FORMULATION OF RATION FOR SWINE

1. Fix/ leave slack space: 2 kg

For nutritive (mineral mixture, salt) and non-nutritive feed additives, added at later stage while balancing the ration.

- **2. Fix level of cereal by-products i.e. DORB :** 07 kg, 20 kg and 25 kg for pig starter, pig growth meal and pig finisher feeds, respectively.
- **3. Fix level of animal protein source i.e. Fish meal:** 10 kg, 7 kg and 5 kg for Pig starter, Grower and Finisher meals, respectively.
- 4. Calculate proportion of Energy feed and Vegetable protein through Pearson square method
- **5. Balance ME content:** Same as you have done in case of poultry
- **6. Balance Available phosphorus:** Same as you have done in case of poultry
- 7. Balance Calcium Content: Same as you have done in case of poultry
- **8.** Check Crude fiber level: calculate CF contributed by different feed ingredients, total it and compare with recommended Max. CF levels given in the feeing standard, it should not be higher than that level. This can be maintained by using good quality DORB (CF, Max. 12 %) and GNC (CF, Max. 11 %), or even then if, CF level is slightly higher, supplementation of fiber digesting enzyme preparations may be recommended.
- **9.** Finally total, quantities of feed ingredients and each nutrients, it should match with the recommended nutrient levels given in the feeding standards.
- 10 .Vit AB_2D_3 and B-complex are necessarily added @ 25 g/100 kg each.

Requirements of Pig Feeds [IS 7472: 1986(Clause 3.3)] BIS 1986

Nutrients	Pig starter/	Pig growth meal	Pig finishing/
	Creep feed		Breeding meal
CP (%)	20 (17.80)	18 (16.00)	16 (14.20)
ME (Kcal/kg)	3360 (2990)	3170 (2821)	3170 (2821)
Ca (%)	0.6 (0.53)	0.6 (0.53)	0.6 (0.53)
Available P (%)	0.6 (0.53)	0.4 (0.36)	0.5 (0.45)
CF (%)	5.0 (4.45)	6.0 (5.34)	8.0 (7.12)

Note: All values are based on moisture free basis (100 % DMB), while values in Parenthesis are converted to 89 % DMB (as fed basis)

Chemical composition of feed ingredients

Feed ingredient/	DM	CP	EE	CF	ME	Ca	P
supplement	%	%	%	%	Kcal/kg	%	%
Maize	89	9.0	3.8	2.20	3340	0.02	0.28
GNC (Expeller)	90	40	7.3	13.0	2600	0.16	0.56
DORB	91	13.5	0.6	12.0-	2200	0.07	1.50
				14.0			
Fish meal	91	42	5.0	1.00	2400	3.73	2.43

Problem 1: Formulate 100 kg pig starter ration as per BIS (1986) using Maize, DORB, GNC (expeller), Fish meal, Mineral mixture, Salt, Vit. AB₂D3 and B-complex.

Step 1: leave slack space:	02 kg
Step 2: Fix level of cereal by-products i.e. DORB	07 kg
Step 3: Fix level of fish meal	10 kg

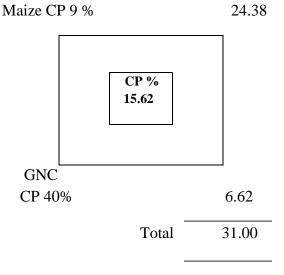
Total Quantity fixed 19 kg

Now calculate CP supply from above quantity $\frac{\overline{CP (kg)}}{Slack \ space \ 02 \ kg \dots \dots \dots \dots 0.00}$ $Fish \ meal \ 10 \ kg = 4.20$ $DORB \ 07 \ kg - 13.50/100x07 = \underline{0.95}$

- 13.30/100x07 - <u>0.93</u> 5.15

CP required to be supplemented through 81 kg [(100 (qty. to be prepared) - 19 kg (qty. already fixed)] is 12.65 kg [17.8 (required CP) - 5.15 kg (CP supplied by qty. of ingredients fixed)] Therefore, CP desired in percentage will be 12.65/81x100 = 15.62 %.

