

## THERAPEUTIC MANAGEMENT OF CONCURRENT VITAMIN A AND ZINC DEFICIENCY IN BUFFALO CALVES- CASE REPORT

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### ABSTRACT

Vitamin A deficiency is either due to an absolute deficiency of vitamin A or its precursor carotene in the diet or secondary in which the dietary supply of vitamin A or its precursor is adequate but their digestion, absorption or metabolism is interfered with to produce deficiency at the tissue level. Secondary vitamin A deficiency may occur in case of chronic diseases of liver or intestine or due to deficiency of zinc (Radostits *et al.*, 2000). Absorption, metabolism, hepatic release, transport, and tissue utilization of vitamin A may depend on adequate zinc status while severe vitamin A deficiency may reduce absorption and lymphatic transport of zinc by altering synthesis of a zinc-dependent binding protein (Bendich, 1993).

**Keyword:** buffalo calves, vitamin A, zinc, therapeutic management

### CASE HISTORY AND OBSERVATION

Five buffalo calves of 1-2 years of age were referred to the Veterinary Clinics and Teaching Hospital of SKUAST-Jammu with the history of sudden inappetance, reduced weight and heavy lacrymation. Clinical examination revealed slight clouding of the cornea, dilated pupils which

do not respond to the light. The menace reflex was almost absent but palpebral and corneal reflex was present; however, animal was not apparently blind. The clinical examination of skin revealed dermatophytosis with rough dry hair coat, heavy deposition of scales, with alopecia and wrinkling at the neck and head. Plucked hairs and scabbed scales were examined for fungal agent by direct microscopy in 10% KOH and lactophenol. Samples were inoculated on mycobiotic agar. The plates were incubated at 28°C for 2-6 weeks and examined for colony formation. Culture examination revealed *T. verrucosum* as the usual cause of dermatophytosis. Blood samples were taken from all the animals in heparinised vials for the estimation of vitamin A and serum zinc concentration. Vitamin A and serum zinc concentration were  $7.12 \pm 0.34$  µg/dl (reference values 15.4-32.3) and  $5.12 \pm 0.26$  µg/L (reference values 6-12). On the basis of history, clinical examination and decreased serum zinc and vitamin A concentration present, the animals were diagnosed to be suffering from combined vitamin A and zinc deficiency.

### TREATMENT AND DISCUSSION

The calves were administered orally with zinc sulphate at the rate of 1 gm per week for 45 days with vitamin A 300,00 IU and Belamyl<sup>a</sup> 3

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ml intramuscularly, as reported by Anand *et al.* (2005). The affected parts were topically treated zinc oxide ointment once daily for three weeks. Marked improvement were reported in terms of disappearance of skin lesions and convulsions, and the appetite returned to normal, but the clouding of eyes remained unaffected. All other buffalo owners were advised to supplement vitamin A and zinc to the animals. Vitamin A has numerous functions such as maintenance of epithelial cells, vision, immune cell function and gene regulation (Chew, 1987). Absorption, metabolism, hepatic release, transport, and tissue utilization of vitamin A depends on the adequate level of serum zinc. Deficiency of zinc predisposes the animal for vitamin A deficiency (Serdar *et al.*, 2009). Zinc plays a regulatory role on vitamin A transport mediated through protein synthesis. Zinc deficiency depresses the synthesis of <sup>a</sup>. A brand of Sarabhai Zydus, Ahmedabad retinol binding protein (RBP) in the liver and leads to lower concentrations of RBP in the plasma (Christian *et al.*, 1998). Vitamin A and zinc also interact through the ubiquitous, oxidative conversion of retinol to retinaldehyde (retinal), a critical step in the metabolic pathway of vitamin A that is well-described in the visual cycle in the retina of the eye and requires the action of a zinc dependent retinol dehydrogenase enzyme (Christian *et al.*, 1998). Zinc is also essential components of the body's antioxidant defense that play an important role in the prevention of free radical-induced damage to tissues for maintenance of health and production (Ewans *et al.*, 2001). Susceptibility to inflammatory and infectious conditions increases during zinc deficiency (Naresh *et al.*, 2001). Along with zinc, vitamin A is also an important defense booster. Vitamin A increases disease resistance and has stimulatory effects on cell-mediated immunity (Bendich, 1993). Deficiency of vitamin A and zinc

often results in increased prevalence of infectious diseases like dermatophytosis in the present case. Therefore, supplementation of zinc along with vitamin A in vitamin A deficient animals is beneficial .

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