**Animal Nutrition**

**Chapter: 2.6**

**Chapter title: Non-ruminant Nutrition**

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**ICAR-IVRI.**

**A. Refresher points:**

* **Lysine and Threonine are the only truly essential amino acids among the 11 Essential amino acids in poultry.**
* **In poultry requirement of amino acids are determined by standardised ileal digestibility (SID) Method.**
* **Threonine is the least toxic Essential amino acid.**
* **Methionine is the most toxic Essential amino acid.**
* **Serine is the only toxic Non- Essential amino acid.**
* **Ideal protein concept given by mitchel.**

**The enzymes present in the digestive secretion of the fowl are similar to those of mammals although lactase has not been detected.**

* **In poultry crop wall does not have mucus secreting glands.**
* **The gizzard wall produces koilin, a protein - polysaccharide complex similar in its amino acid composition to keratin , which hardens in the presence of HCL.**
* **Crop is not essential for bird's life, but presence of it gives more flexibility and more activity.**
* **Lactobacili predominates adhering to the crop wall.**
* **In the chick embryo , pancreatic enzymes are present in the small intestine before hatching**
* **The point of hatching activities of trypsin, amylase and lipase increase rapidly as the cheek ages and are stimulated by the consumption of food.**

**Where the small intestine joints The large intestine there are two long blind sacs known as the " ceaca ".These function as absorptive organs but are not essential to the fowl. Since surgical removal causes no harmful effects.**

* **The ceaca empty by peristaltic contractions into the relatively short colon, whose main function is the transport of digesta to its termination at the cloaca.**
* **In birds esophageal epithelium is thick and cornfield Because of the whole grain feeding.**
* **Birds can not taste and smell, but they pick a feed by touch, feel and appearance.**
* **Birds have touch receptors on a beak.**
* **In poultry, the goblet cells are present instead of the bruner's gland which is present in mammals.**
* **Parrot, piegon, dove, ostrich, emu and humming bird do not have gall bladder.**
* **Ratites family do not have crop.**

**In duodenom, thick mucus is present because of the acids content is come out from the ventriculous.**

* **In herbivorus and granivorous birds have highly developed microbial fermentation in the ceaca.**
* **Bursa of fabricious is a diverticulum of cloaca which is asecondary lymphoid organ present in birds.**
* **Similar to a crop ducks have a bill for tanking up a feed.**
* **At the time of hatching a colour of liver is yellow then after two weeks it becomes dark red.**
* **In birds , two type of enzymes degradation are occurred 1) Autoenzymatic and 2) Alloenzymatic.**
* **In Auto-enzymatic degradegradation action of enzymes are bird origin which is present in proventriculous, pancreas and small intestine..**
* **In Allo-enzymatic degradation action of enzymes are microbial origin Which is mainly present in the crop, ceaca and**

**Rectum.**

* **In birds retrograde movement of the digestive flora occurs.**

**Example = Small intestine to Ventriculous to Proventericulous.**

* **In cage system mainly four disadvantages are**
* **1.) Cage layer fatigue**
* **2.) Fatty liver**
* **3.) Flies disturbance**
* **4.) Increased obnoxious gases like ammonia..**
* **In mammals, lipid is transferred by chylomicron Which is mainly going into the lymphatic system. But in poultry , the lipid is transported by portomichron directly into the portal blood..**
* **In poultry, expression of nutrition requirement is determined by**
* **1.) Intake basis**

**A.) Gram per day**

**B.) Gram per Kg body weight**

**2.) Concentration basis**

**A.) Concentration of the diet.**

**B.) Concentration of gram per Kg diet**

* **Nutrients requirement of birds is determined by metabolism**

**1.)Energy per day**

**2.) Milligrams per day**

* **Major nutrients are determined by metabolisable basis.**
* **Micronutrients are determined by Bio-availability basis.**
* **Nutrient requirements in birds are not static but it's dynamic.**
* **In birds for protein determination use of nitrogen corrected ME is important in low amino acid balance.**
* **Daily ME requirement is determined by amount of energy expenditure through the oxidation of nutrients plus energy retained by tissue. These are tissue which is used for egg production, feather and growth purpose.**

**Heat increment in Birds is calculated by two methods**

* **First one direct calorimetry and indirect calorimetry.**
* **Use of nitrogen corrected metabolism. Energy is important in low amino acid balance.**
* **Nitrogen corrected metabolism energy is value are corrected by zero nitrogen balance by deducting for each gram of nitrogen retained And by adding for each gram of nitrogen ketabolize in the body..**
* **True metabolism energy is always greater than apparent metabolic energy.**
* **Lysine is essential for immune system because if lysine content in body is decrease**

**It also depress the immune function.**

* **Threonine is also essential for humoral response.**
* **Methionine is also essential for cellular immunity.**

**Branched-chain amino acid like valine, leucine and isolucine are also affect both humoral and cell mediated immune-response**

**Branched-chain amino acid like valine,leucine and isolucine are also useful in antibody production.**

* **Glycine is essential for synthetic of uric acid.**
* **Glycine and ornithine both are used in detoxification of aromatic compound just like benzoic acid.**
* **Limiting amino acid is ratio of available amino acid in diet and requirement of bird.**
* **Most limiting amino acid in indian condition is lysine.**
* **Lysine is also needed for carcass composition and breast muscle quality and growth..**
* **Lysine increase in muscle It also increase the ph and water holding capacity of muscle..**
* **Blood meal is high in lysine and tryptophan but low in isoleucine.**
* **Corn gluten meal is high in isoleucine, but low in lysine and tryptophan.**

**So we can use both blood meal and corn gluten meal as supplementary diets.**

* **In Methionine toxicity as a antidote we use glycine.**
* **Amino acid interactions.**

**1.) Amino acid Imbalance**

**2.) Amino acid Antagonist effects**

**2.) Amino acid Toxicity**

* **Ratio of Lysine to Arginine is should be 0.9 to 1.5**
* **Toxicity Of Methionine depressing growth.**
* **Increase the sulphur containing amino acids just like Methionine and Cystine are produces Sulfates.**
* **Two moles of acid from each mole of sulphur containing amino acid produces.**
* **Metabolic acidosis occurs which affect poor bone mineralisation,Thin egg shell and poor growth in birds.**
* **Birds requirement for Arginine, Methionine and Glycine more than mammals.**

**Pig nutrition**

* **Saliva is 99% water supply and only 1% mucin, inorganic salt and contains enzymes alpha-amylase and complex lysozyme.**
* **Pigs do not have alpha-amylase as strong as humans.**
* **Alpha-amylase Do not attack the alpha1->6**

