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Study of the surface properties of brushite during sorption of amino acids

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Abstract

Calcium phosphates are part fisiogenic and pathogenic mineral formations. In the body of animals and humans, brushite occurs mainly in conjunction with other FC in the composition of pathogenic mineral formations. There are a number of assumptions, according to which the basis of the processes of mineralization lies to the adsorption interaction of free amino acids and associated protein molecules with inorganic components of biological liquids. However, the mechanism of their interaction is not fully understood.

In this paper studied the adsorption of amino acids on the surface of brushite. Brushite was synthesized in the system of "$Ca(NO_3)_2$:$(NH_4)_2HPO_4$" with equimolar concentrations. According to the results of XRD and IR spectroscopy established that precipitation is represented by the phase of brushite. It was implemented dynamic dissolution of the solid phase of brushite, by varying the pH. It was received equations of the kinetic graphs. It was investigated the adsorption of amino acids in a wide range of variation in their concentrations and the pH of the solution. It was considered the effect of pH on the maximum adsorption of amino acids on brushite. The result of IR spectroscopy was shown to confirm adsorption. It was determined by the sign of the surface charge of the solid phase of brushite. It was obtained that the values of the sign of the surface charge of brushite positive. It was calculated the values of the Gibbs free energy and revealed that the interaction of amino acids with the surface of the brushite is characterized by physical adsorption.

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