

FEEDING OF PIGS

**Dept. of Animal Nutrition
Co. V. Sc. & AH Jabalpur (M.P.)**

NUTRIENT REQUIREMENTS OF PIGS

- Growing pigs are fed as per different growth phases depending upon age and body weight.
- NRC (1998) suggested six growing stages (3-5, 5-10, 10-20, 20-50, 50-80, and 80-120 kg) for pigs.
- For Indian conditions, Ranjhan (1981): recommended only three stages viz. weaning (5-12 kg), growing (12-50 kg) and finishing (50-100 kg) up to 100 kg body weight.
- BIS (1987) also recommended three phases for feeding of growing finishing pigs.
- Some other workers (Bhar, 1998) preferred to feed grower ration up to 35 kg body weight and shifting to finisher ration thereafter.
- Suggested phasing varied with respect to body weight, mainly due to differences in the performance under different agro-climatic conditions and genetic makeup.

- **For the calculation of (Paul *et al.*, 2007) :**
- **Maintenance Energy requirement for 110 kcal DE (106 kcal ME) / kg metabolic body size ($W^{0.75}$)/day**
- **Maintenance requirements of protein (CP) a value of 8.97 g/kg $W^{0.75}$ /day .was used**
- **As growth pattern, body composition and carcass traits (carcass weight, carcass length, back-fat thickness, loin-eye area) of Indian crossbred and indigenous pigs are different from those of elite exotic pigs, eventually their requirements will also vary.**

Crossbred pigs

The growth potentiality of crossbred pigs (Landrace x native and Large White Yorkshire x native) reared under different crossbreeding programmes varied:

Ranging from a live weight of 43 kg (lower to medium growth potential)

to

56 kg (medium to higher growth potential) at 32 weeks of age.

However, the Landrace crossbred pigs maintained at IVRI attained an average live weight of 110 kg at 32 weeks of age, as it contained more than 75% of exotic blood.

Nutrient requirements (g/day) of CB pigs have been calculated separately for maintenance and for average daily gain in three phases i.e. 8-16, 16-24 and 24-32 weeks of age.

**NUTRIENT REQUIREMENTS OF
PIGS
ICAR 2013**

Table 18. Dietary requirements (as fed basis) of crossbred pigs having lower to medium growth potential

Age (weeks)	8 to 16	17 to 24	25-32
Body weight (kg)	9 to 22	23 to 28	29 to 43
Av weight (kg)	15.64	25	36
BW gain (g/d)	155	224	263
Av daily feed intake (g/d)	610	1120	1430
Feed :Gain	3.98	5.0	5.0
Nutrient requirement			
DE (kcal/kg diet)	3,345	2,727	2,377
DE (kJ/kg diet)	13,993	11,408	9,944
ME (kcal/kg diet)	3,210	2,617	2,282
ME (kJ/kg diet)	13,433	10,951	9,546
CP (%)	21.4	15.2	14.1
Lysine (%)	0.91	0.77	0.81
Methionine (%)	0.65	0.48	0.53
Methionine +Cysteine (%)	0.98	0.76	0.77
Cysteine (%)	0.33	0.27	0.23
Threonine (%)	0.68	0.57	0.62
Tryptophan (%)	0.22	0.17	0.23

Source: Paul *et al.*(2007), NRC (1998), ARC (1981).

Table 19. Dietary requirements (as fed basis) of crossbred pigs having medium to higher growth potential

Age (weeks)	8 to 16	17 to 24	25-32
Body weight (kg)	10 to 21	22 to 38	39 to 56
Av weight (kg)	15.52	29.15	46.56
BW gain (g/d)	189	298	323
Av daily feed intake (g/d)	640	1,350	1,760
Feed :Gain	3.37	4.53	5.44
Nutrient requirement			
DE (kcal/kg diet)	3,550	2,785	2,360
DE (kJ/kg diet)	14,840	11,648	9,885
ME (kcal/kg diet)	3,400	2,670	2,270
ME (kJ/kg diet)	14,250	11,182	9,490
CP (%)	22.7	15.2	14.0
Lysine (%)	0.91	0.75	0.81
Methionine (%)	0.70	0.47	0.53
Methionine +Cysteine (%)	1.04	0.75	0.77
Cysteine (%)	0.35	0.26	0.23
Threonine (%)	0.74	0.57	0.61
Tryptophan (%)	0.23	0.17	0.22

Source: Paul *et al.*, (2007), NRC (1998), ARC (1981).

