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Technical Bulletin

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Frequently Asked Questions

Q.1 What is the normal range of peroxide levels?

The peroxide levels in the feed or an oil sample give us the indication of the oxidation of the nutrients in feed or oil. The oxidation process is divided into three stages i.e. Initiation, Propagation and Termination. As the oxidation process initiates the peroxide levels are low and it increases with the progression of oxidation. A point is then reached when oxidation process is completed and the peroxide levels are at peak. After this point the termination processes of oxidation starts and peroxides, which are formed, get converted into further substrates like ketones and aldehydes. Hence when the sample is tested after this point of time, we will see reduction in peroxide levels, but this does not indicate that the sample is of good quality because the oxidation process has already reached its peak and the sample is becoming rancid. If we check the sample for aldehydes or ketone levels at this stage, we will see their presence in the sample. So it is very difficult to arrive at the oil or feed quality only on the basis of peroxide levels.

There is no definite range of peroxide levels for all the samples as it may vary depending on the fat content of the sample.

Generally peroxide levels of 20 meq / Kg is considered safe when the oil sample is in the initiation phase of oxidation. At this stage it is easy to protect oil or feed sample because oxidation process is reversible at this stage. When the sample is in Termination phase of oxidation, it is an irreversible stage and we cannot protect feed or oil in this stage.

Hence it is always necessary to conduct two tests i.e. Rancimat time and peroxide levels or aldehydes levels to get the correct interpretation of the quality of feed or oil.

Q.2 What are the reasons for gout?

◆ Gout is condition described as enlarged kidneys containing uroliths (deposits) of calcium-sodium-urates. A damaged kidney is quite susceptible to urolith deposits.

◆ Gout is often noticed in the layers (Commercial and breeders) due to the following reasons:

- Kidney lesions caused by viral infections such as Infectious bronchitis usually initiate the development of gout.
- Presence of mycotoxins such as **oosporein** and **citrinin** in the feed leads to kidney damage resulting in gout.
- Excess of calcium in relation to phosphorus or low intake of phosphorus in relation to calcium in layer rations. Phosphorus deficiency causes alkaline urine that leads to gout.
- High dietary levels of calcium and protein in prelay period are often associated with gout. It is often caused by low phosphorus serum which leads to alkaline urine, low water intake (excretion of precipitated urate salts serves as a water conservation mechanism) and electrolyte imbalance.
- Vit.A deficiency leads to Gout.
- Excess sodium in layer rations leads to increased excretion of urates because uric acid colloids are negatively charged and attract sodium cations. When excess potassium and sodium relative to chloride is fed, birds develop gout.

◆ It is recommended to add 0.6% Methionone Hydroxy Analogue (MHA) to the diets, which results in more acidic urine but does not cause a general metabolic acidosis. Thus MHA reduces kidney damage and uroliths formation without problems such as wet litter and metabolic acidosis. Supplemental DL- Methionone is also effective in preventing Kidney damage.

Q.3 What are the reasons for loose droppings?

These are some reasons for loose droppings:

Under Direct control of Farmer Technical reasons:

◆ Poor ventilation in poultry houses.

◆ High temperatures

◆ Huge differences in night and day temperatures

Sanitary reasons:

◆ Colibacillosis

◆ Enteritis

These above reasons need to be taken care of by the farmer at his end by adopting good management practices.

Under direct control of Feed miller Feeding reasons:

◆ Too powdery feed, which decreases feed consumption and increases water consumption.

◆ High content of animal fat in the feed (especially in starter feed)

◆ High content of salt

◆ High level of chlorine due to an excess of salt or an excess of chlorine in some animal origin raw materials (meat meal, fish meal): this is one example why it is very important to follow the characteristics and quality of all raw materials incorporated in feed. Hence it is always advised to test and evaluate each ingredient before inclusion in the feed.

◆ High Calcium content

◆ Destruction of enzymes like B- Glucanases or Xylanases by high pelleting temperature.

