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## **Iodine (I)**

Iodine is essential for animals but is not believed to be required by plants. Its main role is in the production of hormones in the thyroid gland, with the latter also impacting a range of other important animal functions i.e. metabolic rate, cell differentiation and the growth and development of the foetus.

Iodine deficiencies occur in many areas of New Zealand in sheep (particularly lambs), goats and cattle. Deficiencies arise from two main causes: through low iodine levels in feed and through interference by chemicals known as goitrogens. The latter are prevalent in brassica crops (forage kales, cabbages, brussel sprouts and broccoli) but are also found in white clovers. Goitrogens decrease the ability of the thyroid gland to produce hormones. Iodine deficiency in animals often results in a disease known as Goitre, which is also found in the human population. Low iodine levels can also cause subclinical problems resulting in stock ill thrift. The latter may go unnoticed and can include small depressions in wool production, milk production and reproductive performance.

Iodine deficiency is found most often in soils which are highly leached (usually as a result of high rainfall) or in soils with little organic matter, particularly sandy soils. However, because many of the soils in New Zealand have been formed from parent materials that contain little iodine to start with, iodine deficiency can be widespread. Iodine deficiency is less of a problem in coastal areas which receive significant quantities of iodine from the sea from onshore winds. Conversely, iodine deficiency can be a problem in inland areas, which are sheltered from such beneficial wind blown iodine additions.

Uptake of iodine by plants decreases in high pH (6.5) soils. For similar reasons, animals consuming a diet high in calcium are prone to experience iodine deficiency. Iodine concentration in plants is lower when plants are growing rapidly such as in spring but it is commonly also low in summer.

Iodine deficiencies can be overcome in several ways but the most common are: direct treatment of livestock (orally or by injection), spraying it on pasture, adding it to stock drinking water or by providing it as part of a stock lick. It can also be added to fertiliser, though there is some debate as to the effectiveness of this approach.

Excess iodine levels are toxic to animals, so it is very important to keep levels within an optimal range. Iodine is not generally included in soil tests as there is little direct relationship between soil and plant levels.

Iodine deficiency was a common problem in humans before the introduction of iodised salt prior to the Second World War. In more recent times, the Ministry of Health report that, for various reasons, iodine deficiency in humans appears to be increasing again.