Step 4: Calculate proportion of Energy feed and Vegetable protein through Pearson square method



Proportion of maize in the remaining quantity (81 kg) = 24.38/31x81 = 63.70 kgProportion of SBM in the remaining quantity (81 kg) = 06.62/31x81 = 17.30 kg

Ingredients	Qty	CP	ME	Av.	Ca	CF
	(kg)	%	Kcal/kg	P %	%	%
NR, Pig starter (BIS 1986)	-	17.80	2990	0.530	0.530	4.45
DORB (CF 12 %)	07.00	0.95	154	0.105	0.005	0.84
Fish meal	10.00	4.20	240	0.243	0.373	0.10
Maize	63.70	5.73	2178	0.178	0.013	1.40
GNC (expeller)	17.30	6.92	450	0.097	0.028	2.25
Av.P. and Ca thr. ingredients				0.357	0.420	
MM + salt + other additives	02.00			MM *	MM*	
Total	100.0	17.80	3022	Fulfilled	Fulfilled	4.59

Note:1. Available $P = 0.105 + 0.178 + 0.097 = 0.380 \times 0.3 = 0.114 (30 \% of 0.380) + 0.243 = 0.357$

2. MM* (mineral mixture normally contains Ca 20-22 % and P, 9-12 %, in addition to this it also contains essential trace minerals, therefore addition of 2 % will take care of Ca & Av. P and TM); Vit. AB2D3 and B- complex are added @ 25 g/100 kg.

Note: Similarly, by following above steps, you can formulate rations for Growing and Finisher pigs. Final results are given below:-

Ingredients	Qty	CP	ME	Av.	Ca	CF
	(kg)	%	Kcal/kg	P %	%	%
NR, Pig grower (BIS 1986)	-	16.00	2831	0.360	0.530	5.34
DORB (CF 12 %)	20.00	02.70	440	0.300	0.014	2.40
Fish meal	07.00	02.94	168	0.170	0.261	0.07
Maize	58.29	05.25	1947	0.163	0.015	1.28
GNC (expeller)	12.71	05.08	330	0.071	0.020	1.65
Av. P & Ca thr. ingredients			1	0.330	0.310	
MM + salt + other additives	02.00			MM *	MM*	
Total	100.0	15.97	2885	Fulfilled	Fulfilled	5.40

Note 1: Available P = $0.300+0.163+0.071=0.534 \times 0.3 = 0.160 (30 \% of 0.534) + 0.170 = 0.330$ **2. MM*** (mineral mixture normally contains Ca 20-22 % and P, 9-12 %, in addition to this it also contains essential trace minerals, therefore addition of 2 % will take care of Ca & Av. P and TM); Vit. AB2D3 and B- complex are added @ 25 g/100 kg.

Ingredients	Qty	CP	ME	Av.	Ca	CF
	(kg)	%	Kcal/kg	P %	%	%
NR, Pig finisher (BIS 1986)	-	14.20	2821	0.450	0.530	7.12
DORB (CF 12 %)	25.00	03.38	550	0.375	0.018	3.00
Fish meal	05.00	02.10	120	0.122	0.187	0.05
Maize	59.50	05.36	1987	0.167	0.012	1.31
GNC (expeller)	08.50	03.40	221	0.048	0.014	1.44
Av. P & Ca thr. ingredients				0.299	0.231	
MM + salt + other additives	02.00			MM *	MM*	
Total	100.0	14.24	2878	Fulfilled	Fulfilled	5.80

Note 1: Available $P = 0.375 + 0.167 + 0.048 = 0.590 \times 0.3 = 0.177 (30 \% of 0.590) + 0.122 = 0.299$ 2. MM* (mineral mixture normally contains Ca 20-22 % and P, 9-12 %, in addition to this it also contains essential trace minerals, therefore addition of 2 % will take care of Ca & Av. P and TM); Vit. AB2D3 and B- complex are added @ 25 g/100 kg.