**Amylopectin bond.**

* **N-acetyl glucosaminidic linkage is broken by lysozyme.**
* **Pigs have stomach capacity of eight liter**
* **In pig's stomach's Oesophageal region doesn't have any glands..**
* **In Oesophageal region, mainly the active microbial population is present and it's contains mostly are Lactobacilli and streptococci.**
* **The pig's stomach is rarely completely empty between meals and the slow Mixing conditions are conducive to microbial Fermentation at the Oesophageal region and gastric digestion at the pyloric end.**

**Pepsin preferently attack those peptied bonds adjacent to aromatic amino acids.**

* **The epithilal surface of the pig's stomach is susceptible to alteration related to the degree of processing of cereals in the diet.**
* **Trypsin has very specific action Only on peptide linkage involved in carboxel groups just like lysine and Arginine.**
* **Chymotrypsin acts on specifically towards peptide bond of carboxylic group of tyrosine tryptophan phenylalanine and leucine.**
* **Carboxypeptidase which attack the peptide bond of end of the chain, splitting off the terminal amino acid, which has free carboxy group.**
* **In large intestine mostly mucus glands are present.. No enzymes secreting glands.**
* **In pigs early weaning mixture usually included a high proportion of dried milk products which containing lactose because if we give cereals it incompletely digested in the small intestine and passes to the large intestine, where it is fermented by bacteria, causing diarrhea.**

**For carbohydrates apparent digestibility is a true digestibility because no or very less endogenous loss of carbohydrates.**

* **ME = 96%\* DE**
* **Gas production loss is only 0.5 to 1% of GE.**
* **For maintenance = 110 Kcal DE per metabolic body weight per day.**
* **CP = 8.97 gram per metabolic body weight per day.**
* **For gestation= 100 Kcal per metabolic body weight per day.**
* **For lactation = 110 Kcal per metabolic body weight per day.**
* **Maximum inclusion level of fish meal in feed is 10%.**
* **Maximum inclusion level of oil or fat is 5%.**
* **For prevention of colic you have to take precautions**
* **1. Feed regularly and avoid sudden change in diet**
* **2.Avoid overfeeding**
* **3. If quantity of concentrate increase, it increases gradually**
* **4. Provide good quality hay**
* **5.Colic can also cause laminitis by direct damage to the intestinal wall, such as with a torsion (twist of the intestine). The wall will die in that area and allow-bacteria to get into the blood to cause laminitis**
* **6. After foaling see that mares completely expel their afterbirths, Retained afterbirths may cause uterine infection followed by laminitis.**

**MCQ**

1. **What are the first 3 limiting amino acid in pig diet?**
2. **Lysine, Methionine, Threonine**
3. **Arginine , Lysine, Methionine**
4. **Methionine , Arginine , Lysine**
5. **Methionine, Lysine, Valine**
6. **Which is not the feeding system of pig?**
7. **Scavenging system**
8. **Semi- intensive system**
9. **Intensive system**
10. **Extensive system**
11. **Total volatile fatty acid gives how many percentage of energy for maintenance in pig?**
12. **25 to 30%**
13. **20 to 25%**
14. **15 to 20%**
15. **30 to35%**
16. **In piglets which enzyme is most works?**
17. **Lactase**
18. **Amylase**
19. **Galactase**
20. **None of the above**
21. **A kind of arrangement which avoids the risk of injury to piglets by crushing by sow?**
22. **Separater**
23. **Creep**
24. **Hing**
25. **None**
26. **In lactic acidosis lactatic acid bacteria which produce high level of lactate and which volatile fatty acid?**
27. **isovaleric acid**
28. **butyric acid**
29. **acetic acid**
30. **propionic acid**
31. **Founder is a inflammation of ?**
32. **Lamina**
33. **Stomach**
34. **Hoof**
35. **None of the above**
36. **In equine hind gut bacteria produces which enzymes to convert free tryptophan to tryptamins?**

**A. Decarboxylation**

**B. transcarboxylation**

**C Transamination**

**D. D. None Of The Above**

1. **A brittle and cracked hoof may due to deficiency of?**
2. **Sulfur**
3. **Biotin**
4. **Methionine**
5. **All of the above**
6. **Colic refers to ?**
7. **Abdominal pain**
8. **Nervous disorder**
9. **Disease of stomach**
10. **None of the above**

1. **Colic may be due to?**
2. **Parasite**
3. **Excessive**
4. **Gas or sand**
5. **All of the above**

**12. Why creep feed is necessary?**

1. **Faster growth**
2. **Reproductive health**
3. **Lactation**
4. **None of the above**
5. **Lactation tetany in mare,Which is true?**
6. **Localizes and spasmodic contractions**
7. **Low calcium**
8. **Clostriium tetany cause**
9. **Low Magnesium**
10. **Vit E and selenium deficiency leads to?**
11. **Monday morning sickness**
12. **Tying up**
13. **Azoturia**
14. **All of the above**
15. **Quiding is due to sharp molar tooth?**
16. **High fibrous diet**
17. **Sharp molar tooth**
18. **Due to gastro-intestinal reflex**
19. **All of the above**
20. **Osteochondrosis In foals ?**
21. **Copper deficiency**
22. **Iron deficiency**
23. **Magnesium deficiency**
24. **All of the above**
25. **Heaves true about?**
26. **Pulmonary emphysema**
27. **Loss of elasticity in lungs**
28. **Dusty moulds**
29. **Dusty bedding**
30. **Prussic acid poisoning due to**
31. **Glycoside**
32. **Mimosine**
33. **Organophosphate**
34. **None of the above**

