

**BIHAR ANIMAL SCIENCES UNIVERSITY**

**BIHAR VETERINARY COLLEGE, PATNA**

**Department of Animal Nutrition**

**ANN-606**

**UNIT-IV (NON-RUMINANT NUTRITION)**

**Lecture on**

**Feeding of Rabbit & Equine**

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# PG Lecture: 5

**Point to be discuss.....**

- **Feeding management of rabbit and equine under different physiological conditions.**
- **Types of feed used for feeding of above species.**

## FEEDING OF RABBITS

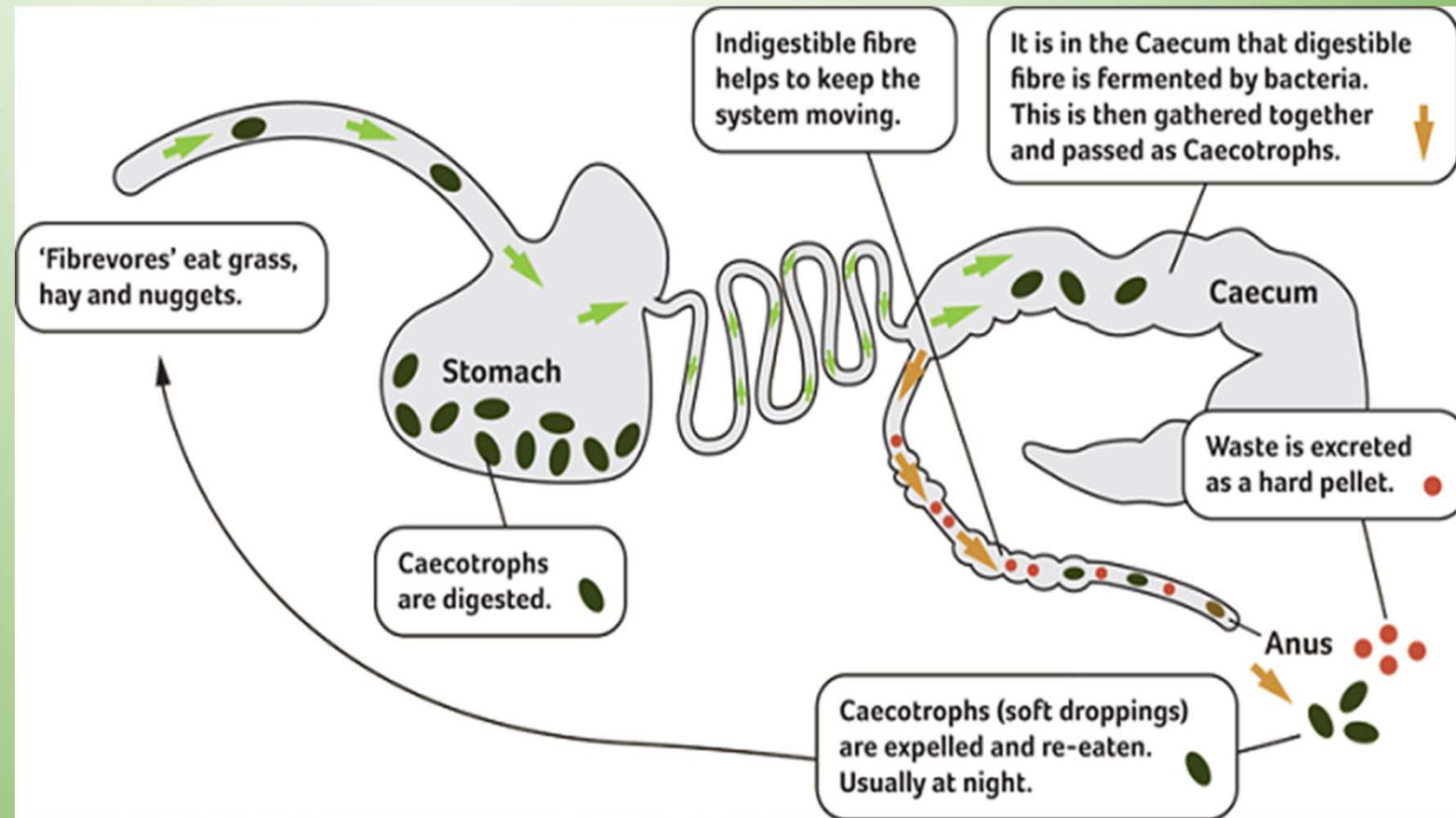
- Rabbits are herbivores, requires plenty of roughage & limited concentrates.
- They have continuously growing incisors & molars which wear down with the normal action of eating.
- As in guinea pigs they also produce nutrient rich caecotropes which they eat directly from the anus area.