◆ High Protein level.

Q.4 Whether Vegetable oil is better than animal fats to incorporate in poultry rations?

◆ Vegetable oils are generally more unsaturated than that of fats from animal origin except Palm oil and Coconut oil; as unsaturated fats have good digestibility it is better to be used in feeds. But if animal fats and vegetable oil are mixed in the ratio 3:1, the digestibility of fats increases

Q.5 Can excess calcium or phosphorus affect manganese utilization by chickens?

◆ Yes, studies conducted at the university of Illinois, USA showed that feeding 0.88 % excess inorganic phosphorus, alone or in combination with excess calcium, reduced manganese utilization by 50-65 %. These trials showed that excess phosphorus is more antagonistic to manganese than is excess calcium.

Q.6 Due to fear of selenium toxicity, dietary selenium levels are reduced, can this be compensated by adding dietary vitamin E, since they both are antioxidants?

◆ Even though they are both antioxidants, they have different sites of action. Vitamin E acts on the biomembranes while seleniumñdependent glutathione peroxidase acts in the cytoplasm. Vitamin E tends to be most effective in preventing lipid peroxidation while selenium is more effective in preventing free radical production. The benefits of increasing vitamin E are doubtful if one is feeding the maximum allowable level of selenium.

Q.7 When a feed analysis gives the “salt content” does it include only the sodium plus chloride concentration?

◆ Probably not: most likely it includes the “total salts” concentration which is the sum of the soluble calcium, potassium, magnesium, sodium, chloride, sulfate, nitrate and borate.

Q.8 Does feeding high levels of copper have the same growth promoting effects in poultry as in pigs?

◆ Recent research in Egypt showed that feeding copper sulfate at 150 ppm improved daily weight gain and feed efficiency in broilers. However, when copper carbonate or copper oxide was fed at the same concentration there was no response. Histological examination of the small intestine suggests that copper sulfate resulted in a healthier intestinal lining with a more absorptive surface.

Q.9 What causes double yolked eggs?

◆ In hens egg production is controlled by the release of specific hormones, which in turn stimulates the release of a single egg yolk from the ovary. After the yolk is released from the ovary it continues it journey through the hens reproductive tract where it develops into an egg with a hard outer shell. Usually, the ovary releases only one yolk in a given day. However sometimes two egg yolks or on rare occasions, even three yolks may be released at the same time resulting in the formation of a double or triple yolked egg.

◆ This release of more than one yolk at a time is due to an over stimulated ovary which occurs as a direct result of the increased level of reproductive hormones in the hen. This phenomenon appears more commonly in young hens and is also seen more frequently in Broiler breeders as compared to layer breeders. Genetics may also be a factor involved with some hens naturally producing a higher percentage of double yolked eggs than others.

Q.10 What is the need of Cobalt inclusion in Broiler feed?

◆ Cobalt is one of the components of vitamin B12 (named also cobalamin and composed by one atom of cobalt in its center linked to four atoms of azote.)

It is essential to promote the synthesis of Vitamin B12 by the intestinal flora. Cobalt is partly brought in the feed by some raw materials, but to ensure the necessary level, it is felt necessary to add cobalt in premix and finally reach from 0.2 ppm to 0.5 ppm Cobalt levels in the feed.

Q.11 Is Choline Chloride necessary in the commercial broiler feed? If yes, why and what is the basic requirement of the broiler? What are the consequences if the levels are increased or decreased?

◆ Choline chloride is the necessary component of the Commercial Broiler feed because it has various function in the broiler metabolism,

- Choline is one of the components of phospholipids, which intervene in the formation of membranes and lipoproteins. Lack of choline weakens cell membranes and hinders fat absorption and this will results in the accumulation of fat in the liver, i.e. hepatic steatosis. v It is necessary for the formation of vital body substances such as creatinine and adrenalin
- It is a vital component of acetylcholine, lecithin and spingomyelin.
- Choline after its conversion to betaine provides labile methyl group for the formation of methionine from homocystine and creatine from guanidoacetic acid.