1. **\_\_\_\_\_\_\_is a eating of faecal like pellets produced in which organ?**
2. **Caecum**
3. **Rectum**
4. **Colon**
5. **All of the above**
6. **Rabbits need how much percentage of crude fibre in diet for intestinal motility and minimise intestinal disease?**
7. **12 to 15%**
8. **8 to 10%**
9. **16 to 20%**
10. **20 to 25%**
11. **Enterotoxaemia in rabbit, mostly caused by?**
12. **Clostridium Spiroforme**
13. **Bacillus piliformis**
14. **Streptococcus lactis**
15. **All of the above**
16. **The most appropriate pH of acidified drinking water was found to be how much base on maximum effect on every daily gain final weight**
17. **4.3**
18. **7.0**
19. **6.7**
20. **8.2**
21. **FOS effects on?**
22. **Increase the transfer of blood urea nitrogen to the caecum**
23. **Decrease the transfer of blood urea nitrogen to the caecum**
24. **It decreases urinary excresion and increase the bacterial synthesis**
25. **All of the above**
26. **Decrease crude fiber in rabbits, diet leads to**
27. **Chewing of hair**
28. **Decreased body weight**
29. **Low meat quality**
30. **All of the above**
31. **Sheep breeding research station sandynallah produced cross bread rabbits using high yielding?**
32. **Nzw cross nilgiri**
33. **Angora cross nilgiri**
34. **Angora cross non descripted breed**
35. **None of the above**
36. **In kids from 3 to 6 days Which disease more prevelant?**
37. **Milk enterotoxaemia**
38. **Scour**
39. **Milk toxicity**
40. **Omphalitis**
41. **If we feed high psyllium mucilloid and guar gum to the rabbits, what happen?**
42. **Caecal impaction**
43. **Excessive gas production**
44. **Intestine inflammation**
45. **None of the above**
46. **Bacillus piliformis causes?**
47. **Tyzzer s disease**
48. **Kyzzer s disease**
49. **Both**
50. **None**
51. **In Ketosis condition what happens?**
52. **Hypoglycemia**
53. **Heavy lactation**
54. **All the above**
55. **Low feed intake**
56. **Trichobezoars condition can be treated by addition of?**
57. **Bromelin**
58. **Papain**
59. **Figicin**
60. **All of the above**
61. **Which gland is responsible for the coat color?**
62. **Pineal gland**
63. **Hypothalamus gland**
64. **Pituitary gland**
65. **None of the above**
66. **Wool production increase in which season?**
67. **Winter**
68. **Spring**
69. **Autumn**
70. **All of the above**
71. **Which amino acid is a must for a healthy wool production?**
72. **Cysteine**
73. **Arginine**
74. **Threonine**
75. **All of the above**
76. **Pheo-melanin gives which color?**

**Red ,Yellow, Brown**

1. **Only 1 % 2**
2. **Only 1 % 3**
3. **Only 3 % 2**
4. **None of the above**
5. **Which co factor is needed for tyrosinase Enzyme in wool production?**

**1. Copper**

**2. Iron**

**3. Zinc**

1. **Only 1 % 3**
2. **Only 1 % 2**
3. **Only 3 % 2**
4. **None of the above**
5. **Fish containing which chemical compound is affect a wool production?**
6. **Trimethyl amine oxide formaldehyde**
7. **Thiaminase**
8. **None of the above**
9. **Anti-vitamine-B**
10. **Which vitamin is necessary for the normal hair pigmentation?**
11. **Biotin**
12. **Riboflavin**
13. **Thiamine**
14. **Pyridoxine**
15. **Decrease in copper in diet gives which color of fur?**
16. **Grey**
17. **Brown**
18. **Spotted white**
19. **Reddish white**
20. **Koilin is a?**
21. **Calcium-polysaccharide complex**
22. **Protein-calcium complex**
23. **A protein polysaccharide complex**
24. **All of the above**
25. **Unlike young pigs, chicks perform well on diets containing uncooked cereals?**
26. **Less utilize**
27. **More utilize**
28. **Similar utilization**
29. **None of the above**
30. **In Geese ligation of the caeca does not alter crude fiber digestibility?**
31. **Affect**
32. **Can’t affect**
33. **Both**
34. **None of the above**
35. **Volatile fatty acids make a large contribution to satisfying the energy requirement of poultry?**
36. **3-4%**
37. **8-12%**
38. **20-25%**
39. **13-17%**
40. **Proteolysis occurs in the?**
41. **Ventriculous**
42. **Proventriculous**
43. **Crop**
44. **None of the above**
45. **Crop wall does not have mucus-secreting glands?**
46. **High in number**
47. **Less in number**
48. **Zero**
49. **None of the above**
50. **In the crop, which enzyme is works?**
51. **Pectinase**
52. **Cellulase**
53. **Amylase**
54. **None of the above**
55. **Microbial activity starts from?**
56. **Ventriculous**
57. **Proventriculous**
58. **Crop**
59. **Mouth**
60. **Who predominate, adhering to the crop wall?**
61. **Streptococcus**
62. **Staphylococcus**
63. **Lactobacillus**
64. **None of the above**
65. **The major products of fermentation are?**

**Lactic acid, Acetic acid, Propionic acid**

1. **Only 1 % 2**
2. **Only 3 % 2**
3. **Only 1 % 3**
4. **All of the above**
5. **Pancreatic juice of fowls contains the same enzymes as the mammalian secretion, and the digestion of proteins, fats and carbohydrates in the small intestine**
6. **Same**
7. **Different**
8. **Little bit same**
9. **More enzymes than mammalian**
10. **Chick embryo, pancreatic enzymes are present in the small intestine before hatching?**
11. **It’s true**
12. **It’s false**
13. **May be**
14. **Depends on the breed**
15. **To save a bird's oesophageal epithelial tissue makes us from mechanical damage which transformation in oesophagus occurred?**
16. **Thick and cornfield**
17. **Thick and mucous secreting**
18. **Thin and keratinized**
19. **Keratinized and columnar**
20. **Among these , which bird does not have a crop?**
21. **Emu**
22. **Ostrich**
23. **Dove**
24. **All**
25. **What is a role of proventriculous?**
26. **Chemical degradation**
27. **Regulation of feed flow**
28. **Reduce particle size**
29. **All**
30. **In poultry among these which secreting glands present**
31. **Bruner's gland**
32. **Goblet cells**
33. **Secreting cells**
34. **None of the above**
35. **Among this which enzymes is present in to the crop?**
36. **Lactase**
37. **Amylase**
38. **Glucosidase**
39. **All of the above**
40. **Alloenzymatic digestion occurs in which part of the GIT?**
41. **Crop**
42. **Ceaca**
43. **Posterior ileum**
44. **All**
45. **Which things favours a microbial fermentation in ceaca?**
46. **Slow passage rate**
47. **High volume**
48. **Both**
49. **No enzymes secreting glandas**
50. **How many percentage of free fatty acid are absorbed directly into the world stream without further metabolism?**
51. **30%**
52. **20%**
53. **Only 5%**
54. **12%**
55. **Lipo-protein in a chicken are called as?**
56. **Porto microns**
57. **Chylomicrons**
58. **Glyceromicrons**
59. **All**
60. **In ostrich the rectum is a major site for fermentation?**
61. **Caecum**
62. **Ventriculous**
63. **Rectum**
64. **Crop**
65. **Microbial fermentation in energy requirement of ostrich may approach fifty percent?**
66. **40%**
67. **17%**
68. **50%**
69. **26%**

