



Ration formulation for sheep and goats

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Ration Formulation for Sheep and Goats

- ▶ **Information needed for ration formulation**
- ▶ **Considerations in the formulation of rations**
- ▶ **Calculation of Nutrient Requirements and Formulation of Ration**
- ▶ **Methods of ration formulation**
- ▶ **System of rearing**
- ▶ **Feeding behaviour of goats**
- ▶ **Intensive concept of stall feeding of sheep and goats**

Sheep and goats are most productive when fed a balanced ration according to their nutrient needs. Ration is a feed required for 24 hours.

Needed nutrients should also be supplied at lowest possible cost.

Use locally available feed ingredients

Information needed for ration formulation

➤ **List of nutrient requirements**

From standard nutrient requirement tables (NRC, ICAR etc.,).

➤ Recommendations should be subject to modification when these are not satisfactory to the particular situation.

➤ Factors should be considered in determining nutrient allowances:
Age, sex, body size, type of production (growth, lactation, pregnancy etc) and level of production.

➤ Generally, protein, energy, calcium and phosphorus are considered in the formulation of rations for sheep and goats.

List of available feeds

- ▶ Good to prioritize the available feeds based on their relative suitability.
- ▶ Most economical sources of the desired nutrients.
- ▶ Analytical data of the feeds are preferred or
- ▶ Average composition data from appropriate feed composition tables or other available information sources may be used.
- ▶ Calculate the unit cost of the major nutrients (energy, protein, calcium, phosphorus) to determine whether the feed is an economical source of the nutrients.
- ▶ The costs of processing, transportation and storage should be considered.
- ▶ Consider the limitation of the various feed ingredients in selection.
- ▶ Basal diet of small ruminants are mostly roughage based.

Type of ration to be formulated

- ▶ **The type of ration to be formulated will determine the needed nutrient content of the ration and the details of the formulation procedure.**
- ▶ **Formulation of complete feed or a finishing concentrate mix to feed as a supplement to a roughage source.**
- ▶ **For sheep and goat rations, we would normally consider roughage as the base feed and then determine what nutrients are needed to supplement the roughage.**

Considerations in the formulation of rations

- ▶ **Keep rations simple.**
- ▶ **The rule of thumb is that simple nutrient needs can be met by simple feed formulae.**
- ▶ **Complex formulae do not necessarily guarantee better performance.**

Feed composition data may be given either on dry matter or on an as-fed basis.

- ▶ **Rations should be formulated on dry basis, especially if wet ingredients such as silage, molasses, etc. are included.**
- ▶ **Formulation can be done on the basis of daily needs (i.e. amounts of nutrients rather than concentration)**
- ▶ **Use of percentage units is the simplest means as the final values can easily be converted to any weight unit.**

Dry matter intake of animals fluctuates – based on species, body size and physiological state of the animal (e.g. pregnancy); and palatability, texture and bulkiness of the diet.

Select the same units of measure for nutrient requirement and feed composition.

For protein, either Crude Protein (CP) or Digestible Protein (DP); for energy, Total Digestible Nutrients (TDN) or Metabolisable Energy (ME).

Calculation of Nutrient Requirements and Formulation of Ration

The DMI varies from 3 % to 6 % in different breeds .

Adult body weight- 15 to 60 kg in different breeds.

Nutrient Requirement may be calculated using following formulae:

- $DM (g/d) = 76 g / \text{body weight } kg^{0.75}$
- $DGP (g/d) = 3 g / \text{body weight } kg^{0.75}$
- $TDN (g/d) = 30 g / \text{body weight } kg^{0.75}$

Methods of ration formulation

- ▶ There are many methods of formulating rations useful for various situations.
- ▶ The end result of using any of the methods is a ration that provides the desired allowance of nutrients in correct proportions economically.
- ▶ Pearson square method and the trial and error methods are most commonly used ration formulation methods.

System of rearing

- ▶ Extensive System
- ▶ Intensive System
- ▶ Semi Intensive System

Extensive system of rearing

Animals are receiving sufficient nutrients or not through grazing can be determined by their body weight

- ▶ If body weight is maintained or slightly increased to a level of 20-30 g/day i.e. they are in maintenance
- ▶ If they are continually losing body weight, they need additional supplementation.
- ▶ If ewes are gaining weight more rapidly we should reduce grazing time.

Intensive Concept of stall feeding of sheep and goats

- ▶ **Sheep or a goat graze / browse on variety of herbage**
- ▶ **Prefer to consume fodder rich in nutrients**
- ▶ **Adoptability of sheep is poor compared to goat for intensive system**
- ▶ **No standard for housing and environment for intensive rearing**
- ▶ **Grazing / browsing sheep or goat consume 30-40% more compared to intensive / forced system of feeding**
- ▶ **Health coverage / infectious disease control**
- ▶ **Labour dependable, Feed and fodder requirement**

Concentrate based ration for goat (weight gain: 75 g /day)

Body weight (kg)	Nutrient requirement (g)			Feed required to meet the nutrient requirement	
	Dry matter	Digestible crude protein	Total Digestible Nutrient	Concentrate mixture (g)	Green grass (kg)
5	-	37	220	100	0.5-1.0
10	350	44	290	150	0.8-1.0
15	500	51	350	200	1.3-1.5
20	620	57	405	250	1.5-2.0
25	730	63	460	300	2.5-3.0
30	830	68	510	350	3.0-3.5
Pregnant ^ψ (30 kg)	1200	71	645	400	3.0-3.5
Lactating ^ψ (30 kg)	1100	61	575	350	3.0-3.5

Ranjhan (1998) Concentrate DM : grass DM =1:1.5

Legume & Tree fodder based ration for goat

Body Wt. (kg)	DMI (g)	DCP (g)	TDN (g)	Grass (kg)	Legume fodder (kg)	Tree fodder (kg)
5	-	37	220	0.50	0.25	0.25
10	350	44	290	1.00	0.50	0.50
15	500	51	350	1.30	0.70	0.70
20	620	57	405	1.70	0.80	0.75
25	730	63	460	2.00	1.00	0.75
30	830	68	510	2.50	1.00	1.00
Pregnant (30 kg)	1200	71	645	2.50	1.25	1.25
Lactating (30 kg)	1100	61	575	2.50	1.00	1.00



Cereal grass DM : Legume DM : Tree leaves DM=2:1:1

Extra dry fodder to meet DM requirement

Ad-libitum dry fodder may also be fed to satisfy the dry matter requirement

For pregnant and lactating ewes 50-100 g of cereal grains may be supplemented

Conclusions

- ▶ **Sheep and goats are most productive when fed a ration balanced according to their nutrient needs.**
- ▶ **Use locally available feed ingredients and use purchased feeds only to fill the gap in nutrient supply from the locally available feeds.**
- ▶ **Nutrient requirement (DCP and TDN) in each stage of animal should be considered while formulating a ration.**
- ▶ **Animals are receiving sufficient nutrients or not through grazing can be determined by their body weight gain / loss.**
- ▶ **Adoptability of sheep is poor compared to goat for intensive system**
- ▶ **Roughages like green grass, legumes and tree fodders should be used to reduce the quantity of concentrate mixture for intensive rearing.**



Thank you