

MINERAL DEFICIENCY

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Calcium and Phosphorus

- **Ca and P are associated in bone formation in growing chicks or poultts and eggshell in mature hens.**
- **Ca is essential for: Clotting of blood, With sodium and potassium for normal contraction of cardiac muscle, Regulation of cellular metabolism and processes.**
- **P is an essential component of purine nucleotides and other phosphorylated compounds in metabolism of carbohydrates and fats, Composition all living cells, and Plays role in maintenance of acid-base balance.**

DEFICIENCY

Utilization of Ca and P depends on presence with amount of vitamin D in diet.

In vit D deficiency, deposition of these minerals in bones of growing chicks and poult is reduced; bones become depleted of mineral; and the quantity of Ca in eggshells is decreased. Def of Ca and P in growing broiler chicks cause rickets that differs histologically from Vit D def.

Tibiae show widening of proliferating zone of epiphyseal cartilage and irregular contours in the boundary between proliferating zones and hypertrophic cartilage .

Irregular cartilage columns and elongated epiphyseal vessels were present. Epiphyseal growth plate had widened and extended as a cartilaginous plug into the metaphysis

SIGNS

- **Chicks are unable to stand , displaying a spraddle-legged posture. Folding fractures and bowing or rotation of tibiotarsus , increased respiratory rates due to poor rib strength and infolding "interfered with respiratory movements of the rib cage" and were polycythemic.**
- **Birds died of right ventricular failure with ascites.**

In laying hens, reduced egg production and thin shelled eggs; depletion of bones calcium ;bones become thin and fractures occur, especially in vertebrae, tibia, and femur. This condition may be associated with cage layer fatigue (OSTEOMYLECIA).

Excess Calcium. Nephrosis and visceral urate deposition (e.g., gout) were observed in the high calcium.

MAGNESIUM

Mg is essential for carbohydrate metabolism and activation of many enzymes, formation of bone and Eggshells.

Chicks and poults are grew slowly for approximately 1 week and then ceased growing and became lethargic. When disturbed, chicks passed into a brief convulsion accompanied by gasping and finally into a comatose state sometimes ending in death.

- **Tibiae exhibit abnormalities including thickening of trabeculae, increased retention of cartilage and occurrence of elongated and inactive osteocytes in the metaphysis. and enlargement of Haversian canals within the diaphysis.**
- **Excess magnesium, producing detrimental effects including reduced growth rate and bone ash in chicks and decreased egg size, eggshell thinning, and diarrhea in hens.**

MANGANESE

- **Mn is necessary for activation of several enzymes, normal growth, reproduction, formation of normal bones and prevention of chondrodystrophy.**

Mn deficiency impairs endochondral bone growth . eggshell quality, very low hatchability and chondrodystrophy in embryos. The peak of embryo mortality occurred on day 20 and 21 of incubation.

Embryo showed parrot beak.