Table 20. Dietary requirements (as fed basis) of crossbred pigs having higher growth potential

Age (weeks)	8 to 16	17 to 24	25 to 32
Body weight (kg)	11.5 to 44	45 to 80	81 to 110
Av weight (kg)	27.675	61.737	95.119
BW gain (g/d)	577	640	553
Av daily feed intake (g/d)	1,550	2,400	3,360
Feed :Gain	2.70	3.74	6.07
Nutrient requirement			
DE (kcal/kg diet)	3,685	3,185	2,125
DE (kJ/kg diet)	15,417	13,328	8,890
ME (kcal/kg diet)	3,537	3,058	2,040
ME (kJ/kg diet)	14,801	12,795	8,535
CP (%)	21.4	16.5	12.6
Lysine (%)	0.70	0.79	0.73
Methionine (%)	0.66	0.51	0.48
Methionine +Cysteine (%)	0.34	0.28	0.20
Cysteine (%)	1.0	0.82	0.69
Threonine (%)	0.77	0.63	0.55
Tryptophan (%)	0.21	0.19	0.20
Calcium (%)	0.70	0.60	0.50
Phosphorus (%)	0.60	0.50	0.45
Av. Phosphorus (%)	0.30	0.25	0.20

Exotic pigs

- Nutrient requirements of exotic pigs (Landrace and Large White Yorkshire) under Indian condition were calculated based on age-wise body weight changes.
- Pigs attained an average body weight of 74 kg at 32 weeks of age.

Table 21. Dietary requirements (as fed basis) of exotic pigs under Indian agro-climatic conditions

Age (weeks)	8 to 16	17 to 24	25 to 32
Body weight (kg)	10 to 25	26 to 48	49 to 75
Av weight (kg)	17.7	36.3	61.0
BW gain (g/d)	255	410	475
Av daily feed intake (g/d)	960	1,560	2,170
Feed : Gain	3.79	3.80	4.58
Nutrient requirements			
DE (kcal/kg diet)	3,000	3,180	2,600
DE (kJ/kg diet)	12,579	13,311	10,883
ME (kcal/kg diet)	2,886	3,054	2,497
ME (kJ/kg diet)	12,075	12,779	10,447
CP (%)	18.4	16.7	15.0
Lysine (%)	0.70	0.65	0.60
Methionine (%)	0.56	0.51	0.50
Methionine +Cysteine (%)	0.29	0.29	0.26
Cysteine (%)	0.85	0.80	0.76
Threonine (%)	0.62	0.62	0.62
Tryptophan (%)	0.19	0.19	0.19

Source: Paul *et al.*(2007), NRC (1998), ARC (1981).

Indigenous pigs

- Average daily body weight gains were worked out as 0.152, 0.186 and 0.262 kg during 6-20, 20-30 and 30-60 weeks of age.
- Nutrient requirements (g/day) of indigenous pigs were calculated for three phases of growth (8-20, 20-30 and above 30kg BW)

Table 23. Dietary nutrient requirements (as fed-basis) of desi (native) pigs

Age (weeks)	8 to 20			21 to 28		29 to 32	
Body weight (kg)	6 to 20			21 to 30		31 to 40	
Daily feed intake (g/d)	610	650	700	900	950	1350	1400
Feed : Gain	4.01	4.30	4.57	4.86	5.10	5.18	5.33
Nutrient requirements							
DE (kcal/kg diet)	3,170	2,950	2,780	3,185	3,030	2,570	2,495
DE (kJ/kg diet)	13,252	12,350	11,622	13,325	12,698	10,741	10,439
ME (kcal/kg diet)	3,040	2,830	2,670	3,060	2,900	2,470	2,395
ME (kJ/kg diet)	12,720	11,857	11,160	12,792	12,190	10,311	10,022
CP (%)	20.	18.65	17.50	18.70	17.80	15.30	14.95
Lysine (%)	0.83	0.77	0.73	0.99	0.94	0.79	0.76
Methionine (%)	0.61	0.57	0.54	0.61	0.58	0.59	0.57
Methionine +Cysteine (%)	0.92	0.86	0.81	0.94	0.89	0.84	0.81
Cysteine (%)	0.65	0.60	0.57	0.69	0.65	0.68	0.66
Threonine (%)	0.31	0.60	0.57	0.34	0.65	0.24	0.66
Tryptophan (%)	0.20	0.19	0.18	0.20	0.19	0.25	0.24

Source: Paul *et al.*, (2007), NRC (1998), ARC (1981).

