

PIXE analysis of Phosphorus and Calcium in bone, liver and urine of disodium etidronate-injected rats

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Abstract

Etidronate (Disodium 1-Hydroxyethylidene-bis-phosphonate ; $C_2H_6Na_2O_7P_2=249.99$), a potent bisphosphonate, has shown to be effective in the treatment of metabolic bone diseases. The phosphorus and calcium are very suitable multiple particulate markers for the investigation of mineral metabolism in the bone of animals by means of the PIXE.

Dynamics of phosphorus and calcium were studied in Fischer rats after single dose of disodium etidronate. The phosphorus and calcium contents in the liver, bone and urine were estimated during 10 m after administration.

Etidronate rapidly and significantly increased bone phosphorus ($p<0.001$) and calcium ($p<0.001$). Etidronate induced a decrease in the excretion of phosphorus and calcium in urine. Also, a decrease in the concentration of phosphorus and calcium in the liver was observed in the administration of etidronate. Present results confirm the potency of etidronate, although the doses used were deliberately high because the primary aim of the study was to examine the kinetics, not the potency of the etidronate. In conclusion, etidronate significantly increases indices of bone formation and may decrease indices of bone resorption in rats.

Key words: PIXE, Disodium Etidronate, Phosphorus, Calcium, Fischer rats