

BIHAR ANIMAL SCIENCES UNIVERSITY

BIHAR VETERINARY COLLEGE, PATNA

Department of Animal Nutrition

ANN-606

UNIT-IV (NON-RUMINANT NUTRITION)

Lecture on

Nutrient requirements in Rabbit & Equine

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PG Lecture: 4

Point to be discuss.....

- **Nutrients and their requirements in rabbit and equine**
- **Different factors affecting nutrient requirements**

NUTRIENT REQUIREMENTS FOR DIFFERENT CATEGORIES OF RABBIT

- Rabbit is a monogastric herbivore, hindgut fermenter, practicing coprophagy, & able to tolerate upto 15% crude fibre.

Components of feed	Unit	Growing rabbits (4-12 weeks)	Lactating doe+ young under mother	Pregnant doe, not lactating	Resting adults (males)	Mixed breeding does plus fatteners
Crude proteins	%	16	18	16	13	17
Metabolizable energy	kcal/kg	2400	2500	2400	2120	2410
Digestible energy	kcal/kg	2500	2600	2500	2200	2500
Fats	%	3	3	3	3	3
Crude fibre	%	14	12	14	15-16	14
Indigestible crude fibre	%	12	10	12	13	12

Cont...

Components of feed	Unit	Growing rabbits (4-12 weeks)	Lactating doe+ young under mother	Pregnant doe, not lactating	Resting adults (males)	Mixed breeding does plus fatteners
Amino acids						
Methionine + cystine	%	0.60	0.60	-	-	0.60
Lysine	%	0.65	0.75	-	-	0.70
Arginine	%	0.90	0.80	-	-	0.90
Threonine	%	0.55	0.70	-	-	0.60
Tryptophane	%	0.18	0.22	-	-	0.20
Histidine	%	0.35	0.43	-	-	0.40
Isoleucine	%	0.60	0.70	-	-	0.65
Phenylalanine + tyrosine	%	1.20	1.40	-	-	1.25
Valine	%	0.70	0.85	-	-	0.80
Leucine	%	1.05	1.25	-	-	1.20

Cont...

Components of feed	Unit	Growing rabbits (4-12 weeks)	Lactating doe+ young under mother	Pregnant doe, not lactating	Resting adults (males)	Mixed breeding does plus fatteners
Minerals						
Calcium	%	0.40	1.10	0.80	0.40	1.10
Phosphorus	%	0.30	0.80	0.50	0.30	0.80
Potassium	%	0.60	0.90	0.90	-	0.90
Sodium	%	0.30	0.30	0.30	-	0.30
Chlorine	%	0.30	0.30	0.30	-	0.30
Magnesium	%	0.03	0.04	0.04	-	0.04
Sulphur	%	0.04	-	-	-	0.04
Cobalt	ppm	0.1	0.1	-	-	0.1
Copper	ppm	5	5	-	-	5
Zinc	ppm	50	70	70	-	70
Iron	ppm	50	100	50	50	100
Manganese	ppm	8.5	2.5	2.5	2.5	8.5
Iodine	ppm	0.2	0.2	0.2	0.2	0.2
Fluorine	ppm	0.5	-	-	-	0.5 ⁵

07-05-2020

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Cont...

Components of feed	Unit	Growing rabbits (4-12 weeks)	Lactating doe+ young under mother	Pregnant doe, not lactating	Resting adults (males)	Mixed breeding does plus fatteners
Vitamins						
Vitamin A	UI/kg	6000	12000	12000	6000	10000
Vitamin D	UI/kg	900	900	900	900	900
Vitamin E	ppm	50	50	50	50	50
Vitamin K	ppm	0	2	2	0	2
Vitamin C	ppm	0	0	0	0	0
Vitamin B ₁	ppm	2	-	0	0	2
Vitamin B ₂	ppm	6	-	0	0	4
Vitamin B ₆	ppm	2	-	0	0	2
Vitamin B ₁₂	ppm	0.01	0	0	0	0.01
Folic acid	ppm	5	-	0	0	5
Pantothenic acid	ppm	20	-	0	0	20
Niacin	ppm	50	-	-	-	50
Biotin <small>07-05-2020</small>	ppm	0.2	<small>Kaushalendra Kumar, BVC, BASU, Patna</small>	-	-	0.2 ⁶

NUTRIENT REQUIREMENT IN EQUINE

Energy

- ❖ Is what horses use to do work.
- ❖ Energy requirements are influenced by **age & work's degree** & its duration.
- ❖ Mature mares in the first 2 trimesters of pregnancy require less energy.
- ❖ Young growing horses, **horses at work & lactating** should be supplemented with **densified energy** sources to meet their energy requirements.

