

A Guide to Proper Feeding of Rabbits For Enhancing Profits

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Introduction

Rabbits are primarily monogastric herbivores. Consume common grains and pulses (Sorghum, Bengal gram, Wheat etc.) and legumes (Alfalfa, Berseem, etc.) as greens or as hay and even kitchen wastes and garden vegetables (Cabbage, Carrot etc) or their leaves.

The dam imposes feeding pattern. A doe feeds her young only once in 24 hours. From the 3rd week of life the young rabbit begin to move about, taking few grams of dam's milk. Within few days they also start feeding grains and forages. Normally rabbit feed and drink water through out the day but feeding nocturnally is the common phenomena. Lactating doe need the richest and most concentrated feed.

Rabbit consumes dry matter **6-8 %** of their bodyweight out of which roughage can contribute up to 60 %. The dietary crude protein content should be **12 to 15 %** for dry non-lactating does and **16 to 20 %** for growers and lactating does with litter respectively.

Feeding schedule for different categories of rabbits

Item	Approximate Body Weight	Quantity to be fed per day	
		Concentrates	Green grass
Bucks	4-5 kg	150 gm	600 gm
Does	4-5 kg	150 gm	600 gm
Lactating does	-	200 gm	700 gm
Weaner (6 weeks)	600-700 gm	50 gm	200 gm



In organized farm, feeding of concentrate in pelletize form is the most common practice. The diameter of the pellet should be 3-4 mm with 10-15 mm length. Feeding of rabbit in **pellet** form is more desirable than mash or ground form.

Type of nutrient	Fattening or growing stock	Lactating doe	Does in kindle	Animal on maintenance
Digestible energy MJ/Kg	10.4	10.9	10.4	9.2
Fat%	3	4	3	3
Crude protein%	14	19	14	15-16
Crude fibre%	15.5	18	16	13

Fibre requirement

The most important component of the rabbit diet is fibre. It's particle size and digestibility are also important. The rabbit needs large indigestible fibre particles (containing lignocellulose) to drive the gastrointestinal system, and to maintain healthy peristalsis. Gastric stasis and the subsequent accumulation of a 'felt' of ingesta and hair is rarely seen in rabbits on high fibre diets.

Large fibre particles ensure the natural wear of the molar teeth with a side-to-side chewing action. Small particles tend to be eaten with a crushing action which encourages unnatural wear on the teeth.

High fibre, low energy diets will result in complete caecotrophy, and avoid the development of '**sticky bottom syndrome**'. Such diets also prevent obesity. Fibre is particularly important for the maintenance of a healthy digestive system: a high fibre diet keeps the correct balance of bacterial flora in the caecum.

High fibre (hay) diets allow the rabbit to 'graze' for several hours daily, which closely parallels the behaviour of wild rabbits, and reduces boredom and stress. This reduces fur chewing of itself or its companions, and reduces destructive chewing of the environment.

Fibre should make up **18 to 20%** of the diet, and of this at least 10% should be crude indigestible fibre. As most complementary dry foods contain less than this (between 5.7 and 14%) every diet should be complemented with good hay.

If the fibre content of the diet falls, the caecal pH alters, and the populations of Clostridia and Escherichia coli rise. This is particularly significant at life stages when the gastrointestinal system is most vulnerable, such as weaning, or during antibiotic usage. Rabbits on high fibre



diets rarely suffer from mucoid enteritis, or enterotoxaemia. High fibre diets will also protect against enterotoxaemia when antibiotics are given.

Protein requirement

The recommended **protein** level of the diet is 12 to 14%. Higher protein levels of 16 to 20% may be used for breeding stock, and 15% for growth. Protein is part of the concentrated ration, but is also found in hay. High protein diets will lead to an increase in the production and excretion of ammonia, and this may increase the rabbit's susceptibility to respiratory disorders, and eye infections. Excess protein may also lead to incomplete coprophagy and the development of '**sticky bottom syndrome**'.

Fat requirement

1% fat for maintenance and **3%** for pregnancy and growth, dry and dull hair coat may be due to deficiency in essential fatty acids.

Carbohydrate requirement

Rabbits have little requirement for **carbohydrate**. However, many pet and house rabbits are fed starchy and sugary treats regularly. This causes obesity and encourages enterotoxaemia. The 'starch overload' theory suggests that excess carbohydrates will exceed the stomach's capacity to absorb them, and these carbohydrates provide fuel in the caecum for the multiplication of *E. coli* and *Clostridia*.

During the process of digestion the microflora in the caecum synthesize **Vitamins B, C and K**. These are then returned to the rabbit in the caecotrophes ingested during caecotrophy. Vitamins A, D and E are included in the pelleted ration. Concentrated ration should not be stored for longer than 3 months as the vitamin content will deteriorate over time. Vitamin B and K supplementation must be considered for rabbits that are unable to practice caecotrophy.

Vitamin A

This should be incorporated into the average concentrate ration at a rate of 10,000 IU/kg. Vitamin A deficiency will result in infertility, abortions, resorption and increased neonatal mortality. Vitamin A deficiency or excess can cause hydrocephalus. Alfalfa is rich in vitamin A, and if fed alongside vitamin A rich pellets may also lead to the development of hydrocephalus. Hepatic coccidiosis will lower the liver levels of both vitamins A and E.