Feeding System

Pigs are reared under scavenging, semi-scavenging and intensive systems of production.

Major population comprises of indigenous pigs which are reared under free-range scavenging system with little or no input.

Indigenous and crossbred pigs are also reared under semi-intensive system wherein they are allowed to scavenge for the whole day and receive household kitchen or hotel waste, rice bran, wheat bran and broken wheat (dalia), after their return

Under intensive system, pigs of exotic breeds, elite crossbreds and small breeds are reared with concentrate feeds, hotel and kitchen wastes, cereal byproducts, vegetable wastes, root crops like boiled sweet potatoes, rhizomes, etc.

Good remunerative price of pork in certain places of India and tariff facilities for live pigs have triggered organized intensive farming of late.

Creep Feed

Early weaning of piglets: at 6 weeks of age: western countries

In India, piglets are weaned at 8 weeks under intensive feeding system

Weaning is advantageous on weight basis rather than on age basis as traditionally practiced.

In a developing country like India, phase or split weaning could also be practiced in such a way that heavier piglets could be weaned at 5-6 weeks, followed by weaning of lighter piglets at 8 weeks (Abraham et al., 2004).

Such split weaning practice reduces the stress of negative energy balance of lactating sows and facilitates faster growth of light piglets.

Creep (pre-starter) feeding is essential for sucking piglets for faster growth and attainment of satisfactory weaning weight.

Piglets should have easy access to creep feeds for ad lib intake. Creep mixtures are introduced at 7-14 days of age and are fed till weaning.

They contain 20% protein (BIS, 1987) and 3,265 kcal ME/kg (NRC, 1998) fortified with adequate minerals and vitamins.

Creep feed is generally mixed with ferrous sulphate at the ratio of 9:1 and fed to prevent anemia in piglets.

Piglets fed on creep attain 12-15 kg body weight at 8 weeks of age in Landrace and Yorkshire pigs (Ranjhan,1981) and about 9-10 kg body weight at 6 weeks in Landrace x desi crossbreds

During suckling period, piglets are more prone to anaemia. A dose of iron injection (iron dextran) may be given on 4th and 14th days as sow's milk does not contain enough iron to take care of piglets requirement in 1st and 2nd week of their age moreover, the intake of creep feed is inadequate at early age.

An alternate method of supplementing iron to the new born piglets is to paint the sow's udder with liquid oral iron supplements (FAO, 2009).

Table A10. Ingredient and nutrient composition of weaner piglet ration (upto 15kg)

Ingredient composition (%)	1	2	3
Maize	48.7	48.7	48.7
Maize gluten meal	0	4	5
Soybean meal	9.6	10.2	9.6
Rice kunda	3	3	3
DORB	8	10	8
Rice polish	9	9	9
Fishmeal	8	4	8
Meat-cum-bone meal meal	0	4	0
Mustard cake	5	6	5
Pea waste	7.6		2.6
Limestone powder	0.8	0.8	0.8
Salt	0.3	0.3	0.3
Lysine	0.025	0.025	0.025
Total	100	100	100
Nutrient composition (kcal/kg or %)			
ME	2982	2947	2977
CP	18.1	20.2	20.3
lysine	0.83	0.88	0.85
Methionine	0.35	0.39	0.40
Calcium	0.81	1.05	0.80
Phosphorus, total	0.94	1.28	0.92

Grower Ration

After weaning with creep feed on attainment of about 12-15 kg at 8 weeks of age, piglets are switched over to grower ration.

At this stage pigs consume considerably more feed.

On careful management once a pig attains about 20 kg of body weight, it would be thrifty in appearance and would almost pass the nutritionally critical period. Thereafter, it performs well on relatively simple rations under optimum management condition.

Table A11. Ingredient and nutrient composition of grower piglet ration (35-60kg)

Ingredient composition (%)	1	2	3
Maize	48.5	48.5	52
Maize gluten meal	0	0	3
Soybean meal	4.6	6	2.5
Rice kunda	7	9	7
DORB	10	10	12
Rice polish	10.3	12	11.4
Fishmeal	6	6	6
Mustard cake	5	5	5
Pea waste	7.5	2.5	0
Limestone powder	0.8	0.8	0.8
Salt	0.3	0.3	0.3
Lysine	0.025	0.025	0.025
Total	100	100	100
Nutrient composition (kcal/kg or %)			
ME	2770	2714	2759
CP	15.0	15.0	15.3
lysine	0.63	0.65	0.57
Methionine	0.29	0.29	0.31
Calcium	0.72	0.71	0.71
Phosphorus, total	0.85	0.85	0.84

Finisher Ration

On attainment of finisher body weight (35-50 kg) pigs are switched over to the finisher ration till they attain market weight of 60-70 kg.

