SURFACE IONIZATION REGULARITIES OF THE SIBUTRAMINE MOLECULE

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Sibutramine is an anti-obesity drug that has been banned due to the risk of cardiovascular diseases (nervousness, dry mouth, headache, dizziness, increased blood pressure, increased heart rate, heart attack, stroke). However, its illegal use has been observed. Therefore, highly sensitive and precise analytical methods are necessary for the detection and structural analysis of sibutramine. From this perspective, surface ionization mass spectrometry (SI/MS) can be effectively used as a rapid and efficient analytical technique.

Surface ionization mass spectrometry is based on the direct generation of ions from a heated solid surface, allowing for the analysis of their physicochemical composition. The SI/MS technique is advantageous for the selective and efficient analysis of nitrogen-based organic compounds.

Experimental studies were conducted using a МИ-1201В static magnetic mass spectrometer, which was modernized for operation in the SI mode [1]. A tungsten (W) ribbon (0.05×1.0×16.0 mm³) was used as a thermoemitter to generate positive ions. The temperature of the thermoemitter was controlled within the range of 600 K to 1150 K.

Preliminary experimental results showed that in the mass spectrum of sibutramine, fragment ions [M-R]⁺ were generated due to the cleavage of the phenyl ring and amine group. Additionally, quasi-molecular ions [M-H]⁺ appeared as a result of hydrogen loss when the molecule desorbed from the thermoemitter surface. It was concluded that the primary ion in the mass spectrum was a fragment ion.

The dependence of sibutramine ion currents on the thermoemitter temperature was found to follow the Boltzmann distribution law, and the threshold temperatures for ion formation were determined.

1. Akhunov S. et al. //European Journal of Mass Spectrometry. 2021. V. 27. №. 1. p. 29-38.