

## **Nutrition and Feeding Of Duck**

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Duck is also an important bird used for egg production and meat production. In India, duck farming is normally not done in organised form. Ducks require ponds or rivers or any other source of water because ducks are adapted to semi-aquatic life span. Due to this reason the duck rearing is more economical than chicken rearing. In the pond or lakes they fulfil their nutritional requirements from the natural vegetation found in water and other insects and worms which grows in the natural aquatic environments. However, ducks can be grown successfully in either of two environments- an open rearing system, in which the growing house opens to an exercise yard with water for wading or swimming, or a confinement growing system, in which ducks are raised in environmentally controlled houses with litter or combination litter and wire floors.

The digestive system of duck is slightly different from chicken as they do not have crop and their proventriculus is cylindrical and make the feed passage rate quicker than that of chicken. Ducks also possess a bill in place of a beak and are capable of separating feed mixed in water. Ducks bill is not well adapted for dry mash feeding. As dry mash sticks to the bills or may choke, ducks try to remove it by shaking or washing out in water. Therefore, ducks should be supplied feeds in wet form.

### **Feedstuff for Duck Ration**

Feed ingredients commonly used for preparation of chicken ration can be used for preparing duck ration. Some feed ingredients contain substances that are toxic to ducks, and should not be included in duck rations. Groundnut meal (peanut meal) is often contaminated with aflatoxin, a toxin to which ducks are most sensitive. Groundnut meal should not be used unless tests have proven it to be free of aflatoxin. Ducks can tolerate only 0.03 ppm or 30 ppb of aflatoxins (such as, aflatoxin B<sub>1</sub>) compared to chicken that can tolerate upto 0.2 ppm. The B<sub>1</sub> aflatoxin is most toxic for ducks because in the liver of ducks the enzyme which converts aflatoxin B<sub>1</sub> to aflatoxicol is found in greatest concentration. Aflatoxicol is responsible for toxicity. However, aflatoxin is not secreted in the egg of ducks. Rapeseed meal is another feedstuff that is potentially toxic to ducks. Some older varieties of rapeseed meal contain erucic acid and goitrogens at levels high enough to be harmful to poultry. Ducks are much more sensitive to erucic acid than chicken and turkeys.

### **Preparation of Duck Ration**

Feed can be presented to the ducks, like chicken, in different forms, such as mash, pellets or crumbles. Ducks grow faster, and utilize their feed more efficiently, when fed crumble or pellet rations. Although ducks can be fed mash ration, growth performance may be reduced by about 10% in comparison to that ducks fed pelleted feed and feed wastage will be increased. For newly hatched ducklings, pellets should not have a diameter more than 3.18 mm and length more than 7.9 mm. After two weeks of age, ducklings can consume pellets of about 4.76 mm in diameter and 12.7 mm in length. Dry mash is not recommended as it forms a sticky paste when

mixed with saliva, which cakes and accumulates on the outer ridges of the mouth. In attempting and to free their bills of caked feed, ducks make frequent dip their bills in water to wash, causing feed wastage. Therefore, ducks should be supplied feeds in wet form. Feeding mash also reduces feed intake, and in the case of market ducks, reduces their growth rate. For small flock owners who are not able to feed pellets, wet mash can be fed. Water is mixed with the mash just before feeding. Enough water is added to form a thick mash without making it watery.

## Feeding Different Categories of Ducks

### Feeding of Broiler Duck

Broiler ducks, such as White Pekin, typically are given 2 or 3 feeds during the growing period. Information presented in Table 4.13 is on the basis of a two-feed programme; a diet containing 22% protein for the period of 0-2 weeks and 16% protein diet for the period from 2-7 weeks. The need for 22% protein during the starting period, however, is questionable because it is reported that protein levels of 18 and 19%, respectively, in diets providing 3,000 to 3,025 kcal MEn/kg, are adequate from 0-2 weeks (NRC, 1994). A typical three-feed programme may consist of diets containing 20, 18, and 16% crude protein for the periods from 0-2, 2-4, and 4-7 weeks, respectively. The growth rate of ducklings is not affected greatly by the energy concentration of the diet; however, feed efficiency is usually improved and carcass fat is increased when dietary energy level is increased.

