Iodine Testing

DCPAH now offers iodine testing in feeds, serum, milk, and body tissues. Iodine is a nutritionally essential trace element necessary for the synthesis of thyroid hormones. It is deficient in the natural diets of animals in many areas of the world, including the Great Lakes region of the US. Therefore, it is typically supplemented in livestock diets, usually in the form of iodized salt. Iodine is also a toxic element and care must be taken to avoid excessive supplementation.

Iodine in the serum exists in inorganic and protein-bound forms. The protein-bound forms represent the thyroid hormones, primarily, while the inorganic iodine is not biologically active. Inorganic iodine typically represents the large majority of iodine present in serum. Total serum iodine and particularly serum inorganic iodine reflect the current dietary iodine consumption. Serum inorganic iodine is a good short-term measure of iodine consumption and will reflect excessive iodine supplementation, when present. Milk iodine concentrations typically reflect serum inorganic iodine concentrations.

A deficiency of dietary iodine eventually results in hypothyroidism and goiter. However, because of storage of iodine in the thyroid gland, animals may go for several months with insufficient iodine consumption before hypothyroidism develops. In such cases, serum total and inorganic iodine concentrations will be low, but thyroid function will be normal. These animals are not suffering from iodine deficiency, but will be eventually if additional iodine is not added to the diet.

Animals that are functionally deficient in iodine will be hypothyroid, but there are many causes of hypothyroidism other than iodine deficiency. The presence of adequate serum total or inorganic iodine concentrations in the face of hypothyroidism implies that the hypothyroidism is not due to iodine deficiency, although some goitrogenic toxicants may alter this relationship.

The best assessment of functional iodine status is thyroid iodine concentration. The presence of an enlarged thyroid gland accompanied by a low iodine concentration is diagnostic of iodine deficiency goiter. The thyroid gland is the only tissue that accumulates significant iodine. Although iodine concentrations in other tissues are measurable and may reflect excessive iodine consumption, tissues other than thyroid gland are generally poor indicators of iodine nutritional status.

While there is some concern about radioactive iodine contamination relative to recent events in Japan, DCPAH is not able to test for iodine radioactivity.

Iodine testing at DCPAH is available under the following test numbers:

**Iodine Total, Serum (50246) and Iodine Inorganic, Serum (50247)**

Serum for iodine testing may be collected in red-top tubes. It should be separated from the clot before submitting. One-half milliliter of clear serum is sufficient for either serum total or inorganic iodine determination, or both. The minimum iodine concentration detectable in serum by DCPAH procedures is 5 ng/mL.
Iodine, Tissue (50248)
Thyroid glands may be collected from necropsy tissue. It is best to send the entire gland, although it is not necessary. Other tissues such as liver are not recommended for the assessment of iodine status, but samples of five grams (or less in the case of biopsy samples) are sufficient for iodine testing. The minimum iodine concentration detectable in tissues by the DCPAH procedure is 0.5 ug/g.

Iodine, Feed (50249)
One-half pound of feed or feed supplement collected in a plastic bag is adequate for dietary iodine testing. If there is a label indication of the expected iodine concentration of the feed, please include that information. The minimum iodine concentration detectable in feed by the DCPAH procedure is 0.25 ug/g.

Iodine, milk (50251)
For milk testing, composite samples such as would be collected during a Dairy Herd Improvement (DHIA) test are best, but not essential. One milliliter of milk is sufficient for iodine testing. The minimum iodine concentration detectable in milk by the DCPAH procedure is 5 ng/mL.