

3-4 Trace element supplementation

Trace elements are a small and yet extremely important part of dairy cow nutrition. Inadequate intake of any of the essential trace elements can result in reduced milk production, more disease (specific diseases and poorer immunity) and decreased reproductive performance. Important trace elements in pasture systems are Cobalt (*Co*), Copper (*Cu*), Iodine (*I*), Selenium (*Se*) and Zinc (*Zn*).

Deficiencies

Deficiencies can be either primary or secondary

- Primary deficiencies arise because of insufficient levels of the actual trace element in the diet.
- Secondary deficiencies arise when the pasture contains something else that reduces the uptake of the trace element (e.g. pasture with high molybdenum reduces the absorption of copper).

Cobalt

Required for production of Vitamin B_{12} and B_1 , energy metabolism in the rumen and in the cow, fiber digestion and immunity. High manganese in soil reduces cobalt uptake by the plant. Therefore, as pasture is generally high in manganese it is usually low in cobalt. Cows should be supplemented with 8 to 10 mg cobalt/cow/day (mg = milligrams)

Options: cobalt sulphate orally, commercial cobalt sources, cobalt sulphate fertiliser, strategic use of Vitamin B₁₂ injections.

Copper

Required for growth and production, animal health and immunity, reproduction and calf viability. High intake of molybdenum, sulphur and iron, which often occurs in pasture-based diets, especially in winter and spring, reduces copper uptake by the animal. Supplement cows with 250 to 400 mg Copper/cow/day.

Options: copper sulphate orally, copper bullet, copper capsule (needles), copper injection (not recommended for cows during the breeding season), commercial copper sources, copper sulphate fertiliser (not recommended in secondary deficiencies).

lodine

Required for intake, energy metabolism and milk production, protein synthesis, reproduction, and heat detection. Uptake of iodine by pasture can be low. Additionally, iodine is easily leached during wet weather in winter and spring. Requirements for iodine increase during cold wet weather. Supplement cows with 50 to 60 mg lodine/cow/day.

Options: "Stock iodine" (3ml of 2% or 0.5 ml of 10% per cow orally), 8ml of 5% teat spray on flank weekly, commercial iodine sources, oil-based slow release injections.

Selenium

Required for disease resistance (e.g. mastitis), placental shedding (post-calving cleaning), milk production, reproduction, calf viability and immunity. There are regions that will have high selenium levels in pasture, particularly if they have been fertilised with selenium fertiliser. In such areas supplementation should be avoided. If in doubt, consult with your vet or farm consultant. Supplement cows with 5 mg Selenium/cow/day.

Options: oral or injection products, commercial selenium sources, and slow release injections.

Zinc: (note: see FarmFact 3-6 and 3-7 for Facial Eczema recommendations)

Required for growth and production, reproduction, hoof strength, and immune system. The need for zinc supplementation will vary from farm to farm. Farms using zinc in summer for facial eczema may still require zinc supplementation in the spring. Pasture analysis should determine the need for supplementation. Excess zinc intake will increase the risk of milk fever and copper deficiency, and may depress appetite.

Supplement cows with up to 750 mg zinc/cow/day.

Options: zinc sulphate, zinc oxide, and commercial zinc sources

How should I supplement?

There are many modes of supplementation

- Drench, injection, bullet
 - Most effective method of supplementation
- In a small amount of carrier (e.g. 250g of molasses or grain)
 - Effective method of supplementing
 - All cows must eat supplement
 - Need infrastructure to feed supplement
- Water trough treatment
 - Effective method of supplementing if well formulated soluble mineral supplements are used.
 - Use dispenser to avoid settling of inorganic trace elements
- Fertiliser
 - Probably least effective method for animal supplementation
 - Of no practical use in secondary deficiencies
 - Responses are variable
 - Zinc and iodine fertilisers are not reliable as plant uptake is poor

Your vet, farm consultant or Dexcel Consulting Officer can help you decide on the best method for you.

Note: <u>there is little scientific evidence of a benefit to commercial "protected" trace element</u> <u>sources when compared with simple inorganic trace elements (e.g. copper sulphate, cobalt</u> <u>sulphate, sodium selenate, etc.)</u>

Example of trace element mix that can be formulated on farm

Trace element	Product	Amount of trace element	Requirement (mg/cow/day)	Recommendation
Cobalt	Cobalt Sulphate	210 mg/g	10	1 g CoSO₄ per 20 cows/day
Copper	Copper Sulphate	250 mg/g	350	1.5 g <i>CuSO₄</i> /cow/day
lodine	Stock lodine	2 or 10 mg/ml	60	3 ml of 2% stock iodine /cow/day
Selenium	Selmitt 5	5 mg/ml	5	1 ml Selmitt 5 /cow/day
Zinc	Zinc Sulphate	230 mg/g	800	3 g ZnSO₄ /cow/day