1. **What are the major non-essential amino acid present in the Tissue?**
2. **Aspartic acid**
3. **Glutamic acid**
4. **Valine**
5. **All**
6. **Which amino acid is present in 'd' form?**
7. **Methionine**
8. **Lysine**
9. **Ornithine**
10. **None of these**
11. **Broiler chicken requirement of ME is?**
12. **3200**
13. **2700**
14. **3700**
15. **2400**
16. **Maize contains\_\_\_\_\_\_\_\_\_CP%?**
17. **8%**
18. **16%**
19. **20%**
20. **5%**
21. **Limestone is a good source of?**
22. **Calcium**
23. **Phosphorus**
24. **Both**
25. **Magnesium**
26. **In Poultry methionine can be replaced by sulphur?**
27. **Yes**
28. **No**
29. **Some extent**
30. **Depends on the form of supplement**
31. **Ketogenic amino acid is?**
32. **Tyrosine**
33. **Alanine**
34. **Leucine**
35. **Glycine**
36. **Glucogenic and ketogenic amino acid is?**
37. **Lysine**
38. **Arginine**
39. **Valine**
40. **Isoleucine**
41. **Glucogenic amino acid is?**
42. **Tryptophan**
43. **Threonine**
44. **Lysine**
45. **None of the above**
46. **Mostly lysine interactes with?**
47. **Glycine**
48. **Arginine**
49. **Tryptophan**
50. **None of the above**
51. **Leucine interacts with which amino acids?**
52. **Methionine and threonine**
53. **Lysine and glycine**
54. **Isoleucine and valine**
55. **All of the above**
56. **Methionine mostly inhibit which amino acid?**
57. **Threonine**
58. **Lysine**
59. **Histidine**
60. **All of the above**
61. **Which amino acid is increase the arginase activity?**
62. **Histidine**
63. **Lysine**
64. **Leucine**
65. **All**
66. **Which amino acid is increase threonine dehydrase activity?**
67. **Methionine**
68. **Glutamine**
69. **Hydroxy-proline**
70. **Proline**
71. **Mostly amino acids are degraded in which organ?**
72. **Liver**
73. **Muscle**
74. **Intestine**
75. **All**
76. **In muscle mostly which amino acid are degraded?**
77. **Leucine**
78. **Isoleucine**
79. **Valine**
80. **All**
81. **Serine and Glycine can be synthesized from?**
82. **3-phosphoglyceric acid**
83. **Glutamic acid**
84. **Both**
85. **None**
86. **Proline and hydroxyl proline can be synthesized from?**
87. **Glutamic acid**
88. **Alanine**
89. **Aspartic acid**
90. **All**
91. **Mostly 1st limiting amino acid in diet is?**
92. **Lysine**
93. **Methioine**
94. **Arginine**
95. **Valine**
96. **Which is mycotoxin binder ?**
97. **Clay**
98. **FOS**
99. **Active carbon**
100. **All**
101. **Another method is the degradation of mycotoxins into non-toxic metabolites by using indigestable complex carbonhydrates**
102. **Bacterial cell walls**
103. **Yeast cell walls**
104. **Both**
105. **None**
106. **Which is the synthetic mycotoxin binder?**
107. **Cholestralamine**
108. **Polyvinyl chloride**
109. **None**
110. **Which is the synthetic mycotoxin binder?**
111. **PVPP**
112. **Bentonite**
113. **Both**
114. **None**
115. **Conditionally essential amino acids in pigs are?**

**Tyrosine, Proline, Arginine Cytine**

1. **Only 1&2**
2. **Only 1&3**
3. **Only 4&2**
4. **All**

**102. Which is byproduct if ethanol industry commonly used in pig diet?**

1. **DDGC**
2. **WHEAT BRAN**
3. **HOPS**
4. **DORB**

**108. Which of the following is a component of coenzyme A?**

1. **Retinol**
2. **Riboflavin**
3. **Pantothenic acid**
4. **Pyridoxine**

**109. Enzyme carbonic anhydrase has which element?**

1. **Iron**
2. **Zinc**
3. **Copper**
4. **Cobalt**

**110. High concentration of zinc in pig diet causes defeciency of?**

1. **Magnesium**
2. **Iron**
3. **Copper**
4. **Manganese**

**111. High tryptophan in diet increases the pork quality ?**

1. **Yes**
2. **No**
3. **Some extent**
4. **Depends on breed**

**112. For increase the intra muscular fat content of pork?**

1. **Reduce fat content in the diet**
2. **Reduce cp content in the diet**
3. **Reduce cf content in the diet**
4. **Reduce minerals content in the diet**

**113. To reduced LM drip losses which supplements of mineral is used?**

1. **Manganese**
2. **Magnesium**
3. **Iron**
4. **Calcium**

**114. Pre-slaughter feed withdrawl leads to?**

1. **Reduced the incidence of PSE pork**
2. **Increased the incidence of PSE pork**
3. **High affinity of meat**
4. **None**

**115. Supplementation of creatinine monohydrate causes?**

1. **Elevated initial and ultimate ph of pork**
2. **Decreased initial and ultimate ph of pork**
3. **Light coloured meat**
4. **None**

**116. Iodine value of pork is \_\_\_\_\_ than the soya bean oil?**

1. **Higher**
2. **Lower**
3. **Equal**
4. **None**

**117. Supplementing conjugated linolenic acid increase the propotion of which type of amino acids in meat?**

1. **Satturated fatty acid**
2. **Un satturated fatty acid**
3. **Only short chain fatty acid**
4. **Only long chain fatty acid**