Choline deficiency leads to decreased growth and perosis. Requirement of choline chloride: Considering lot of differences of biosynthesis ability, lot of variability in raw materials, most scientist recommend adding choline chloride in the feed.

The requirement of choline is higher in young chicks. In adult birds the deficiency symptoms are not readily produced.

Q.12 Are all organic Trace Minerals Similar?

No. There are six types of organic trace minerals available in the market. They are as follows:

◆ **Metal amino acid complex:** Metal amino acid complex result from complexing a specific soluble metal salt (such as Zinc, Copper, Manganese) with an amino acid. These metal amino acid complexes are manufactured using a new patented "amino acid extraction process" that breaks down a pure source of protein into an intermediate product containing only free amino acids without dipeptides, tripeptides or larger protein fragments. The free amino acids are complexed in one-to- one ratio., i.e. amino acid molecule bonded to one amino acid molecule.

◆ **Metal specific amino acid complex:** These complexes result from complexing a soluble metal salt with specific amino acid. The endproduct is a new molecule containing one ion of the metal and one molecule of the amino acid, say methionine.

◆ **Metal amino acid Chelate:** Chelates are formed from the reaction of a metal ion from a soluble metal salt with amino acids having a mole ratio of one mole of a metal to one, two or three (preferably two) moles of amino acids to form co-ordinate – covalent bonds. The process is deficient because of its inability to specify with amino acids – and how many are being chelated.

◆ **Metal Proteinate:** metal proteinates result from the chelation of salts with amino acids and or partially hydrolysed proteins. The final product may contain single amino acids, dipeptides, tripeptides or other protein derivatives. Often the resulting mixture is bound too weakly to withstand the environment of the digestive tract. Metal proteinates are not a defined chemical entity. These types of products tend to vary from one batch to the other.

◆ **Metal Polysaccharide complex:** It results from complexing a soluble salt with a polysaccharide solution declared as an ingredient of the specific metal complex. The product is more of an organic mineral matrix without any chemical bonding between the mineral and the polysaccharide.

◆ **Metal Propionate:** It is the result of combining soluble metals with soluble organic acids. Resulting products are highly soluble and generally dissociate in solution.

Table1 Requirement of choline Chloride in broilers

Standards	Starter/Grower	Finisher
NRC (USA)	1300 mg/Kg	1000-750 mg/Kg
INRA (French)	600 mg/ Kg	500 mg/Kg
BIS (Indian)	1400 mg/ Kg	1000 mg/Kg.

Q.13 Is choline chloride required in layer rations?

Layers have an essential requirement for choline like broilers. The major utilization of choline is in the formation of the phospholipids lecithin a, component of egg yolk. A number of factors may influence henís requirement for choline for instance age, feed intake and dietary crude protein or methionine levels. It is generally accepted that dietary requirement declines with age, possibly associated with an increasing feed intake. Methionine is the first limiting amino acids for egg production and, given the common function with choline in methyl group donation, interactions between the two nutrients may be anticipated.

In various studies it is found that where diets are low in crude protein and/or marginal in total sulphur amino acids, better responses were seen with methionine and choline supplementation.

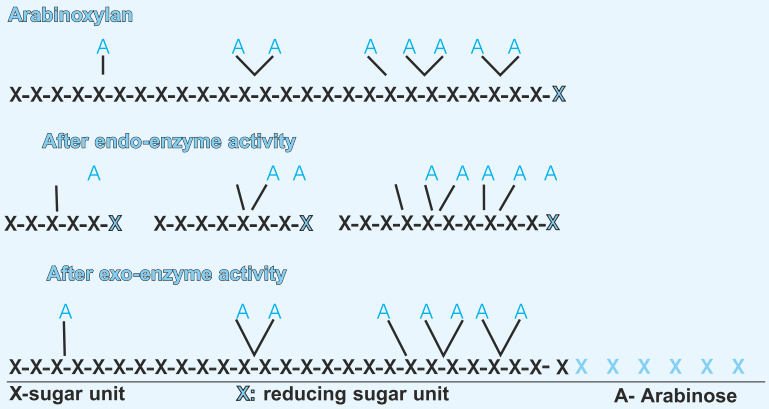
Table 2: Performance of Commercial layers when fed diets three levels of methionine with and without supplemental choline.

