

METABOLIC CHANGES OF THYROID HORMONES IN CATTLE. REVIEW

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Summary. In this review, the metabolic changes of thyroid hormones (TH) at specific tissues of cattle are reported. The thyroid gland produces and releases triiodothyronine (T₃) and thyroxine (T₄), which represent the only iodine-containing hormones in vertebrates. Thyroid hormones play critical roles in the differentiation, growth, metabolism, and physiological function of virtually all tissues. TH is required for the normal function of nearly all tissues, with major effects on oxygen consumption and metabolic rate. Animal and human studies indicate that thyroid hormones play an important role in cardiovascular, nervous, immune, and reproductive system development and function. The primary function of the hypothalamus-pituitary-thyroid (HPT) axis is to regulate thyroid hormone synthesis and production. Peripheral metabolism of thyroid hormones is a critical component of the impact these hormones have on intracellular function. Thyroid hormones can be metabolized in peripheral tissue by deiodination, conjugation, deamination, and decarboxylation enzyme reactions.

It has been known for decades that the neuroendocrine system can both directly and indirectly influence the developmental and functional activity of the immune system. TH have circadian rhythmicity in the plasma of lactating dairy cows, and concentrations of T₄ and T₃ in cattle are influenced by a variety of environmental factors, such as the ambient temperature and dietary components and intake. The positive correlation between circulating thyroid hormone concentrations and energy balance is well known in many species including cattle. In lactating dairy cows plasma T₃ and T₄ concentrations are negatively correlated with daily milk yield. Blood levels of T₄ were found to be lower in the earliest days of lactation than in late lactation.

Thyroid dysfunctions are associated with numerous morphological, physiological, and behavioral disorders, including reproductive and developmental disorders in humans and animals.

Key words: cattle, thyroid gland, thyroid hormones, review.