

Influence of salts of singly-, double- and triple-charged cations of metals on sorption of H^+ and OH^- ions on dextran

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Abstract

Investigation of dextran type polyglycosides is of great interest for biochemists and physiologists due to significance they have taken as blood plasma substitutes as well as gel-filters for molecular screen chromatography.

Dextrans – polysaccharides consisting of glucopyranose remainders with empirical formula $(C_6H_{10}O_5)_n$. The majority of dextrans has branching structure and contain two types of hydroxyl groups: glucoside and glucose. Glucoside and glucose hydroxyl groups are characterized by different chemical activity and determine not only the structure of polysaccharides but their physical and chemical properties as well.

Investigation of acid-base balance within systems of dextran – electrolyte water solutions is necessary for determination of colloid and chemical properties of these dispersion systems which determine their use as blood plasma substitutes as well as natural sorbents applied for cleansing of organism from harmful substances.

Influence of salts of singly-, double-, and triple-charged cations of metals on sorption of H^+ and OH^- on dextran depending on electrolyte concentration and pH of dispersion system has been investigated in this work. Studies have been carried out by method of continuous potentiometric titration.

Water solutions of KCl, BaCl₂ and Fe(NO₃)₃ salts with concentration $1 \cdot 10^{-3}$ to $1 \cdot 10^0$ mole/l have been used in this work. It was determined that sorption balance within studied systems was gained in 30 minutes.

The research carried out has shown that dextran water dispersions are characterized by abnormality in classical dependence of ion exchange on solutions ionic force. It was determined that dextran pH_{TH3} values within KCl solutions are shifted insignificantly into the acid zone $4.75 \rightarrow 4.70 \rightarrow 4.60 \rightarrow 4.35$ as the concentration within the range $1 \cdot 10^{-3} \rightarrow 1 \cdot 10^{-2} \rightarrow 1 \cdot 10^{-1} \rightarrow 1 \cdot 10^0$ mole/l grows due to low specific adsorption of potassium cation. It was shown that theoretical concept of specific sorption increasing as the cation charge grows appearing in increase of pH_{TH3} value shift into the acid zone within the range of cations $K^+ \rightarrow Ba^{+2} \rightarrow Fe^{+3}$ is in force for dextran dispersions.