Slaughtering pigs at 60-70 kg may be more economical than at 90 kg followed in some western countries (Kumar et al., 1976).

For the indigenous pigs slaughter at about 45 to 50 kg was recommended (AICRP on Pigs, IVRI, 1993).

On attainment of slaughter weight, finisher pigs should be fed on restricted diet or low energy diet, so that the intake is economically controlled within the required limit and pigs are not obese due to overfeeding.

Table A12. Ingredient and nutrient composition of finisher pig ration (60kg and above)

Ingredient composition (%)	1	2	3
Maize	48.3	55	51
Maize gluten meal	0	2	0
Soybean meal	3.2	2	3.2
Rice kunda	8	8	8
DORB	15	15	15
Rice polish	7.4	7.4	5
Fishmeal	4.5	4.5	4.5
Mustard cake	5	5	5
Pea waste	7.5	0	7.5
Limestone powder	0.8	0.8	0.8
Salt	0.3	0.3	0.3
Lysine	0.03	0.03	0.03
Total	100	100	100
Nutrient composition (kcal/kg or %)			
ME	2710	2740	2740
CP	14.1	14.1	14.0
lysine	0.54	0.50	0.54
Methionine	0.28	0.29	0.28
Calcium	0.66	0.65	0.66
Phosphorus, total	0.79	0.75	0.77

Feeding of Pregnant Sows

- Feeding schedules recommended for finisher pigs may be followed for breeding sows with higher level of vitamins.
- Feeding of pregnant sows and gilts should match their nutrient requirements.
- Feed offered needs to be restricted to 2 to 2.5 kg per day, because higher quantity of feeding may lead to embryonic mortality.
- Recommended 2.0 kg of grower/finisher ration (containing 16% CP, 3,000 kcal DE/kg diet, 0.7% lysine) for 15 days for **flushing of** breedable gilts or sows before mating followed by 1.5 kg till farrowing.
- On the day of farrowing, 250 g of wheat bran could be offered for proper lactation.
- Thereafter, for the next 3 days increasing quantities of the above recommended ration could be offered in such a way that by 4th day sow could get at least 2.0 kg of that feed.
- From 5th day onwards sows should be fed to appetite by offering the daily quota of feed twice daily.

➤ From 5th day onwards sows should be fed to appetite by offering the daily quota of feed twice daily.

➤ The interval between two feedings should be 8 hours. Such feeding is continued till weaning of the piglets.



➤ Thereafter, sows should again be fed 1.5 kg of feed daily till the breeding season.

➤ Good quality succulent fodder (berseem, lucern, etc.) at the rate of 5-6 kg per pig may be offered along with concentrate mixture.

Feeding of Lactating sow

- **Should be offered additional feed for early recovery of the body condition (body weight loss) and for milk production.**
- **For a lactating Gilts 2.0 kg of meal with 0.2 kg meal per piglet in the litter may be sufficient to meet the nutrient requirements(Ranjhan, 1981).**
- **For a lactating sow 3.5 kg of meal with 0.2 kg meal per piglet in the litter may be sufficient to meet the nutrient requirements(Ranjhan, 1981).**

Table 24. Dietary nutrient requirements (as fed-basis) of crossbred (Landrace X desi) pregnant gilts

Days of Gestation	0 to 75	75 to 111/114
Body weight (kg)	78.00 to 112.3	120.5 to 130.6
Av Weight (kg)	94.3	126.3
Av Daily Feed Intake (kg)	2.20	2.50
Feed : Gain	4.80	5.20
DE kcal/kg	3,440	3,420
DE MJ/kg	14.40	14.30
ME Kcal/kg	3,300	3,280
ME MJ/kg	13.84	13.74
CP (%)	18.84	18.92
Lysine (%)	0.80	0.83
Methionine (%)	0.65	0.70
Methionine +Cysteine (%)	0.99	0.99
Cysteine (%)	0.34	0.35
Threonine (%)	0.70	0.72
Tryptophan (%)	0.21	0.22

Source: Paul *et al.* (2007), NRC (1998), ARC (1981).

