

## New emulsifiers for food applications based on hydrophobically modified chitosan

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New emulsifiers have been prepared on the base of hydrophobically modified chitosan (Ch) and chitosan succinate (ChS). Chitosan polyelectrolyte complex was obtained by salt complexation with an anionic surfactant hexadecyl-oligo-oxyethylene hemisuccinate (HOS). Modification of ChS was made with the use of surfactants of different nature: anionic (sodium dodecyl sulfate), cationic (dodecyl pyridinium chloride) and nonionic (oxyethylated cetyl alcohol) surfactants. It was found that both modified Ch and ChS-surfactant complexes have high surface activity, however surface activity of Ch-HOS complex is higher as compared with that value for ChS-surfactant complexes. That can be explained by unusual structure of HOS which has the polyethylene oxide chain located between the hydrophilic head group and the hydrophobic alkyl tail and promotes the interaction between HOS and Ch according to various mechanisms: electrostatic, hydrophobic interaction and complex formation (due to hydrogen bonding). The cooperative action of these mechanisms enhances the hydrophobicity of HOS-Ch complexes. That increases adsorption of HOS-Ch complexes on the oil surface and thus improves stability of oil-in-water emulsions. Hydrophobic modification of ChS by surfactants differs significantly from hydrophobic modification of Ch by HOS. It should be connected with the distribution of hydrophilic and hydrophobic groups in ChS molecule determining its polyampholyte properties. New hydrophobically modified Ch and ChS are effective emulsifiers of oil-in-water emulsions therefore various factors controlling the stability of emulsions in presence of these Ch derivatives have been studied. The results obtained demonstrate a possibility to produce effective biocompatible emulsifiers on the basis of hydrophobically modified Ch and ChS complexes.

**Keywords:** hydrophobically modified chitosan, hexadecyl-oligo-oxyethylene hemisuccinate, chitosan succinate, emulsion stabilization, surfactant, surface activity, food emulsifier

### Biography

Elena Lasareva works at the Chemical Department of Lomonosov Moscow State University as a scientific researcher. She received a bachelor's degree in chemistry at the same University at 1976 and a master's degree in biogeochemistry in 1987. Her current field placement is MSU, Chair of Colloid Chemistry, Chemical Department. Her research interests include biogeochemistry, colloid chemistry and polymer sciences.

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