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Ion-Chromatographic Analysis of Ethane-1-hydroxy-1,1-diphosphonate in Urine

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From 25 g urine the Ethane-1-hydroxy-1,1-diphosphonate (EHDP) is separated by coprecipitation with calcium-phosphate. By this procedure all EHDP is collected, even if an excess of phosphate does not precipitate completely. More Ca^{2+} rises the amount of precipitated phosphate, but the amount of EHDP does not change.

The precipitate is dissolved in acetic acid. In the solution Ca^{2+} is replaced by Na^+ by an ion exchanger. Traces of adsorbed EHDP on the ion exchanger are washed off with a solution of ethylenediaminetetraacetate. The EHDP is separated from phosphate by ion chromatography and determined by a phosphorus-specific detection system.

The rates of recovery must be controlled by analysis of the sample in parallel, spiked with EHDP. They depend reproducibly on the species of urine analysed and are normally in the range of 70 - 100 %, but in some samples they are much lower.

Any EHDP in blank tests of unspiked urines was not found.

The limit of detection depends on numerous parameters and should be determined in every individual case. Usually the limit of detection is below 50 ppb EHDP.