Protein

- **Horses use protein to synthesize various body tissues.**
- **Proteins are composed of amino acids of varying composition.**
- **Protein requirements vary for different classes of horses.**
- **Young, growing horses have a higher requirement for protein.**
- **Mature horses have a much lower requirement for protein young because it needs for maintenance of body tissue rather than growing new tissue.**

Minerals

- **Required for various purposes, serving as components of the skeletal system to maintaining nerve conductivity, muscle contraction and electrolyte balance.**

Vitamins

- **Vitamins A, D and E are the most common vitamins added to horse diets.**
- **Although B complex vitamins are synthesized in the large intestine of horses, including them in performance horse diets may be necessary.**

NUTRIENT REQUIREMENTS OF EQUINE AS PER INDIAN STANDARD

Class	TDN (Kg/day)	Crude Protein %	Calcium %	Phosphorus %	Feed intake %, BW
Adult horses at rest	3.7	8.0	0.30	0.2	1.5
Pregnant mare (last 3 months of pregnancy)	4.2	10.0	0.45	0.35	1.75
Lactation (First 3 months)	6.4	12.5	0.45	0.35	2.75
Nursing Foal (3-5 months) Requirements in addition to milk	1.6	16	0.8	0.55	0.75
18-24 months	3.9	10.0	0.40	0.35	2.0
12-18 months	3.8	12.0	0.50	0.35	2.5
2 year old to maturity	3.7	9.0	0.40	0.35	1.75

Energy requirement of horses for various types of physical activity (In addition to maintenance requirement)

Physical Activity	Mcal / Hour / 45 Kg Body weight	TDN / Hour / 45 Kg Body weight
Walking	0.02	4.53
Slow Trot	0.23	54.36
Fast Trot and Cantering	0.57	99.66
Cantering and Galloping	1.05	240
Strenuous effort	1.77	403.17

NUTRIENT REQUIREMENT IN EQUINES AS PER NATIONAL RESEARCH COUNCIL (NRC, USA)

Requirements for Sedentary, Mature Horses of Different Body Weight

Size of Horse	Digestible Energy (Mcal/day)	Crude Protein (gm)	Calcium (gm)	Phosphorus (gm)
Maintenance (500 Kg)	15	600	18	13
Maintenance (550 Kg)	16.5	700	20	14
Maintenance (600 Kg)	18	750	22	15

Requirements for growth & different Production Stages (BW of 550 Kg)

Age of Horse (Weight/growth)	Digestible Energy (Mcal/day)	Crude Protein (gm)	Calcium (gm)	Phosphorus (gm)
6 months				
240 Kg/1000 g per day	15.5	750	39	22
12 months				
350 Kg/500 g per day	19	900	38	21
24 months				
470 Kg/200 g/day	19	850	37	20
Class of Horse				
Breeding Stallion	22	850	20	14
Broodmare				
Early Pregnancy	17	700	20	14
8 months pregnancy	18.5	850	28	20
11 months pregnancy	21	1000	36	26
Lactation (1st month)	32	1700	59	38
Lactation (3rd month)	31	1600	56	36
Lactation (5th month)	28	1450	40	25

Requirements for different working horses

Working Horse	Digestible Energy (Mcal/day)	Crude Protein (gm)	Calcium (gm)	Phosphorus (gm)
Light exercise	20	750	30	18
Moderate exercise	23	850	35	21
Heavy exercise	27	950	40	29

Dry Matter Intake

- The dry matter intake of horses is **1.5–2.5%** of their BW per day

Roughage and concentrate requirements of horses		
Type of work	Feed per 100 kg live weight	
	Roughage (kg)	Concentrate (kg)
Ideal	1.5	Nil
Light (2 hours/day)	1.25–1.5	0.5–0.75
Medium (2 hours/day)	1–1.5	1.0
Heavy (4 hours/day)	1.0	1.0–1.5

Factors influencing nutrient requirements in horses

- **Body weight of the horse or its size.**
- **Breed**
- **Age**
- **Physiological status of the horse - gestation, lactation, rate of growth**
- **Nature and intensity of work**
- **Body temperament**
- **Hair coat**
- **Fat insulation**
- **Environment – temperature, wind velocity and relative humidity**
- **Health status**
- **Vices of the horse**

Discussions.....

Questions, if any.....??

THANKS