

## Study of heparin interactions with zinc cation(II) and amino acid (proline)

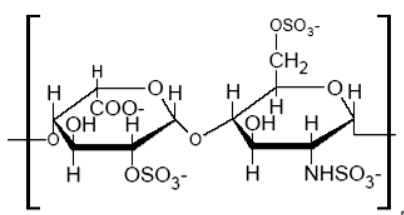
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The aim of this work was to study the complexation of Zn(II) ions with high molecular weight heparin and amino acid (proline) in a molar ratio of 1: 1: 1 using pH titration (background electrolyte 0,15 M NaCl; temperature 37 °C) and methods of mathematical modeling of chemical equilibria (algorithms New DALSF EK, AUTOEQUIL and HYPERQUAD 2008).

It was considered that the high molecular weight heparin forms monoligand and polyligand complexes with Zn(II) ions (caused by a number of factors: the conformation of the polymer chain, steric factors) monomer unit of heparin in this case acts as tetradentate ligand.



Monomer disaccharide unit of heparin

As the result, after processing of titration curves using methods of mathematical modeling of ternary systems: metal ions – heparin – amino acids were obtained equilibria models, including the most likely possible forms. Equilibriums, forms and the corresponding stability constants are shown in the table below:

Equilibrium	$\lg\beta$
$\text{Hep}^{4-} + \text{Pro}^{-} + \text{Zn}^{2+} \leftrightarrow \text{ZnHepPro}^{3-}$	$9.54 \pm 0.29$
$\text{Hep}^{4-} + \text{H}^{+} + \text{Pro}^{-} + \text{Zn}^{2+} \leftrightarrow \text{ZnHepHPro}^{2-}$	$16.26 \pm 0.31$

All efforts demonstrated in this paper are focused on complex ion-molecule equilibria, which involve Zn(II) ion, high molecular weight heparin, as well as amino acid (proline). Particular interest for us is the synthesis and structural identification of ternary metal complexes due to possibility of their use in medicine.