Vitamin C

This vitamin is also synthesized during the process of digestion. However vitamin C supplementation may be of benefit in the treatment of respiratory disease, and in the prevention of enterotoxaemia, as it may inhibit toxin production. It can be given at a dose of 50 to 100 mg/kg daily. Over dosage does not occur as any excess is excreted through the kidneys.



Vitamin D

This is incorporated into the average concentrate ration at a rate of 900 IU/kg. Excess vitamin D may be a factor in excessive calcium uptake, and the development of dystrophic calcification of renal and aortic blood vessels (at levels of 2300 IU/kg of feed) although the rabbit has a unique calcium metabolism.

Vitamin E

This is incorporated into the average concentrate ration at a rate of 50 mg/kg. Vitamin E deficiency can lead to **reduced fertility**, and additional vitamin E can be added to the diet by supplementation with wheat germ. Vitamin E deficiency can cause **muscular dystrophy** and **hind leg paralysis in young rabbits**. These symptoms may be seen if less than 16 mg/kg vitamin E is incorporated into the diet. Blood biochemistry in a case of hypovitaminosis E will reveal a raised creatine phosphokinase (CPK).

Vitamin A and E deficiency may result in infertility, vitamin E deficiency cause muscular dystrophy, vitamin C supplementation will be helpful in treating respiratory diseases

Calcium

The rabbit has an unusual calcium metabolism. The level of plasma calcium is not regulated by vitamin D and parathyroid hormone as in other mammals, but varies directly with the level of dietary calcium. Excess calcium is excreted through the urinary system, making **bladder and kidney stones** a common occurrence if diets are high in calcium. **Metastatic calcification** can also occur with high calcium diets. Conversely, as much of the dietary calcium is held in the pelleted portion of the ration, rabbits that are selective feeders and leave their pellets may have a low calcium intake. This leads to **osteoporosis**, particularly evident in the vertebrae, and jaw bones. Poor mineralization of the teeth, and acquired malocclusion are consequences of a diet too low in calcium. Osteoporosis of the vertebrae leads to vertebral fractures. The daily requirement for calcium of a medium-sized pet rabbit is approximately 510 mg.

Copper

Copper is added in the form of cupric sulphate to the concentrate ration at a rate of 4 to 30 mg/kg. It is thought to reduce enteritis and increase weight gain in young stock. There are no toxic effects from feeding this level of copper.

Water

Fresh **water** should be available at all times, even when the rabbit eats a large amount of greens and may seemingly not drink much. Water can be provided in bowls or sipper bottles; the latter is more hygienic. It is important to use whichever the rabbit is familiar with, as if



presented with an unfamiliar water source the rabbit may fail to drink, and dehydrate. Sipper bottles must be cleaned regularly, and checked for leakage. '**Blue fur disease**' is a moist dermatitis associated with *Pseudomonas* contamination of leaking sipper bottles.

Grass is one of the most neglected components of the rabbit diet. Whilst its wild counterparts feed exclusively on grass, most pet rabbits are never given fresh grass, although they receive dried grass as hay. Grass is an excellent source of fibre and has a more abrasive action on the teeth than hay.

Eating grass encourages the side-to-side chewing action essential for the proper wear of the molars. Grass should be gradually introduced into the diet, when the grass growth is rapid, as eating too much at this time can cause digestive upsets. The grass that is fed should be pulled rather than as grass clippings as the latter have a tendency to overheat and ferment, again causing digestive disturbances.

FEEDING MANAGEMENT

Along with concentrated pellet, green forage including Cabbage, Lucerne, Hedge lucerne, Berseem, Paragrass, Sesbania leaves are best suited. The green should be fed ad libidum. The rabbit should not feel stress in feeding so the regular routine should be followed properly. **Concentrates should be fed in the morning and roughages should be fed in the evening.**

Supply of clean and cold water is very much essential, an adult rabbit requires about only litre of water a day. The water intake of rabbits in a temperate climate is 1.5-2.5 times that of dry matter consumed. In warm climate the ratio may raise to 4:1. Water can be provided in pot, by a nipple attached to either a pipeline or a bottle. In lactating and pregnant does water should be provided round the clock.

Leaves of Murungai, Agathi and cultivated fodder grasses like Guinea, Napier and Paragrass are palatable to rabbits apart from the leguminous fodder such as Cowpea, Lucerne, Stylosanthes etc.

COPROPHAGY / CAECOTROPHY

Digestion in rabbit is of typical one. The functioning of the rabbit's digestive tract is virtually the same as that of other mono-gastric animals. Its unique lies in the dual function of the proximal colon. When the caecum content enters to colon in the early morning, the colon will secrete a mucous which envelops the pellet to form **soft pellet** or **night pellet** (more scientifically caecotrophes) and the rabbit directly eat the soft pellet in the morning from the anus.



The soft pellet contains high value protein and soluble vitamins particularly B complex vitamin. The second expulsion is the *hard pellet*. This action is called caecotrophy or coprophagy. To encourage caecotrophy the feed should contain adequate quantity of roughages.

Conclusion

Feeding rabbits precisely following the scientific feeding requirements with locally available feed ingredients and fodder varieties will decrease the investment cost thereby enhancing the profits even though reared as small scale rabbitry.