**118. Which vitamin protects cell membrane integrity?**

1. **E**
2. **B**
3. **C**
4. **A**

**119. Lower thiobarbituric acid reactive substances (TBARS) value of pork?**

1. **Calcium**
2. **Manganese.**
3. **Magnesium**
4. **Zinc**

**120. Excess molybdenum in the diet causes which mineral deficiency?**

1. **Copper**
2. **Calcium**
3. **Lead**
4. **Cobalt**

**121. Which vitamin deficiency leads to exudates around eyes?**

1. **Biotin.**
2. **Pantothenic acid**
3. **Riboflavin**
4. **Pyridoxine**

**122. Goose stepping is due to deficiency of?**

1. **Pantothenic acid**
2. **Pyridoxine**
3. **Niacinamide**
4. **Folacin**

**123. Which of the following amino acid yield acetyl coa during catabolism?**

1. **Glucogenic**
2. **Ketogenic..**
3. **Essential**
4. **None**

**124. Which amino acid supplementation leads to lowering strees effect?**

1. **Tryptophan..**
2. **Lysine**
3. **Leucine**
4. **Taurine**

**125. Water content in piglets at birth time ?**

1. **80%.**
2. **50%**
3. **60%**
4. **None**

**126. With increases age the body composition of pigs with reference to fat content?**

1. **Unchanged**
2. **Increase.**
3. **Decrease**
4. **None**

**127. The relative capacity of small intestine in pigs \_\_\_\_\_\_\_\_% of GIT.**

1. **33.5**
2. **18.5**
3. **20.5**
4. **27.5**

**128. The oxidation of 1 gm of lipid,protein and carbohydrate gives you how many % of water?**

1. **1.02,0.4,0.6**
2. **0.4,0.5.1.1**
3. **0.4,0.7,0.9**
4. **1.05,0.5,0.8**

**129. Grower chick‘s growth is depressed when free fatty acids in a diet are more than?**

1. **11%**
2. **15%**
3. **20%.**
4. **22%**

**130. Most abundant organic compound in a world?**

1. **Cellulose**
2. **Pectin**
3. **Chitin**
4. **Peptidoglycan**

**131. What is classical effect if NSP’s seen in in rye?**

1. **Poor growth**
2. **Chelate of mineral**
3. **Sticky diarrhea**
4. **All**

**132. B-glucan NSP is present in feed?**

1. **Soyabean**
2. **Barley**
3. **Alfalfa**
4. **None**

**133. Arabinoxylans present in which feed?**

1. **Barley**
2. **Oat**
3. **Wheat**
4. **All**

**134. Raffinose group of oligosaccharides present in?**

1. **Soyabean**
2. **Wheat**
3. **Barley**
4. **All**

**135. Absence of which enzyme chickens, oligosaccharides remain undigested?**

1. **Alpha-galactosidases**
2. **Beta-glucosidases**
3. **Both**
4. **None**

**136. For growing pigs metabolic weight?**

1. **0.70**
2. **0.60**
3. **0.75**
4. **0.80**

**137. NE maintenance for poultry?**

1. **83**
2. **86**
3. **90**
4. **84**

**138. Level of fat above\_\_\_\_ in poultry diets is very toxic?**

1. **10..**
2. **12**
3. **15**
4. **5**

**139. If temperature is high ,so?**

1. **We offer high energy diet**
2. **We offer less energy diet**
3. **We offer watery diet**
4. **None**

**140. If we feed high energy diet,so**

1. **We also give high protein diet**
2. **We also give less protein diet**
3. **Depends on breed**
4. **None**

**141. Restricted feeding is done mainly in?**

1. **Grower**
2. **Broiler breeder**
3. **Broiler**
4. **All**

**142. Pellet quality is assessed by**

1. **Pellet durability index**
2. **Pellet binding index**
3. **Pellet stickiness index**
4. **All**

**143. Pellet durability index is high in?**

1. **Soya**
2. **Maize**
3. **Rye**
4. **Wheat..**

**144. For increased feed intake of lower feed energy diet?**

1. **Pellet**
2. **Crumble**
3. **Whole grain**
4. **Mash**

**145. Which protein in wheat are give dough making characteristics?**

1. **Gluten**
2. **Zein**
3. **Glutelin**
4. **None**

**146. Vitamin B12 synthesized by?**

1. **Only mammals**
2. **Plants**
3. **Microorganisms**
4. **All**

**147. Vitamin content can be varied by?**

1. **Soil type**
2. **Crop location**
3. **Storage condition**
4. **All**

**148. Natural biotin in corn often available \_\_\_\_\_\_\_\_to young chick.**

1. **60.**
2. **70**
3. **30**
4. **55**

**149. Vitamin B12 produced by?**

1. **Metabolic process**
2. **Fermentation process.**
3. **Both**
4. **None**

**150. Vitamin K is expressed in which unit?**

1. **IU/Kg**
2. **Mg/Kg**
3. **Both**
4. **None**

**151. Biological natural antioxidant is?**

1. **Vit E**
2. **Selenium**
3. **Ethoxyquine**
4. **All**

**152. Which damages more vitamin premix?**

1. **Iron**
2. **Zinc**
3. **Cobalt**
4. **Copper**

**153. Which vitamin is needed for conversion of homocystine to methionine?**

1. **Folic acid.**
2. **Vit H**
3. **Vit B2**
4. **All**

**154. Flaxseed contains which anti-vitamin factor?**

1. **1-amino-D-proline**
2. **Floxadin**
3. **Monensin**
4. **All**

**155. When we feed high amount of vit-A effects on vit-E is?**

1. **It also increases**
2. **It also decreases**
3. **Equal level**
4. **Not affected**