### Feed conversion ratio

Feed conversion ratio of broiler ducks, such as White Pekin ducks is around 2.5-3:1 which is obtained at the market age of about 6-8 weeks.

**Table 4.13: Nutrient requirement of broiler ducks (White Pekin ducks) as percentage or unit per kilogram of diet (90% dry matter) (NRC, 1994)**

Nutrients	Unit	0-2 weeks	2-7 weeks	Breeding
Energy <sup>a</sup>	kcal ME/kg	2900	3000	2900
<i>Protein and amino acid</i>				
Crude protein	%	22	16	15
Arginine	%	1.1	1.0	-
Isolucine	%	0.63	0.46	0.38
Leucine	%	1.26	0.91	0.76
Lysine	%	0.90	0.65	0.60
Methionine	%	0.40	0.30	0.27
Methionine + Cystine	%	0.70	0.55	0.50
Tryptophan	%	0.23	0.17	0.14
Valine	%	0.78	0.56	0.47

<i>Macro minerals</i>				
Calcium	%	<b>0.65</b>	<b>0.60</b>	<b>2.75</b>
Chlorine	%	0.12	<b>0.12</b>	<b>0.12</b>
Magnesium	mg	<b>500</b>	<b>500</b>	<b>500</b>
Non phytate phosphorous	%	<b>0.40</b>	<b>0.30</b>	-
Sodium	%	0.15	<b>0.15</b>	<b>0.15</b>
<i>Trace minerals</i>				
Manganese	mg	<b>50</b>	? <sup>b</sup>	?
Selenium	mg	0.20	?	?
Zinc	mg	<b>60</b>	?	?
<i>Fat soluble vitamins</i>				
A	IU	<b>2500</b>	<b>2500</b>	<b>4000</b>
D <sub>3</sub>	IU	<b>400</b>	<b>400</b>	<b>900</b>
E	IU	<b>10</b>	<b>10</b>	<b>10</b>
K	mg	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>
<i>Water soluble vitamins</i>				
Niacin	mg	<b>55</b>	<b>55</b>	<b>55</b>
Pantothenic acid	mg	<b>11</b>	<b>11</b>	<b>11</b>
Pyridoxine	mg	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>
Riboflavin	mg	<b>4.0</b>	<b>4.0</b>	<b>4.0</b>

Note: For nutrients not listed or those for which no values are given, see requirement of broiler chicken as guide. Where experimental data are lacking values typeset in bold italics represent an estimate based on values obtained for other ages or species

<sup>a</sup> These are typical dietary energy concentrations as expressed in kcal MEn/kg diet.

<sup>b</sup> Question marks indicate that no estimates are available.

**Table 4.14: Approximate Body weight and feed consumption of broiler ducks (White Pekin ducks) upto 8 week of age (NRC, 1994)**

Age (weeks)	Body weight (kg)		Weekly feed Consumption		Cumulative feed consumption	
	Male	Female	Male	Female	Male	Female
0	0.06	0.06	0.00	0.00	0.00	0.00
1	0.27	0.27	0.22	0.22	0.22	0.22
2	0.78	0.74	0.77	0.73	0.99	0.95
3	1.38	1.28	1.12	1.11	2.22	2.05
4	1.96	1.82	1.28	1.28	3.40	3.33
5	2.49	2.30	1.48	1.43	4.87	4.76

6	2.96	2.73	1.63	1.59	6.50	6.35
7	3.34	3.06	1.68	1.63	8.18	7.98
8	3.61	3.29	1.68	1.63	9.86	9.61

### **Nutrient Requirement of Layer Duck**

Nutrient requirements of layer ducks are not yet fully established and hence, the nutrient requirement specification is not published by the national agencies like BIS and NRC. However, one of the authors of this book worked through the nutrition and feeding of layer ducks like Khaki Campbell (Koley and Samanta, 2012; Koley and Samanta, 2012). Following his experiences and works, nutrient requirements at which satisfactory results were obtained from the Khaki Campbell ducks are presented in the table 4.15.

