

3 - 4 mg were heated in closed corundum crucibles with a volume of 85 μl . at a speed of 5 deg min^{-1} in dry nitrogen atmosphere. The device was pre-calibrated by temperature using the Netzsch method and standard samples.

RESULTS AND DISCUSSION

Thermal analysis indicates that glucose undergoes several endothermic transformations when heated to 500°C (Fig. 1(a)). During the first of these, starting above 144°C and reaching a maximum depth of about 154°C, the substance obviously melts, since the process occurs with heat absorption, but without weight change. According to literary data, for example, given in [8], glucose melting, in fact, takes place near 150°C - 160°C. Immediately after the first endo-effect weight substances begins to decrease. This occurs to a greater extent, the higher the temperature, but by 250°C the process slows down. As a result, a stage is formed on the TG curve, the end of which corresponds to a reduction in the weight of the sample by 23 %.

Heat absorption at this stage is manifested in the DSC (Differential Scanning Calorimetry) curve in the form of a not very intense, but rather wide thermal effect,

completely coinciding in temperature with the step on the TG curve, which indicates the beginning of glucose destruction [1]. The results of the kinetic analysis, published in [4, 5], indicate that in the specified temperature range several consecutive and parallel reactions take place, whose contribution to the overall process depends on the temperature and heating rate.

According to [6, 7] on the course of the process also affect the composition of the atmosphere, the presence of impurities in substances and many other factors. According to [2], the products of glucose thermolysis are represented by several tens of compounds, and according to [3] their number reaches 130.

Due to the complexity and variability of the composition of volatile products of thermal degradation of glucose, as well as other carbohydrates, their analysis in this work was not performed. Weak decomposition of glucose is possible earlier, already close to the melting point, but with prolonged heating.

Further heating of the substance leads to the continuation of weight loss, which is manifested on the TG curve by an even greater step than the previous one: the total loss at this stage is approximately 55 %. However, on the DSC curve, this transformation is found in the

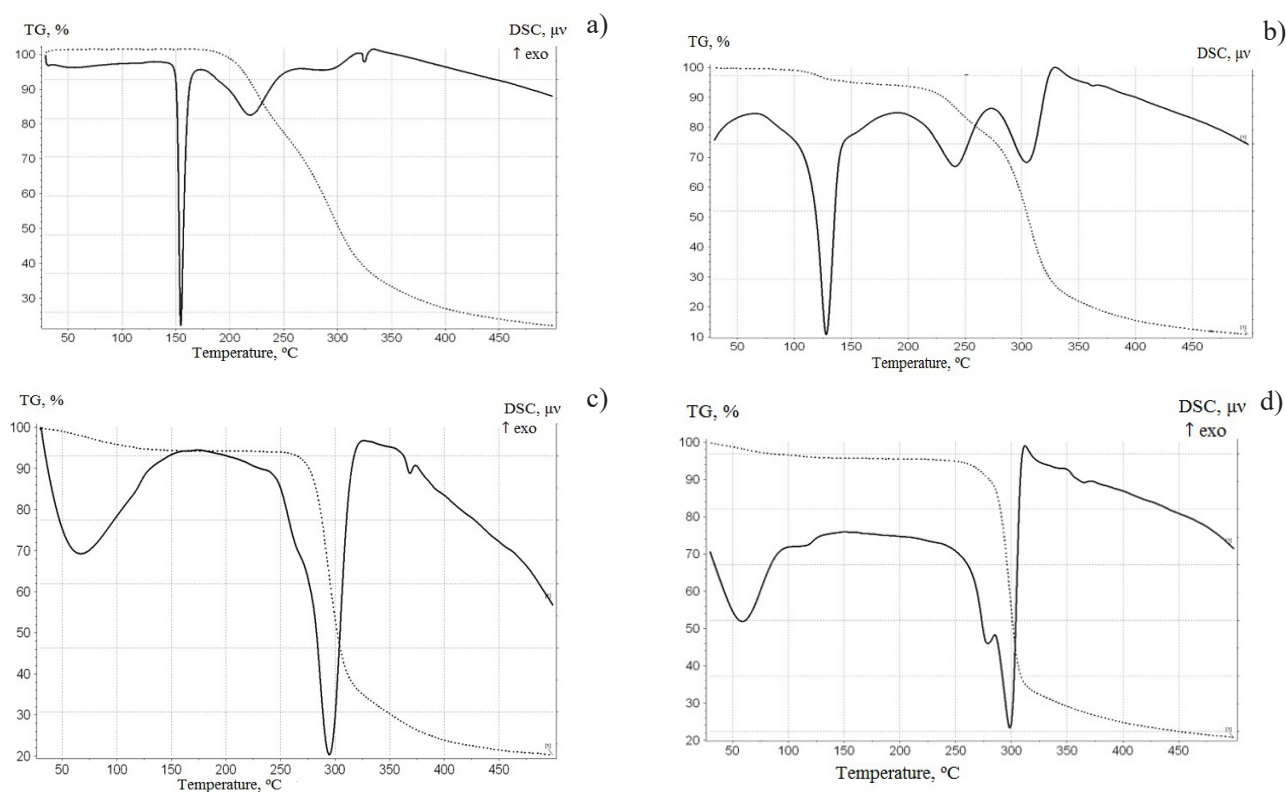


Fig. 1. DSC and TG curves for glucose (a), maltose (b), amylose (c) and amylopectin (d).