**156. Pellets are cut to desired length ,and then gently broken to produce\_\_\_\_\_\_\_\_?**

1. **Crumbles**
2. **Mash**
3. **Crenels**
4. **None**

**157. Percentage of urea used in pig dietis?**

1. **Maximum 5%**
2. **Maximum 10%**
3. **Maximum 8%**
4. **None**

**158. High level of essential fatty acids in broiler \_\_\_\_\_\_\_\_\_\_\_ growth rate.**

1. **Increase**
2. **Decreases**
3. **No effect**
4. **None**

**159. High level of molasses in pellet causing diarrhea because of?**

1. **Potassium**
2. **Calcium**
3. **Sugar**
4. **All**

**160. Common salt is used in adulterant in?**

1. **Mineral mixture**
2. **Wheat bran**
3. **Fish meal**
4. **All**

**161. Urease is used for quality assessment of?**

1. **Soya bean meal**
2. **DCP**
3. **DORB**
4. **None**

**162. Maximum permissible level of aflatoxin in ducks as per BIS**

1. **3 ppb**
2. **50 ppb**
3. **20 ppb**
4. **20 ppm**

**163. . Maximum permissible level of aflatoxin in layers as per BIS**

1. **3 ppb**
2. **50 ppb**
3. **20 ppb**
4. **3 ppm**

**164. Maximum permissible level of aflatoxin in layers as per CARI,Izzatnagar**

1. **3 ppb**
2. **50 ppb**
3. **20 ppm**
4. **3 ppm**

**165. Olive colour discolouration of egg yolk is due to?**

1. **Dicoumarol**
2. **Moringa leaf**
3. **Cottonseed meal**
4. **Neem cake**

**166. Phytic acid decreases availability of ?**

1. **Calcium**
2. **Phosphorus**
3. **Zinc**
4. **All**

**167. Subabul contains which ANF?**

1. **Trypsin inhibitor**
2. **Tannins**
3. **Saponins**
4. **Mimosine**

**168. Protein utilization is interferes in?**

1. **Trypsin inhibitor**
2. **Tannins**
3. **Both**
4. **None**

**169. Oxalic acid interferes in?**

1. **Calcium**
2. **Iron**
3. **Magnesium**
4. **All**

**170. Most susceptible species for aflatoxin toxicity is?**

1. **Chicken**
2. **Cattle**
3. **Duck**
4. **Sheep**

**171. Methods of wet processing of grain?**

1. **Popping**
2. **Roasting**
3. **Exploding**
4. **Extrusion**

**172. Methods of dry processing of grain?Micronising**

1. **Pressure cooking**
2. **Reconstitution**

**Fill the blanks**

1. **Fatty liver and hemorrhagic syndrome is cause due to which \_\_\_\_\_choline\_\_\_\_\_\_\_\_deficiency.**
2. **\_\_\_\_\_\_\_\_\_is the 1st limiting amino acid in pigs**
   * + 1. **Fatty liver and kidney syndrome is caused due to which \_\_\_\_biotin\_\_\_\_\_\_\_\_\_ deficiency.**
       2. **Minimum amount of crude fiber must required in the chicken diet is\_\_\_3 4\_\_\_\_\_\_\_\_**
       3. **In broiler breeder we use \_\_\_restricte\_\_\_\_\_\_\_\_feeding system mostly to avoid fatty body.**
       4. **During hatchability \_\_\_\_\_b 7\_\_\_\_\_\_ deficiency leads to short bone or micro-melia.**
       5. **Less than\_\_\_\_2000\_\_\_\_\_ Total dissolved solid (in ppm) required in water for birds.**
       6. **If we feed high energy diet to birds , what happened to the feeding intake \_\_less\_\_\_\_\_\_\_\_.**
       7. **\_\_\_\_\_iodine\_\_\_\_\_ deficiency leads to increase in incubation period in birds.**
       8. **\_\_\_\_\_\_methi\_\_\_\_ is first limiting amino acid in soybean meal.**
       9. **\_\_\_\_\_lysin\_\_\_\_\_\_ is a First limiting amino acid in most cereal based diets.**
       10. **In chicken raw soybean leads to develop an enlarge \_\_\_pancreas\_\_\_\_\_ organ.**
       11. **Minimum calcium content in bone meal as per BIS is\_\_\_32\_\_\_\_\_\_\_%**
       12. **In poultry vitamin D2 has only about\_10\_\_\_\_\_\_ per cent of the potency of D3.**
       13. **In deficiency of vitamin B1 in poultry, retraction of the head is due to paralysis of the anterior\_\_\_hock\_\_\_\_ Muscle.**
       14. **Vitamin B12 contains :5..% Co.**
       15. **\_\_\_\_\_\_\_\_\_ Enzyme absent in poultry..**
       16. **Folic acid deficiency also leads to death of embryo during incubation**
       17. **Vitamin A, E, B12 are needed in proper amount to avoid early embryo mortality at around 2, 1-3 and 8-14 days respectively. Mineral elements are essential for the develop.**
       18. **Digestible energy equivalent of 1 kg of TDN\_\_\_\_\_\_4.41 Mcal**
       19. **Methods of protein evaluation in which amino acid pattern of lean muscle protein serves as the reference pattern\_\_\_\_\_ideal protein**
       20. **Protein evaluation method based on weight gains of poultry\_\_\_\_\_\_\_PER**
       21. **Product of digestibility and biological value of protein\_\_\_\_\_NPU**
       22. **Method of protein evaluation based on gross amino acid composition\_\_\_\_\_\_chemical score**
       23. **Average daily intake of a laying hen\_\_\_\_110 gm**
       24. **The feed component which imparts deep yellow pigmentation to egg yolk\_\_\_xanthophyll**
       25. **Excess intake of unsaturated feed may cause deficiency of\_\_\_vit e**
       26. **\_\_\_\_tyrosin amino acid can be formed from phenyl alanine**
       27. **Minimum ME requirement for broiler starter feed (kcal/kg) as per BIS\_\_\_\_\_2800**
       28. **Minimum % of of crude protein in chick starter feed \_\_\_\_as per BIS 20**
       29. **\_\_\_\_ amino acid which gives rise to thyroxintyrosine**
       30. **Methyl melonic aciduria is seen in deficiency of vit \_\_\_\_b12**
       31. **Esters of fatty acids with higher alcohols other thanglycerol is called as \_\_\_\_waxes**
       32. **Monensin is\_\_\_\_ionophor antibiotic**
       33. **\_\_\_oil cake is known to produce high hard buttercotton seed**
       34. **Yellow maize contains vitamin A in th form of**
       35. **Wheat bran is rich source of\_\_\_\_chemical name of vit E**
       36. **Amino acid which is essential for poultrybut not for other single stomach animal**
       37. **The byproduct of any cereals or millet crop left over after harvesting, thresng and removal of grains is called ass**
       38. **Optimum moisture for storage of food grains is**
       39. **An essential amino acid for monogastric animals but non essential for pigs**
       40. **The true ME value are always \_\_\_\_than the apparent ME in poultry**
       41. **Requirement of energy is always related to\_\_\_\_\_\_\_\_\_\_**
       42. **One IU of vitamin A is the**
       43. **The amino acid in a feed that is most deficient in bird ‘s diet is called as \_\_\_\_\_\_\_\_\_\_\_**
       44. **In poultry essential amino acids are \_\_\_\_\_\_\_\_\_11**
       45. **In legumes most deficient amino acid is\_\_\_\_\_\_\_\_\_\_\_**
       46. **In cereals most deficient amino acid is\_\_\_\_\_\_\_\_\_\_\_**
       47. **One IU of Vitamin A equals to 0.3 microgram of Vitamin A acetate**
       48. **One retinol equivalent is equal to 1.0 microgram of all trans retinol**
       49. **The two major forms of vitamin D are?\_\_\_\_\_\_\_**
       50. **One IU of Vitamin D is defined as biological activity of 0.025 microgram of cholecalciferol**
       51. **In young one vitamin D deficiency leads to rickets but in adults osteomalacia**
