

Microminerals and Their Importance in the Fertility of Farm Animals

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ABSTRACT

Microminerals, also called trace minerals, are required by farm animals in very small quantities, but they have a major role in maintaining good health and fertility. Important microminerals include zinc, copper, selenium, manganese, iodine, cobalt and iron. When these minerals are deficient or unbalanced in the diet, animals may show poor growth, delayed maturity, irregular heat, poor conception, pregnancy loss or reduced semen quality. These problems can affect cows, buffaloes, sheep, goats, pigs and horses. Microminerals help in proper development of reproductive organs, hormone activity, egg and sperm production, and protection of body cells from damage. Providing a balanced mineral mixture according to the animal's needs can therefore support better reproductive performance. Farmers should also remember that giving excess minerals is not beneficial and may sometimes be harmful. Good-quality feed, adequate minerals, clean water and proper reproductive management together form the foundation of good fertility.

INTRODUCTION:

For a livestock farmer, getting an animal pregnant at the right time is just as important as keeping it healthy. Poor fertility means more repeat breeding, longer gaps between calvings or lambings, and increased feeding and management costs. Many factors can affect fertility, including poor nutrition, disease, heat stress and improper breeding management. Among these factors, mineral nutrition is sometimes overlooked.

Microminerals are needed in very small amounts, but their role in the body is much greater than their quantity suggests. Zinc, copper, selenium, manganese, iodine and cobalt are some of the important trace minerals involved in normal growth, immunity, hormone function and reproduction (Hidiroglou, 1979).

A shortage of these minerals may not always produce obvious signs. Sometimes the first indication is poor reproductive performance. Therefore, providing a balanced diet with adequate minerals is an important part of reproductive management.

How Microminerals Help in Fertility

Microminerals support reproduction in several ways. They help the reproductive organs develop normally, support hormone production and help eggs and sperm develop properly. Some trace minerals also act as part of the body's antioxidant defence system and help protect reproductive cells from damage (Nair *et al.*, 2025).

When animals do not receive enough minerals, they may show weak or irregular heat, delayed puberty, poor conception or pregnancy problems. In breeding males, mineral deficiency may affect sperm production and quality. However, infertility should not automatically be blamed on minerals because

diseases, poor body condition, energy deficiency and other management problems can also cause reproductive failure.

Important Microminerals for Fertility

Zinc: Zinc is important for reproductive organ development, hormone function and sperm production. It also supports immunity and normal tissue repair. Adequate zinc nutrition is particularly important for breeding animals (Nair *et al.*, 2025).

Copper: Copper supports enzyme activity, immunity, blood formation and reproduction. Low copper availability may be associated with poor reproductive performance. However, excessive copper can also be harmful, so supplementation should be carefully balanced.

Selenium: Selenium supports antioxidant protection and normal reproductive function. It helps protect reproductive cells from oxidative damage and supports healthy pregnancy. Because selenium is required only in small amounts, excessive supplementation should be avoided.

Manganese: Manganese is involved in normal reproductive development and reproductive function. Inadequate manganese has been associated with poor fertility and reduced reproductive performance in ruminants (Hidiroglou, 1979).

Iodine: Iodine is needed to produce thyroid hormones, which influence growth, metabolism and reproduction. Severe iodine deficiency can interfere with normal reproductive activity.

Cobalt: Cobalt is particularly important in cattle, buffaloes, sheep and goats because rumen microorganisms use it to produce vitamin B12. It therefore indirectly supports energy metabolism and overall health.

Importance in Different Farm Animals

Animal	Importance of microminerals in fertility
Cow and buffalo	Support normal heat, ovarian activity, conception and maintenance of pregnancy.
Sheep and goat	Support puberty, heat, ovulation, conception, and healthy pregnancy.
Swine	Support puberty, reproductive performance, sow fertility and semen quality in boars.
Horse	Help maintain normal reproductive function in breeding mares and stallions.

The requirement for each mineral is not the same for every animal. It changes with species, age, pregnancy, lactation, growth and production level. The mineral content of fodder can also vary with soil, season and location.

What Farmers Should Do

Farmers do not need to remember complicated mineral formulas. A few simple practices can help:

- Provide a good-quality mineral mixture suitable for the animal and its stage of production.
- Give special attention to breeding animals, pregnant animals and animals recovering after parturition.
- Do not assume that giving more minerals will always improve fertility.
- Avoid giving individual mineral supplements without knowing whether they are actually needed.
- Use good-quality green fodder, dry fodder and concentrate feed as part of a balanced ration.

- If repeated breeding or poor fertility continues, consult a veterinarian instead of assuming that mineral deficiency is the only problem.

Where mineral deficiencies are common in a particular area, region-specific mineral supplementation can be useful because the mineral content of soil, crops and fodder differs from place to place (Prasad & Gowda, 2005).

CONCLUSION

Microminerals may be required in very small amounts, but they have an important role in the fertility of farm animals. Zinc, copper, selenium, manganese, iodine and cobalt support normal reproductive development, hormone activity, egg and sperm production and overall reproductive health. Their importance applies to cattle, buffaloes, sheep, goats, pigs and horses, although the requirements vary between species.

For farmers, the message is simple: small amounts of minerals can make a big difference when the diet is deficient, but more is not always better. A balanced ration, suitable mineral mixture, clean water, good body condition and proper breeding management are all necessary for good fertility. When reproductive problems continue despite proper feeding and management, veterinary advice should be sought to identify other possible causes.

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