**Table 4.15: Nutrient requirements of layer ducks (Khaki Campbell) (Source: Koley and Samanta, 2012a; Koley and Samanta, 2012b)**

<b>Nutrients</b>	<b>Starter (0 – 8 weeks)</b>	<b>Grower (8 – 20 weeks)</b>	<b>Layer (20 weeks onwards)</b>
ME (Kcal/kg)	2750	2700	2650
CP (%)	20	15.5	18
Calcium (%)	1.0	1.0	3.10
Available Phosphorus (%)	0.5	0.45	0.45
Methionine (%)	0.5	0.42	0.47
Lysine (%)	1.15	0.80	1.0

### **Feeding of Layer and Breeder (Broiler and Layer) Ducks**

#### **Feeding of starter duckling**

Ducklings should be started on a starter diet containing 20% CP and 2750 kcal ME/kg within 36 hour of hatching. This should be fed for about 6-8 weeks. Both riboflavin and niacin must be added in the diet, because deficiencies of these B group vitamins restrict growth and development in ducklings. Grains which form the bulk of ration are deficient in these vitamins. Salt generally makes droppings more watery and should not be added in the ration or in very low amount. 0.25% of common salt is not harmful, but ducklings upto the age of 3 weeks are very sensitive to salt. Ducklings should be given free access to crumble feed in shallow trays upto 2 weeks of age. If mash is fed to ducklings, it should be moistened slightly with water to prevent choking. Five equally spaced feedings throughout the day can be given and it should be made sure that they do not have more than they can eat at one feeding. Ducklings should have access to insoluble grits. Plenty of fresh drinking water in a container must be given to ducklings in a container that enables immersion of their heads.

As ducklings are the most susceptible to aflatoxin toxicity, always they should be given freshly prepared feed and mouldy feed or feed stored more than 1 week must be avoided.

### **Feeding of grower/developer**

Grower ration containing 2700 kcal ME/kg and 15.5% CP should be provided at about 6-8 weeks of age and continued upto pre-laying age of about 18-20 weeks. It is very important to maintain proper body weight of grower ducks prior to laying. If growers become fatty it would be detrimental to their health and will impair their reproductive performance. It is, therefore, necessary to limit their daily intake of feed to an amount that will supply all the necessary nutrients that are needed for proper development, while avoiding an excess of calories. Since the ducks becomes very hungry at the time of feeding, the feed must be spread out so that all the ducks have a chance to eat. Feed can be spread out in long troughs, on a cement slab or on the ground if the area is dry and clean.

### **Feeding of layer/laying breeder duck**

Layer ration is provided from 18-20 weeks of age when birds start laying. Layer rations contain a higher level of calcium than other duck rations. A level of 3.10% of the diet is adequate for most breeds of ducks including high egg producing breeds. When enough calcium is included in the ration, it is not necessary to feed oyster shells in addition. However, it will do no harm to make oyster shells available. It has also been found beneficial to restrict feed to some degree during the laying period.

### **Watering of duck**

Plenty of clean drinking water should be available to ducks at least 8-12 hours per day. In some management systems it is advantageous to shut off feed and water at night to help maintain litter inside buildings in a dry condition. This applies to breeder ducks or market ducks over 3 weeks of age. If done properly, this practice is not harmful and has no effect on performance during periods of moderate temperatures. During periods when temperatures are above 32<sup>0</sup>C, drinking water should be available in the evening until the temperature has dropped below 26.5<sup>0</sup>C, or else made available all night. Ducks do not require water for swimming in order to grow and reproduce normally. Providing some water for wading or swimming can be beneficial, especially in hot climates. Ducks can expel excess heat through their bill and feet when allowed contact with water that is appreciably below their body temperature (107<sup>0</sup>F/41.7<sup>0</sup>C). Water temperature of 50-70<sup>0</sup>F/10-21<sup>0</sup>C is ideal for ducks.

In those ponds and rivers where the contamination of industrial waste of factories are found the concentration of mercury is very high. Mercury is converted by microbes into methyl mercury that is a fat soluble form of mercury. When taken up by algae or other plants, these algae and plants are consumed by small fishes. Ducks eat these fish and methyl mercury is deposited in liver and fatty tissue. The consumers who consume meat from such ducks also get traces of mercury, which is in long term may produce mercury poisoning.