## Colon uniqueness of Rabbit

- Proximal colon has dual function, if the contents of caecum enter the colon in the early morning, they undergo few chemical changes & purely become pellets coated with mucus and these pellets gather into clusters, are known as soft or night pellets or *Caecotrophes*.
- At other times of the day, the solid part of the food containing fibres over 0.3 mm long, forms hard pellets & is excreted out.
- Hard pellets are expelled directly, but the soft pellets are recovered from the anus immediately.
- To do this, the rabbit twists itself around, sucks on the soft faeces and then swallows them without chewing.

- By the end of morning, there are large numbers of soft pellets inside the stomach which comprises almost  $\frac{3}{4}$  of the total contents & follow the same digestion pattern as normal feed.
- Some parts of the feed may be recycled up to 4 times and this process of recycling faeces in order to complete digestion of feed is known as *caecotrophy*.
- Half of the pellets consist of imperfectly broken-down food & gastric secretions whereas, other half consists of bacteria (contain a large amount of high-value proteins) & water soluble vitamins.

# Cecotrophy in Rabbit



## Feeding of rabbits as per their stages of development

- Rabbits need to be fed differently at different stages of their growth to ensure healthy development, digestion and weight gain.
- Avoid any sudden changes in diet.
- New foods should always be introduced gradually.
- Fresh clean water should be available all the times.
- Water bottles are recommended for waterer.

## Feeding of kits

- **Baby rabbit or kit, feeds solely on its mother's milk for first 3 weeks.**
- **During the first few days, the milk contains high levels of antibodies that help to protect the kit from disease.**
- **After 3 weeks, the kit will begin nibbling on feed offered to its mother.**
- **By 7 weeks of age, kits can be fed feed similar to that of an adult.**
- **Weaning is practiced by 8 weeks of age.**





## Feeding of Juveniles

- Between weaning & 7 months of age, young rabbit can have an unlimited amount of feed both roughage & concentrate.



## Feeding of young adult

- Young adult rabbits from age 7 months to 1 year should be introduced to grass/ hays, and it should be available all day.
- At this stage they will require little concentrate.



## Feeding of Mature adult

- Mature adult rabbits should be fed on hay/grass.
- Concentrate can be reduced in maintenance rabbits.

## Feeding of pregnant & lactating does

- Hay / grass is fed adlibitum & concentrate can be fed upto 200 g /doe /day.

## Feed intake by Rabbits

### Dry matter intake (DMI)

- For maintenance DMI is 3.8 to 4% of BW per day & it increases based on growth & production.
- Growing rabbits (After weaning) = 100g
- Resting Does = 150g
- Does in Gestation = 250g
- Nursing Does (until litter is 3 weeks of age) = 250g
- Does with litter of 7 or 8 (3 to 8 weeks) = 1000g

## Feedstuffs commonly used for rabbits

- **Green roughages:** Grasses, weeds & leafy vegetable.
- **Root crops:** Carrots, sweet potatoes, turnips & beets.
- **Cereal grains & by-product:** Oats, wheat, barley, corn, rice & bran.
- **Hays:** Leguminous or non leguminous.
- **Protein supplements:** Oil cake or pulses.
- **Common salt.**

## Complete feed for rabbits

- Rabbits can be fed **complete feeds in a pelleted form** given below is an example of ingredient composition of complete feed.

