

FEEDING OF POULTRY

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Feed cost remains the highest cost in the business of producing either egg or meat. Therefore, it becomes essential that, while the feed is produced at the lowest cost it will also support maximum production. A sound nutrition management is essential to a successful poultry operation. The ever soaring price of poultry feed ingredients has put an enormous burden on the farmers as well as on nutritionists to make the poultry farming a sustainable enterprise.

Compared to other animals poultry have more complex nutrient needs. More than 40 specific chemical compounds or elements are nutrients that need to be present in the diet of chicken to support life, growth and reproduction. To maximize production at the least cost, producers should pay close attention to the nutritional requirements of each species.

Diet Specifications For Chicken

A poultry feed must supply the necessary protein, carbohydrate, fat, minerals and vitamins in their proper proportion. Feeds are composed of a variety of feedstuffs. This allows a nutrient deficiency of one feedstuff to be offset by the nutrients of another feedstuff. The palatability of feedstuffs must be considered in formulating rations for poultry.

The diet of poultry varies depending upon their intended purpose. A feed designed for laying hen is not adequate for optimal growth in broiler, nor is a broiler feed proper for laying hens. Rations are manufactured in a feed mill as mash, pellets, or crumbles. Pelleted or crumbled feeds are generally used in meat production. Pelleting reduces feed wastage and minimizes the selection of feed ingredients by the chicken.

Environmental temperature can alter feed intake of birds. Cold temperature increases feed consumption because of the increased need for energy to maintain body temperature. Warmer temperature on the other hand will decrease energy needs and thus feed intake. Because of these changes in feed intake, it is important to ensure that the hen is receiving adequate protein, vitamin and minerals. It is

essential to fortify the diet with more protein, vitamins and minerals in the warmer summer months. Adequate calcium is extremely important in summer.

Nutrient requirement of chicks and growers

Chicken grown under a range of environment conditions and housing systems can influence nutrient needs. In most situations, variable management conditions influence energy needs. So it is important to relate all other nutrients to energy level since feed intake is controlled by energy need. As stated earlier in hot climate birds eat less. Birds grown on floor eat more feed rather than in cages and so nutrient levels can be reduced. The diet specifications are based on conventional ingredients where nutrient digestibility is fairly predictable. When non standard ingredients are used, it is essential to formulate to more stringent standards of digestibility such as for digestible amino acids.

In practice flock may not grow according to expected standard and for light breeds, they are more likely to be underweight than target. Heavy breeds on other hand achieve weights that are greater than standard goal. For these reasons there needs to be flexibility in time of change from starter to grower diet. According to standard schedule starter are fed for first 8 weeks followed by grower. If body weight is below standard weight at 8 weeks of age, changing to grower diet will not likely to achieve target weight at maturity. Approximate feed and water intake of chicks and their average body weight are given in Table 1.

Grower birds may take approximately 60-80 g of feed per bird per day. It is not advisable to provide ad libitum feeding at this age, as the birds may put on more fat and their egg-laying rate will later be affected. To avoid this, monitor their growth as given below (Table 2). If birds are found to be over-weight, restrict the quantity of feed (only 80-90 percent of the normal quantity to be provided per day) to bring down the body weight.

Age (wk)	Feed intake week (kg)	Water intake week (kg)	Body weight at end of the week (g)
1	40	15	60
2	90	25	105
3	140	45	160
4	200	65	230
5	250	80	300
6	280	95	370
7	310	105	440
8	350	120	530

Table 1: Feed and water intake by 1 000 egg type chicks

Age (wk)	Average Body weight (g)	Age (wk)	Average Body weight (g)
9	615	15	995
10	695	16	1040
11	770	17	1085
12	850	18	1150
13	910	19	1220
14	960	20	1295

Table 2: Growth pattern of egg type layers in grower state (9-20 weeks)

Nutrient requirement of layer chicken

Layer chicken quite precisely adjusts the feed intake according to the need for energy and so variable energy needs are accommodated by change in feed intake. Most Leghorn strains will now commence egg production with feed intake as low as 80-85 g/day and it is difficult to formulate diets for such a small appetite. For all diets, maintaining the balance of all nutrients to energy is the most important consideration during the feed formulation.

In general terms, diet nutrients concentration decrease as laying advance with notable exception of need for calcium. Thus diet protein and amino acids expressed as per cent of the diet or ratio of energy decline as the bird progress through the laying cycle. In order to sustain shell quality, it is important to increase diet calcium level and to concomitantly decrease the diet phosphorus level as the bird gets older. The need for less methionine is

partially related to the need for tempering late cycle increase in egg size since it is usually uneconomical regarding egg pricing and larger egg have thinner shells. Approximate feed and water intake and egg production of layers are given in table 3.

Diet and egg size

Increasing the hen's intake of balanced protein results in an increase in egg size. If the diet is suboptimum in energy, little increase in egg size will be noticed by increasing the level of protein because the hen utilizes protein to meet the requirement of energy.