Table 25. Dietary nutrient requirements (as fed-basis) of cross-bred lactating sow

	Days of lactation					
	0 to 21			21 to 56		
Body weight (kg)	120 to 112 (Mean 115.6)			112 to 99 (Mean 105.9)		
Av daily feed intake (kg/d)	3.80	4.30	4.800	3.80	4.30	4.80
DE (kcal/kg diet)	3,400	3,000	2,700	3,400	3,000	2,700
DE (MJ/kg diet)	14.20	12.50	11.30	14.20	12.50	11.30
ME (kcal/kg diet)	3,264	2,880	2,592	3,264	2,880	2,592
ME (kJ/kg diet)	13.70	12.05	10.80	13.70	12.05	10.80
CP (%)	21.80	19.20	17.30	21.10	18.60	16.80
Lysine (%)	1.10	0.97	0.87	1.04	0.92	0.82
Methionine (%)	0.57	0.50	0.45	0.53	0.48	0.43
Methionine +Cysteine (%)	0.78	0.69	0.62	0.78	0.69	0.62
Threonine (%)	0.74	0.65	0.59	0.71	0.63	0.57
Tryptophan (%)	0.23	0.20	0.18	0.22	0.19	0.17

Source: Paul *et al.* (2007), NRC (1998), ARC (1981).

Feeding of Boars

- Breeding boars may be fed on finisher diets.
 - However, the amount of feed offered may be restricted to 2.5 kg/head/day (Ranjhan, 1981).
- +
- Good quality succulent fodder (berseem, lucern, etc.) at the rate of 5-6 kg per boar may be offered along with concentrate mixture.
 - Overfeeding of boars must be avoided.
 - AICRP on Pigs (IVRI, 1986) recommended 1.5 to 1.8 kg of grower or finisher ration (containing 16% CP, 3,000 kcal DE/kg diet, 0.7% lysine) for breeding boars depending upon the condition of boars.

Nutrient Requirement of Pigs

NRC 1998

	Body Weight (kg)					
	3-5	5-10	10-20	20-50	50-80	80-120
Average weight in range (kg)	4	7.5	15	35	65	100
DE content of diet (kcal/kg)	3,400	3,400	3,400	3,400	3,400	3,400
ME content of diet (kcal/kg) ^b	3,265	3,265	3,265	3,265	3,265	3,265
Estimated DE intake (kcal/day)	855	1,690	3,400	6,305	8,760	10,450
Estimated ME intake (kcal/day) ^b	820	1,620	3,265	6,050	8,410	10,030
Estimated feed intake (g/day)	250	500	1,000	1,855	2,575	3,075
Crude protein (%) ^c	26.0	23.7	20.9	18.0	15.5	13.2

TABLE 2 REQUIREMENTS FOR PIG FEEDS TO BE
(Clause 3.4)

SL No.	CHARACTERISTIC	REQUIREMENT		
		Pig Starter/ Creep Feed	Pig Growth Meal	Pig Finish- ing/ Breed- ing Meal
(1)	(2)	(3)	(4)	(5)
	i) Calcium (as Ca), per- cent by mass, <i>Min</i>	0·6	0·6	0·6
	ii) Available phosphorus, percent by mass, <i>Min</i>	0·6	0·4	0·5
	iii) Iron (as Fe), mg/kg, <i>Min</i>	100	90	80
	iv) Copper, mg/kg, <i>Min</i>	8	6	6
	v) Manganese, mg/kg, <i>Min</i>	30	30	20
	vi) Zinc, mg/kg, <i>Min</i>	50	50	50
	vii) Common salt (as NaCl), percent by mass, <i>Max</i>	0·5	0·5	0·5

(1)	(2)	Creep Feed	Meal	ing/ Breeding Meal
(1)	(2)	(3)	(4)	(5)
i) Moisture content, percent by mass, <i>Max</i>		11·0	11·0	11·0
ii) Crude protein ($N_2 \times 6.25$), percent by mass, <i>Min</i>		20·0	18·0	16·0
iii) Crude fat or ether extract, percent by mass, <i>Min</i>		2·0	2·0	2·0
iv) Crude fibre, percent by mass, <i>Max</i>		5·0	6·0	8·0
v) Total ash, percent by mass, <i>Max</i>		8·0	8·0	8·0
vi) Acid insoluble ash, percent by mass, <i>Max</i>		4·0	4·0	4·0
vii) Metabolizable energy (k cal/kg), <i>Min</i>		3 360	3 170	3 170