DCP %	TDN %	Ingredients	Quantity (grams)
16	68	Cow pea hay	30
		Maize	28
		DORB	25
		GNC	15
		Min. mix.	1.5
		Salt	0.5



## Chewing items

- Feed that requires **little chewing**, produces uneven tooth wear, causing enamel to grow on the sides of the teeth.
- These **spikes** can cause severe oral pain and excessive salivation.
- Also cause **reluctance to chew**, inability to close the mouth & reduced food intake.
- In addition to roughages, **rabbits can be provided with chew sticks** made of wood or any safe material.
- Feed efficiency for rabbits is **2.5 : 1** .

## Feeding management of horse

- See the individual horse **feeding habits**, and adjust rations accordingly.
- **Working horse** total ration should be fed **thrice per day**.
- Feed a **quarter of concentrate** required at morning & mid day, remaining **half at night**.
- **Reduce** the amount of **concentrate** by **50–70%** on **non-working days** of horse.
- Make any **changes in the ration gradually** over a period of **10–14 days**.
- Keep **feed and water troughs clean**, and remove leftovers.
- **Don't allow** a horses to **drink large quantities of water immediately after exercise**.
- Allow the horse to **drink only 2–4 L**, and then let it cool before allowing free access.
- **Avoid working** the horse on a **full stomach & allow at least 2 hrs for digestion**.

## FEEDING FOALS

- Feeding of foals is according to its age.
- **Mare milk can meet the requirement of foal up to the first 3 months age.**
- **Composition of mares milk:**
  - Fat - 1.25, Crude protein - 2.1%, Lactose - 6.3%, Ash - 0.4% & Gross energy - 480 Kcal/kg.**
- **Colostrum feeding provides immunity to the foal.**



## Feeding orphan foal

- Foal can be injected with horse serum for immunity.
- Fostering or hand rearing by bottle or bucket feeding can be carried out.
- Modified cow milk - cow milk 600 ml + 150 ml lime water + 1 spoon sugar.
- Frequency of feeding once in 2 hours- first 2 weeks, once in 4 hours - next 2 weeks and 4 times a day feeding upto weaning.

## Creep feed for foal

- **Beyond 1.5 month additional creep feed can be provided.**
- **Creep feed should provide 75 % TDN and 16 % crude protein with highly digestible ingredients.**
- **It can be fed @0.5 to 1 % of the foals body weight.**

## Creep feed composition

Ingredient	Percent in feed
Oats groats rolled	15
Flaked oats	20
Flaked maize or sorghum	35.75
Soy bean meal	15
Skim milk powder	5
Molasses	5
Di-calcium phosphate	2
Ground limestone	0.75
Mineral mixture	1
Vitamin supplement	0.5

## FEEDING OF YEARLINGS

The following is the feeding schedule for yearlings

- **3- 6 months:** 500 gm grain or concentrate mixture & 1 Kg good quality hay.
- **6-9 months:** 1 kg grain or concentrate mixture & 2-3 Kg good quality hay.
- **9-12 months:** 2 kg grain or concentrate mixture & 4-5 Kg good quality hay.

## FEEDING OF STALLION

The feeding of stallion is critical for its breeding performance.

- Amount of energy required by the stallion during the act of mating is quite small, but for additional physical activity & psychological response to breeding, increases the dietary energy needs.
- During the breeding season, more energy-dense feeds (grains) to be included in the ration to meet the stallion energy requirements.
- Vegetable oil can also be used to provide extra energy which can reduce the inclusion of large amounts of grain.
- Stallion should be fed high quality hay at a minimum level of 1.0 % of BW.

- Stallions, used to mate many number of mares will require energy-dense grains @0.75 kg/100 kg BW.
- Other nutrient requirements also increase during the breeding season.
- Providing a suitable vitamin/mineral supplement.
- If stallion already receiving balanced diet then adding extra feed or supplements to the diet will not enhance fertility.
- Stallions that exercised regularly should be fed as per their level of work.
- After breeding season, maintain on maintenance ration by increasing the hay portion and decreasing the grain portion of the ration.