Increasing the level of methionine result in curvilinear response in egg weight and this better weight gain response to methionine, change slightly during different production cycles.

Increasing the level of linolenic acid has been shown to increase egg size

Age (w k)	Hen-day Egg Production (%)	Feed Intake/ 1000 birds/day (kg)	Water Intake/ 1000 birds/day (litre)
21	8	75	160
22	20	80	180
23	40	90	210
24	68	95	240
25	83	98	260
26	88	100	280
27	90	104	290
28	92	104	300
29	94	104	310
30	94	104	310
31	94	110	320
32-39	92	110	310
40-47	88	107	290
48-59	84	105	270
60-64	80	105	260
65-70	77	105	240
71-76	72	105	240

Table 3: Egg production, Feed and Water intake by layers under optimal conditions

Nutrition and egg shell quality

The egg shell thickness is a problem during the summer months. The ideal time to feed calcium supplement would be in the afternoon since calcium requirement of hen is more at this time. Feeding of limestone or shell grit on top of a diet containing full calcium requirement is not recommended as high calcium intake is known to chalky deposits and rough egg shell surface. High calcium is also known to cause soft shelled eggs due to phosphorus deficiency.

Nutrient requirement of broiler chicken

The genetic selection for growth rate continues to result in some 30-50 g yearly increase in broiler weight. There has also been an obvious improvement in feed efficiency. The modern broiler chicken is able to respond adequately to diets formulated over a range of nutrient densities. To a large extent, the ability of the broiler to grow well with

range of diet densities relates to its voracious appetite as well as cues related to specific nutrients. The major factor influencing choice of feed scheduling is market age and weight. As a generalization, the earliest that a bird is marketed, the more prolonged the use of starter feed. For heavier birds, high nutrient dense starter feed is used for shorter period of time.

An indication of growth performance and feed efficiency of broiler chicken is given in Table 4 and optimum floor space, feeder space and drinker space requirement of chicks, growers, layers and broilers in table 5.

Feeding Backyard Poultry

In prevailing socio-agro-economic situation in Kerala backyard rearing of poultry plays an important role in betterment of financial security and nutrition of people especially economically backward sections of the society. Different types of poultry

Age (wk)	Average Body weight	Feed efficiency	Water intake/ 1 000 birds/day (litre)
1	150	0.85	35
2	340	1.04	60
3	640	1.30	120
4	980	1.48	180
5	1340	1.64	230
6	1720	1.82	280
7	2100	2.02	320

Table 4. Growth performance and feed efficiency of broilers

Bird	Age group	Floor space (cm ²)	Feeder space (cm)	Drinker space (cm)
Chicks	0-4 wks	675	1	0.5
	5- 8 wks		2.5	1
Grower		1260	6-8	2
Layer		1800	10-12	2.5
Broiler	0-2 wks	120	3	1.3
	3-4 wks	367	5	2.5
	5-6 wks	730	8	2.5
	> 7 wks	945	8	2.5

Table 5. Feeder space, floor space and drinker space requirement per bird

Bird	Age group	Floor space (cm ²)	Feeder space (cm)	Drinker space (cm)
Duck Egg type	Up to 3 wks	740	2.5	2.5
	4 – 8 wks	1500	8.5	4
	9 – 20 wks	2250	10	5
	Adult	3100	12	6
Duck meat type	Up to 3 wks	900	5	2.5
	4 – 8 wks	1800	10	5
	9 – 20 wks	2700	12	6
	Adult	3600	15	7.5

Table 6: Feeder space, floor space and drinker space requirement per bird

like chicken, ducks, Japanese quail, turkey and geese are reared as backyard flock. A major cause of problem in backyard flock is improper nutrition. The birds developed by different institutions meant for backyard rearing are of genetically improved variety and as a consequence is unable to live and produce meat and egg on the feeding regime that is practiced for nondescript variety.

The birds on range should be fed sufficient feed to meet its nutritional requirements. One of the most important and most often overlooked nutrients is water. It is imperative that clean water be available to the birds all the times.

It is difficult to procure the conventional feed ingredients at cheaper rate to mix feed economically especially for small flock owners. More over, commercial layer rations are not easily available compared to broiler feed in most of the places in Kerala. Depending up on the availability, feed them layer mash at the rate of 25-30 g per bird per day. Otherwise grains, especially wheat may be fed to backyard birds at the rate of 30-40 g per bird. Ensure that backyard birds are not fed with too much cooked rice. This may lead to fattening of birds.

Diet Specifications for Ducks

Growth rate of meat ducks continues to improve on annual basis with male being around 3.2 kg at 42d. Nutrient programme are aimed at finding a balance between expression of growth and control of carcass fatness. The ducks seems to be able to digest fiber slightly better than does the chicken and as such metabolizable energy values for ducks may be 5-6 % greater than corresponding values of chicken- such difference should be considered in

setting energy specifications of diets. Space requirements for ducks are given in table6.

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