

Fig. 1. IR spectra of glucose (a) and maltose (b). Areas of manifestation of bonds: 1 - ν OH (hydroxyl), 2 - ν OH (H_2O), 3 - ν_s CH and ν_{as} CH, 4 - δ CH₂+ δ OCH+ δ CCCH, 5 - δ CH₂+ δ COH+ δ CCCH, 6 - δ OCH+ δ CCCH, 7 - δ CH+ δ OH, 8 - ν CO+ ν CC, 9 - ν CO, 10 - ν CO+ ν CCH, 11 - δ CH, 12 - δ CCO+ δ CCCH.

product of glucose, one of the molecules of which has lost the hydroxyl group associated with the anomeric carbon atom, and the other a similar group at the fourth carbon atom, and the fourth carbon atom. Due to its molecular structure, the infrared spectrum of maltose should be similar in nature to that of glucose, but, at the same time, it should have significant differences. Indeed, some of the lines, characteristic of the glucose spectrum, namely those of ν OH, ν CO, δ COH, δ OCH and δ CCO, are significantly weakened or disappear altogether (Fig. 1). And this is natural, since it is these links that should be most changed as a result of the formation of the-1,4-glycosidic bridge. In fact, the spectral manifestation of most of maltose chemical bonds is

well known [2, 3, 6 - 8]. But this is not valid for $\alpha(1 \rightarrow 4)$ bonds. Thus, a number of publications [4, 5, 9 - 12] report that the absorption bands recorded in the ranges of $750\text{ cm}^{-1} - 950\text{ cm}^{-1}$, $930\text{ cm}^{-1} - 940\text{ cm}^{-1}$, and $1140\text{ cm}^{-1} - 1175\text{ cm}^{-1}$ could be assigned to these bonds. According to refs. [11 - 14], the presence of C-O-C bond appears as maxima at 1105 cm^{-1} and 1150 cm^{-1} , while according to refs. [3, 15] it corresponds to a band in the range of $966\text{ cm}^{-1} - 993\text{ cm}^{-1}$. In terms of glycosidic bond identification in the carbohydrates IR spectra, a useful information may be obtained by comparing the spectra of glucose homologs and those of several pyranose rings containing more than two carbon atoms.

Indeed, a gradual change of the proportion of $\alpha(1 \rightarrow 4)$

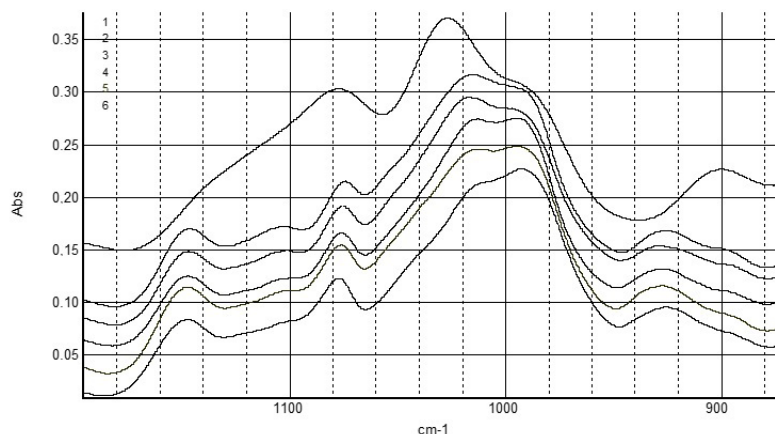


Fig. 2. IR spectrum: maltose (1), maltotriose (2), maltotetraose (3), maltohexaose (4), maltseptaoose (5), amylose (6). Spectrum line 1 is strongly maleficated.