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**VISCOSITY OF AQUEOUS SOLUTIONS OF THE DIETARY MONO- AND
POLYSACCHARIDES**

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It is one of the common today's trends in food processing industry to use various dietary supplements and sugar substitutes instead of sucrose. The main reasons for that are excessive calorific value of sucrose and comparatively difficult process of its digestion. These problems cause gaining excessive weight because of overconsumption of sweets on the one hand and additional load on the human digestive system – on the other. In the context of substituting sugar, it is important to control not just taste qualities but the rheological parameters of the products and raw materials. Indeed, sugar provides not just sweetness but also the required viscosity, consistency and/or uniform distribution of the components within the bulk of the end product. The latter characteristic is caused by the ability of sucrose to form and maintain more or less stable structuring in the disperse systems. The solutions of monosaccharides are less viscous and do not provide the required stability to secure this structuring. This problem can be solved by adding some amounts of polysaccharides to restore the needful viscosity.

It has been found that the effect of adding the carbohydrates on the system's viscosity depends on their molecular mass. For the concentrations 1-30 %, the viscosity increases with the hydrocarbons' concentration, and this effect enhances with an increase of the solute's molecular mass. The efficiency of adding the carbohydrates decreases in the sequence sucrose>glucose>fructose for the entire range of concentrations. The system's density also increases with its concentration.

It was found that the aqueous solutions of pectin with the concentration up to 0.4 % exhibit the properties of regular Newtonian's fluids. However, when pectin and some mono- or polysaccharide are simultaneously present, their cumulative effect on the solution's viscosity is slightly greater than just a sum of the separate effects of each component. It was found that only 0.05 % of pectin was sufficient to keep the system's viscosity at the values that are characteristic of the working solutions with sucrose. Therefore, it can be concluded that a mixed additive of pectin and some monosaccharides can maintain the rheological characteristics of the system even if it does not consist of sucrose. An additive of 0.05-1% of pectin and 10-40 % of glucose provides the needful sweetness and maintains the system's viscosity at the level that is required to keep the stability of the semi-finished confectionery and food. As seen in the Fig., viscosity of the solution of glucose containing a 0.05 % additive of pectin remains above that of the solution of sucrose with the same concentration. It proves that such solutions of glucose can be used as sugar substitutes in the food industry without a risk of losing the required system's consistency and viscosity.

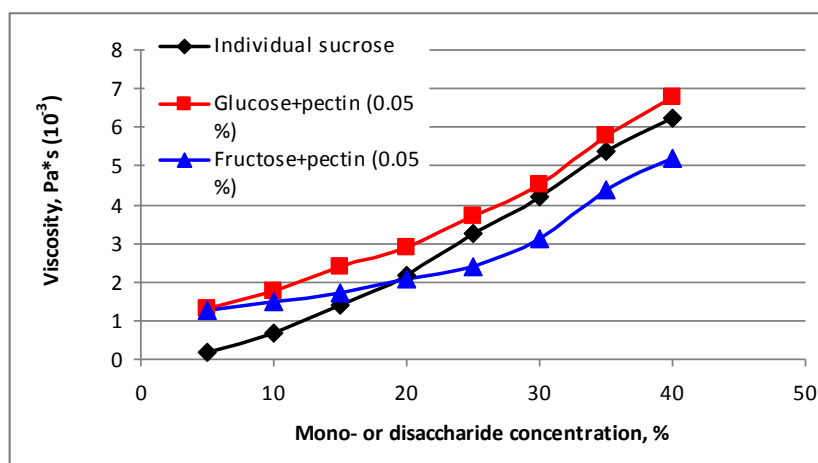


Fig. Comparison of viscosity of the individual solutions of sucrose and combined solution of glucose (fructose) with 0.05 % of pectin.