       52. **Yellow discoloration of tissue of fat is due to deficiency of vit E**
       53. **Feed supplements are nutritional and are added to the feed to cover up the missing nutrients**
       54. **Feed additives are for increasing the existing nutritional efficiency**
       55. **Tessential fatty acid (leinolic acid) is essential in the diet of breeder hens for the normal hatchability of egg.**
       56. **Riboflavin deficiency result in poor hatchability and cubed down embryo**
       57. **Biotin deficiency is reflected in parrot beaks**
       58. **Pantothenic acid deficiency shows uanhatched embryo showing subcutaneous haemorrhage >**
       59. **Thymine deficiency may result to early embryonic death high incidence of embryonic deformities**
       60. **The end product of protein metabolism in birds is**
       61. **Consumption of polished rice may causes deficiency of B vitamin namely**
       62. **Forms major ereal in poultry diet**
       63. **The maximum permissible level of salt in poultry ration is**
       64. **Cereals and millets re richin which nutrients**
       65. **In birds \_\_\_\_ more susceptible to aflatoxicosis**
       66. **For swine ME is \_\_\_% of DE**
       67. **The calcium to phosphorus ratio in laying hen is**
       68. **Coconut oil is rich in \_\_\_\_\_fatty acids**
       69. **Amino acids are absorbed through active transport mechanism**
       70. **Deoiled rice bran contains \_\_\_\_energy than rice bran**
       71. **\_\_\_\_value of a protein is very much dependent on indigestible amino acids make up of a protein**
       72. **Vitamin C can besynthesised from \_\_\_glucose**
       73. **Cholesterol is \_\_\_dietary essential in monogastrics animals**
       74. **True digestibility is always \_\_\_\_\_than the apparent digestibility**
       75. **Maximum level of inclusion of maize in poultry diet 60**
       76. **Maximum level of inclusion of rice bran 10-20in poultry diet**
       77. **Maximum level of inclusion of wheat bran 5-10in poultry diet**
       78. **Maximum level of inclusion of molasses 5 in poultry diet**
       79. **Maximum level of inclusion of soyabean meal 40 in poultry diet**
       80. **Maximum level of inclusion of fish meal 5-10 in poultry diet**
       81. **Maximum level of inclusion of hatchery by product meal 2-3 in poultry diet**
       82. **Maximum level of inclusion of feather meal 2 in poultry diet**
       83. **All plant feed stuffes contains commonly tannins.**
       84. **Alanine can be synthesized from Pyruvic acid**
       85. **Aspartic acid can be synthesized from**
       86. **Protein value is highest in Fish meal**
       87. **The common coccidiostat used in the broiler feed islasalocid**
       88. **Rapeseed meal contains an anti-nutritional factor which severely harm the ducks.erucic acid**
       89. **The energy requirement of the broiler finisher ration (BIS) is ------------ Kcal /kg. 3200**
       90. **An additional quantity of nutrient given over the requirement is Nutrient allowance**
       91. **The energy requirement of the grower chicken ration is ------------ Kcal /kg 2500**
       92. **Birds experiencing diseases require an increase intake of some nutrients such as Antibiotics**
       93. **The following one may be added in the layer chicken diet to meet out the calcium requirements Shell grit**
       94. **The exact quantity of nutrient given to the animal to meet out optimum production is Nutrient requirement**
       95. **The energy requirement of the creeper ration for piglets is ------------ Kcal /kg 3360**
       96. **Creep feed for piglet is otherwise known as Pre-starter feed**
       97. **Live microbial culture added as feed additive in the pig feed is Sacchromyces spp.**
       98. **Restricted feeding is recommended commonly in ------------ stage of poultry Grower**
       99. **Oxidative stress is more common in Poultry**
       100. **The common coccidiostat used in the broiler feed is Amprolium**
       101. **The ―star gazing posture‖ is deficiency of ------------------ in poultry. Thiamine**
       102. **Anaemia mainly occurs in livestocks due to deficiency of Iron**
       103. **Rapeseed meal contains ----------------------- which severely harm the livestock and poultry. Glucosinolates**
       104. **Toxicity of aflatoxin is greatest forDucklings**
       105. **The energy requirement of the creeper ration for piglets is ------------ Kcal /kg3360**
       106. **Antibiotics are added in the ration as growth promoting agent at Sub-therapeutic level**
       107. **Animal protein factor found inFish Meal**
       108. **Gluten is generally not fed to non-ruminants due to bulkiness**
       109. **---------------------- is an excellent source of energy and B-complex vitamins among the following milling by-products. Polish**
       110. **The calcium content in the animal body is:3.33**
       111. **Active form of which mineral work as glucose tolerance factor cobalt**
       112. **Calcium requirement of breeder mash (BIS): 1.0**
       113. **The vitamin crucial in etiology of FLKS:biotin**
       114. **Glycine is essential amino acids for: chicks**
       115. **Common calcium supplement used in the layer poultry feed is shll grit**
       116. **The common aflatoxin binding agent used in the feed is: hascas**
       117. **The common phosphorus supplement used in poultry feed is: monosodiumphosphate**
       118. **Excessive salt intake increased the requirement of : water**
       119. **Egg is having highest biological value**
       120. **Essential amino acid was invented by rose w.c.**
       121. **Vitamin concern with the prevention of perosis is:choline**
       122. **Basic role of Cell integration which of the Vitamin works “Anti-Infective Vitamin A**
       123. **Which of the following element work as substitute of antibiotics in simple stomachAnimals copper**
       124. **Probiotics may be recognized as\_\_\_\_\_\_\_\_\_direct fed microbials (DFM)**
       125. **Higher amount of PUFA in diet will increase the demand of:Vitamin E**
       126. **Heat treatment of protein reduces the protein quality affecting mainly the amino acid: lysine**
       127. **Is referred as “Lipotropic factor choline**
       128. **Digestible energy requirement for lactation in pigs is estimated to be 110 Kcal/ kg W0.75/ day**
       129. **Adult swine rations may have10-12%CF**
       130. **Calorie: Protein ratio in broiler starter and broiler finisher must be ……and ………Respectively122:1, 145:1**
       131. **Calorie: Protein ratio in layer starter and layer grower ration must be ………..and**
       132. **……… respectively: 130:1, 156:1**
       133. **Calorie: Protein ratio in layer must be:145:1**
       134. **Amino acids are found dietary essential in poultry:11**

