

Trace Minerals

The term "trace" refers to certain minerals which are in the feed in small amounts, such as grams per ton. The trace minerals include copper, iodine, manganese, zinc, iron, selenium, cobalt, magnesium, fluorine and molybdenum. In contrast, other minerals are sometimes referred to as macro minerals because they are available in large amounts, such as pounds per ton. These macro minerals are calcium, phosphorus, sodium, chloride, potassium and sulfur.

Although required in small amounts by poultry, trace minerals play a key role in their nutrition. For example, trace minerals make up part of the enzyme systems in the body.

COPPER

Copper is an essential part of many enzymes or enzyme systems in poultry. There, it acts as a catalyst in several oxidation reactions. In addition, copper along with iron helps prevent anemia. Further studies have shown that a copper deficiency has been linked to aortic rupture in chickens and turkeys.

Copper can be supplied through the feed as copper oxide or copper sulfate. As copper sulfate, it acts as a mold inhibitor in the crop of the bird.

Whether or not copper sulfate acts as a growth promotant is debatable, depending on the research examined. If a little copper is good, too much may be harmful. Furthermore, research has shown that excessive levels of copper can be toxic. However, the toxic level is many times greater than the recommended level.

IODINE

The thyroid gland uses iodine to produce the thyroid hormone. This hormone helps to regulate the body's metabolic rate.

An iodine deficiency will cause goiter, an enlargement of the thyroid gland. This deficiency may develop in chickens but is seldom noticed because of the feathers. Even if the chicken does have goiter, it apparently does not affect the bird's growth rate and feed conversion. In an extreme iodine deficiency situation, hatchability may be affected. However, the requirement for iodine is small, and meeting that requirement is fairly easy in most diets. To be completely safe, though, some iodine should be added to the diet.

Iodine is usually included in the diet as calcium iodate.

MANGANESE

Manganese, like other nutrients, plays a role in growth, hatchability and egg production. Manganese also seems important in maintaining eggshell quality and in preventing perosis. A deficiency of manganese in a breeder diet will produce a high percentage of chondrodystrophic embryos. Chondrodystrophic chicks have very short and thickened legs, short wings, parrot beaks, retarded down and a smaller size. Turkeys apparently require more manganese than chickens.

Nearly all ingredients contain manganese with the best sources being ground limestone, rice bran, oyster shell, wheat bran and wheat midds. The manganese requirement can be easily met by adding manganese directly to the diet. However, if the diet contains excess calcium and phosphorus, a manganese deficiency may occur.

Manganese may be added as manganese sulfate or manganese oxide.

ZINC

Feather fraying is one sign of a zinc deficiency along with poor hatchability, poor growth and poor egg production. Other symptoms may occur as well, such as little or no feathering, shortening of the legs and dermatitis of the feet. Like manganese, excess calcium can cause a zinc deficiency.

Zinc may be added as zinc sulfate or zinc oxide.

IRON

Iron commonly is linked to anemia, the first sign of an iron deficiency. Considerable debate exists on whether or not to add any iron to the normal poultry diet.

However, most trace mineral pre-mixes carry iron either in the carbonate or sulfate form. The iron content in feed ingredients can vary considerably.

SELENIUM

Selenium plays a role in preventing exudative diathesis and myopathy of the gizzard. It works together with vitamin E and the sulfur-bearing amino acids. The amount of selenium found in poultry diets varies depending on where (geographic location) the ingredients used in the diet were grown. North Carolina soils are noted for being selenium deficient.

Other minerals that are found in small quantities in poultry diets are cobalt, magnesium and chlorine.

However, since most poultry diets contain adequate amounts from the natural ingredients, it may not be necessary to add these minerals to poultry diets. When considering magnesium, certain ground limestones cannot be used because they contain too much magnesium. Chlorine, on the other hand, is added to the diet through salt. Therefore, the chlorine allowance is usually met when the sodium allowance is met.

Below are three suggested levels of trace minerals that should be added to feed. These levels are grams of the element (copper for example) rather than the compound (such as copper sulfate).

Amount To Be Added Per Ton of Finished Feed

	Chicken	Turkey	Chicken or Turkey
Copper (g)	8.0	8.0	8
Iodine (g)	4.0	4.0	4
Manganese (g)	55.0	75.0	75
Zinc (g)	50.0	75.0	75
Iron (g)	75.0	75.0	75
Selenium (mg)	90.8	181.6	**

**Selenium cannot be fed to chickens at the same level that it can be fed to turkeys. Therefore, if only one trace mineral pre-mix is used for both species, the selenium should be added to the feed apart from the trace mineral pre-mix.

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