## Feeding of pregnant mares

- In early to mid-gestation, nutrient demands for developing fetus are minimal.
- Growth of the foal ranges 90 to 220 g per day, therefore, the mare's nutrient requirements in early to mid-gestation are similar to maintenance ration.
- During late gestation the foal is growing @350 to 450 g/day so, to support this growth, the mare's energy & protein requirements increase.
- Foetal uptake of minerals is enhanced during the last trimester, so, dietary Ca & P requirement increased substantially.
- Elevated energy & protein requirements of a mare in late gestation can be met by increasing the amount of mixed hay of leguminous species & grass.
- Adequate intakes of minerals and vitamins are also provided.

## Feeding of lactating mares

- Mare at the time of lactation should have a good body condition.
- Under feeding mares during lactation can lower milk production, ultimately affecting the growth of foal.
- A thin body condition will also decrease the mare's ability to be re-bred.
- In addition to its own needs, mare produce 2 to 3% of her BW/day as milk.
- The energy and protein requirement increase 75 to 100 per cent.
- Lactating mare needs 3 times more calcium & 2.5 times more phosphorus as needed in early gestation.
- When fed grass hay alone then supplements the protein, energy & MM.
- The mare's nutrient requirements decline in the 4<sup>th</sup>, 5<sup>th</sup> & 6<sup>th</sup> months of lactation, as milk production declines.



## FEEDING OF RACE HORSES

- Horse performing **light work** for **2-3 hrs/day**, their **energy** requirements **increases 50% above maintenance**.
- Horse performs **moderate work** such as fast trotting, cantering, jumping, etc. for **4-5 hrs/day**, **energy** requirement **increased by 70% above maintenance**.
- It is **not possible** to meet the **energy needs** by feeding roughage alone in above conditions.
- Further, horses **after several hours of work do not eat enough**, hence, the **energy density of the ration has to be increased by supplementing grains**.
- **Addition of fat** to the ration **upto 10%** also increases the energy density.

### **Ration for 500 kg horses performing light work**

- 1. Alfa alfa / grass hay – 7 Kg**
- 2. Crushed oats / barley – 2 Kg**
- 3. Mineral mixture – 30 g**
- 4. Iodised salt – free choice**

### **Ration for 500 kg horses performing moderate work**

- 1. Alfa alfa / grass hay – 8 Kg**
- 2. Crushed oats / barley – 3 Kg**
- 3. Mineral mixture – 30 g**
- 4. Iodised salt – free choice**

## **Ration for 500 kg horses performing intense work**

- 1. Alfa alfa / grass hay – 9 Kg**
- 2. Crushed oats / barley – 4.5 Kg**
- 3. Oil – 500 g**
- 4. Mineral mixture – 30 g**
- 5. Iodised salt – free choice**

## Feeding of horses before riding

- **High intensity work**
  - **Remove hay 4 hours** prior to competition.
  - **Feed grain 4 hours** before competition.
- **Light to moderate intensity work**
  - **Remove hay 4 hours** before riding.
  - **Adapt horse to eating smaller quantity of ration by** spread throughout the day.
  - **Feed grain 4 or more hours** before riding.
- **Long distance races**
  - **Allow free access to hay right up to the competition or even during the ride.**
  - **Feed large quantity of grains/CM 4 hours** before the ride.
  - **Feed smaller quantity of grain throughout the ride.**

## GUIDELINES FOR FORMULATION OF RATIONS OF EQUINES

### Feed intake & Forage : Concentrate Ratio for different categories of Horses

Factor		Feed Intake	
		% of Body Weight	Forage:Concentrate Ratio
Maintenance		1.5	100:0
Pregnancy		2.2	75:25
Lactation		2.2	55:45
Work	Mild	1.5	65:35
	Hard	1.5	30:70
3-month foal		3 - 4	0:100
6-month foal		2 - 2.5	25:75
12-month yearling		2.0	35:65

**Discussions.....**

**Questions, if any.....??**

**THANKS**