|  |  |
| --- | --- |
| **1. Soyabean** | **A.Curcin** |
| **2. Neem** | **B.Kunitz Inhibitor** |
| **3. Oat Hay** | **C.Nitrate Posining** |
| **4.Jatropha** | **D.Nimbidin** |

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| --- | --- |
| **1.Anti-Vitamin A** | **A. Thiaminase** |
| **2.Anti-Vitamin E** | **B. Soyabean** |
| **3.Anti Vitamin B3** | **C.Wheat Bran** |
| **4.Anti Vitamin B1** | **D. Raw Kidney Bean** |

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| **1.Oats** | **A. Tannin** |
| **2. Turnip** | **B. B Glucan** |
| **3.Casia Torra** | **C.Crysophanic Acid** |
| **4.Napier** | **D. Oxalate** |

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| **1. Sudan Grass** | **A. Amygdalin** |
| **2. Cassava** | **B.Dhurrin** |
| **3.Bitter Almond** | **C.Linamarine** |
| **4. Alfalfa** | **D. Estrogenic Substances** |

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| **1. Anti- Infective Vitamine** | **A. A** |
| **2.Anti-Rachitic Vitamine** | **B. E** |
| **3.Anti-Sterlity Vitamine** | **C.D** |
| **4. Antihaemorrhagic Vitamine** | **D.K** |

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| **1.Anti-Neuritic Vitamine** | **A. B1** |
| **2. Anti-Dermatitis Vitamine** | **B.Pyridoxin** |
| **3. Anti-Pernicious Vitamine** | **C.B12** |
| **4. Anti-Stress Vitamine** | **D.C** |

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| **1. Nutritional Roup** | **A. A** |
| **2.Penguine Like Squat** | **B. D** |
| **3. Bleeding Syndrome** | **C. K** |
| **4.Crazy Chick Disease** | **D. E** |

**Syncope Syndrome Pigs Vite**

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| --- | --- |
| **1. Star Grazing Polyneuritis** | **A.** |
| **2. Curled Toe Paralysis** | **B.** |
| **3. Goose Stepping** | **C.** |
| **4.Flks Parrot Beak** | **D.** |

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| **1. Parakeratosis Swollen Hock Frizzeled Feather** | **A. Zn** |
| **2. Molybdenum Defeciency Femoral Head Necrosis** | **B.** |
| **3.Mo Toxicity Teartness** | **C.** |
| **4. Mn Perosis Slipped Tendon** | **D.** |

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| **1.Cotton Seed Cake** | **A.BMR** |
| **2.Bagasse** | **B.Phytase** |
| **3.Feed Additive** | **C.Pellet Binder** |
| **4.EUN** | **D.Gossypol** |

**Product Precursor**

|  |  |
| --- | --- |
| **1. Oxalic Acid** | **A.Vit C** |
| **2.Niacin** | **B.Tryptophan** |
| **3.Vit C** | **C.Hexose Sugar** |
| **4.Taurin** | **D.Cystine** |

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| **1.In Vivo Method** | **A. Metabolisable Trial** |
| **2.External Indicator** | **B.Chromic Oxide** |
| **3.Main EAA In Pig** | **C.Lysine** |
| **4. Main EAA In Poultry** | **D.Glycine** |

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| **1.No. Of EAA In Poultry** | **A.10** |
| **2. No. Of EAA In Pig** | **B.8** |
| **3. EFA In Poultry** | **C.Linoleic Acid** |
| **4.Omega 3 Fatty Acid** | **D.** |

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| **1. Maximum Level Of Crude Fiber In Poultry** | **A. 6-8%** |
| **2. Maximum Level Of Crude Fiber Pig** | **B. 8-10%** |
| **3. Maximum Level Of Fat Poultry** | **C. 2-5%** |
| **4. Maximum Level Of Fat Pig** | **D. 10-15%** |

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| **1.Chick** | **A. C/P Ratio 130** |
| **2.Broiler Starter** | **B. C/P Ratio 122** |
| **3.Broiler Finisher** | **C. C/P Ratio 145** |
| **4. Layer** | **D.C/P Ratio 144** |

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| **1. Grower C/P Ratio** | **A. 156** |
| **2.Breeder C/P Ratio** | **B.190** |
| **3. Grower CP%** | **C.16%** |
| **4.Breeder CP%** | **D.18%** |

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| **1.Vitamin A** | **A. Nutritional Roup** |
| **2. Vitamin D** | **B.Rickets** |
| **3. Vitamin E** | **C.Encephalomalacia** |
| **4. Vitamin K** | **D.Subcutaneous Hemorrhagic Blemish** |

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| **1. Vitamin B6** | **A. Hyperexcitability** |
| **2. Vitaminb12** | **B.Pernicious Anaemia** |
| **3. Vitaminb7** | **C.Cracked Feet** |
| **4. Vitaminb3** | **D.Chick Dermatitis** |

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| **1.Folacin** | **A.Macrocytic Anaemia** |
| **2.Salt** | **B.Cannibalism** |
| **3.Cholin** | **C.Perosis** |
| **4. Riboflavin** | **D.Clubbed Down Feather** |

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| **1. Creeper Ration** | **A. Nr Ratio 1:4** |
| **2.Starter** | **B.1:4.5** |
| **3.Grower** | **C.1:5** |
| **4.Finisher** | **D.1:6** |

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| **1. Parakeratosis** | **A. Defeciency Of Zn** |
| **2.Corneal Keratinization** | **B. . Defeciency Of Na** |
| **3.Water Poisoning** | **C. . Excess Of Nitrate** |
| **4.Crazy Chick Disease** | **D. . Defeciency Of Vitamin E** |

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| **1. Pig Pelagra** | **A. Defeciency Of Vitamin B3** |
| **2. Swollen Hock Syndrome** | **B. . Defeciency Of Zn** |
| **3.Sulfur Rickets** | **C. . Defeciency Of Phosphorus** |
| **4. Phosphorus Rickets** | **D.Excess Of Iron** |

**Anti Nutritional Factor Detoxification Method**

|  |  |
| --- | --- |
| **1.Mould** | **A.Add Acetate** |
| **2.Aflatoxin** | **B.Add Nh3 Or Nh4oh** |
| **3.Salmonella** | **C.Pelleting Of Feed** |
| **4.Lectin** | **D.By Moist Heat** |

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| **1.Physical Wet Processing** | **A.Green Chopping** |
| **2. Physical Dry Processing** | **B.Grinding** |
| **3.Chemical Processing** | **C.Add Urea Molasses** |
| **4.Biological Processing** | **D. Add Bacteria** |

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| **1.Dry Rolling** | **A.Between Steel Rollers** |
| **2.Papping** | **B.Grain Passed Through Dry Heat Rapidly** |
| **3.Micronizing** | **C.Use Infrared Energy** |
| **4.Pelleting** | **D.By Grinding The Material Following By A Mechanical Process** |

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| **1. Nutritive Ratio** | **A. Tdn-Dcp/Dcp** |
| **2.Nutritive Value Index** | **B.Realative Intake Of Test Forage\*Tdn/100** |
| **3. Total Digestible Nutrients** | **C.%Dcp+%Dcf+%Dnfe+%Dee\*2.25** |
| **4.Protein Efficiency Ratio** | **D. Wt Gain/Protein Intake** |