Supplement Methionine(%)	Choline(%)	Egg production (%)	Egg weight (g)	Egg content (g) (g/hen/day)	Feed Consumption
0.000	-	60.1	59.8	32.3	83.8
0.000	+*	60.6	59.2	32.7	87.0
0.033	-	71.4	60.3	38.7	94.3
0.033	+*	78.5	61.8	43.2	99.8
0.067	-	74.5	62.7	42.0	95.8
0.067	+*	75.9	62.3	42.7	95.9

However both nutrients can increase egg production, methionine has larger influence on egg size. Choline has small and consistent effect on egg yield over and above those achieved by methionine. This may be interpreted as choline exerting a sparing effect on methionine use for methyl group supply.

In commercial layers fed on least cost rations, the requirement for metabolic methyl group is best met from choline and that feeds should contain sufficient choline to provide 118 mg/hen/day. As a feed intake of 100g/day, a recommendation of 118mg choline/day equates to a dietary requirement of 1180mg/ Kg, similar to that advocated by NRC 1994. As these levels may be only slightly higher than those supplied by the raw material in a typical commercial diet, there has been debate about the need for the dietary supplementation with Standards Starter/Grower Finisher NRC (USA) 1300 mg/Kg 1000-750 mg/Kg INRA (French) 600 mg/ Kg 500 mg/Kg BIS (Indian) 1400 mg/ Kg 1000 mg/Kg. Table1 Requirement of choline Chloride in broilers choline chloride. Supplementation of choline from the natural sources is highly variable so the precaution has to be taken while considering the fulfillment of choline requirement by the raw materials. Leeson and Summers recommend 1200-1400 mg/kg of choline content in the commercial layer diets. Taking into consideration that approxi-mately 1000mg/Kg of choline is available to the birds through the commercial least cost diets, the dietary supplementation of choline chloride should be in the range of 250-500 mg/ Kg of the feed.

Figure 1. Endo-exo activity of xylanase enzyme



Q.14 What is the endo-exo activity of a xylanase enzyme?

◆ Endo-xylanase activity breaks down arabinoxylan into shorter polysaccharides, resulting in a decreased viscosity, liberation of nutrients and improved production performances.

◆ Exo-xylanases are only active at the end of arabinoxylan chain. This exo activity only has a minor effect on viscosity.

Importance of endo-xylanase activity

Q.15 Micro- ingredient blending or premix preparation – can it be done especially at farm levels?

◆ Micro-ingredient blending is a highly sophisticated procedure due to following reason,

- ❖ Various micro ingredients added in the premixes are in different ratio, for Eg. Vit B12 is added in very low dosages that are in micrograms whereas; Vitamin A is added in thousands of I.U.This huge difference in the ratio makes impossible for homogenous mixing in ordinary mixes.
- ❖ The micro ingredients are added in very low dosages in feed. Thus one MT of premix preparation may reconstitute feed for several thousand broilers. Hence the multiplier effect of a small error in blending premixes is very high.
- ❖ Supervisory efforts are required at very high levels for precise mixing. Manual weighing of small ingredients may leads to error, which can be toxic to birds. For eg. Selenium is added at very low dosages, the safety margin for selenium is also low. Hence any error in addition of selenium can lead to deficiency or toxicity.

Looking into all above factors, it is practically not possible to achieve the efficient mixing of micro ingredients at farm levels.

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