage selection.
- For this the concept of “complete ration” is identified in which large number of Unconventional feeds are used to prepare proper nutrient ration to animal.
- Expander extruder method is of importance in processing of such feeds .
Expanding-application of moisture , pressure , temperature to gelatinize the starch portion. Extruding-pressing the feeds through constrictions under pressure.

Dr. G.V. Narasa investigator,team of Excellence on Feed Technology and Quality assurance,NATP project of ICAR found that processing behaviour of crop residues such as bajra and soyabean straw ,castor and palm press fibre when subjected to Expander-Extruder processing and steam pelleting increase nutritious value of crop residues.

Constraints in the utilization of NCFR

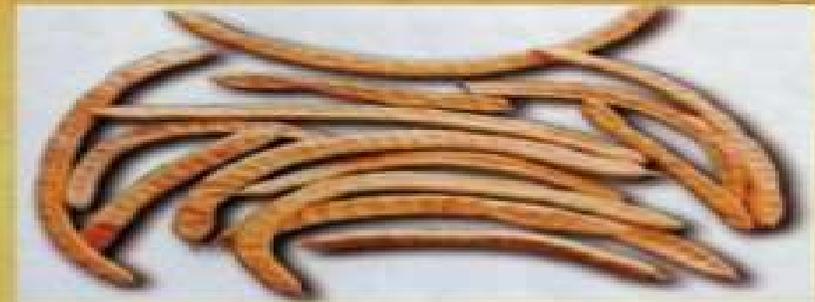
- 1.Limited knowledge on the chemical composition and feeding values of Non conventional feeds.**
- 2.Most of NCFR contains Anti-Nutritional factors thus not suitable for use in animal feed, And little knowledge about their characterization, quantification in ingredient ,and their long range effects on animal health and productivity.**
- 3.Non availability of NCFR in large quantities. Production is scattered in definite areas.**
- 4.Availability is restricted to particular season in a year. And no storage facility.**
- 5.Lack of managerial and technical skills utilize the feed in situ.**
- 6.Processing difficulties : Difficulties in collection , handling, transportation, and processing of these feeds.**

Nutritious value and Deleterious factors in some unconventional feeds

1.Vilayati Babul pods :

Nutritious value-Contains TDN-65%,CP-12%

Deleterious factors-contain 0.74-1.5% tannins which is generally not harmful.



2.Cocoa pods :

Nutritious value-TDN-63.5%,DCP-6.3%.

Contains good amount of pottasium.

Deleterious factors-Contains Theobromine a poisonous alkaloid.



3.Guar meal :

Nutritious value-TDN-75-80%,CP-50-55%

It is rich in methionine, cysteine and lysine and is good source of vitamins and minerals.

Deleterious factors-Contains Antitrypsin factors, Residual guar gum.



4. Dhaincha :

Nutritious value-CP-32.7% It is good source of lysine and methionine.

Deleterious factors-Contains trypsin inhibitor and tannins.



5. Sugarcane tops :

Nutritious value-TDN-45%,CP-3%

Deleterious factors-Oxalates



6. Palm tree :

Nutritious value-TDN-40%,CP-3.5%

Deleterious factors-Contains tannins.



7. Kusum Cake :

Nutritious value-TDN-79.62%,CP-20.9%

Deleterious factors-Cyanogenic glycosides.



8. Tomato Waste :

Nutritious value-TDN-55%

CP-15%

Deleterious factors-Generally no deleterious factor found. however they are prone to microbial infection.



9. Jowar Cake and Gluten :

Nutritious value-TDN-67.2%

CP-10%

Deleterious factors-Contains tannin and is unpalatable

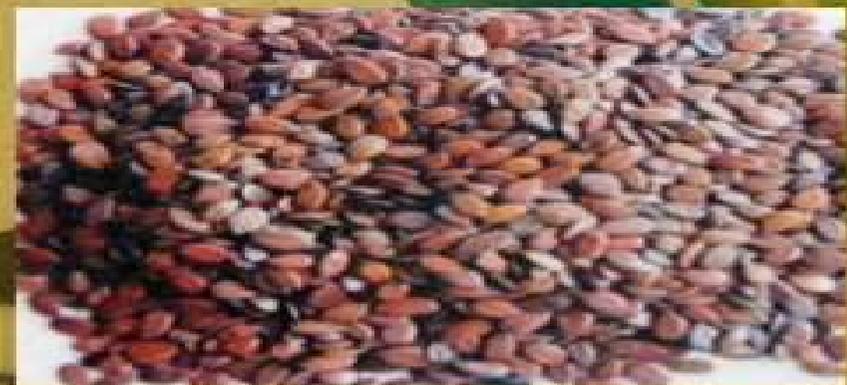


10. Subabul seeds :

Nutritious value-TDN-65%

CP-29%

Deleterious factors-Contains 'Mimosine' which adversely affect reproductive ability of animals.



Discussions.....

Questions, if any.....??

THANKS