0SYNTHESIS OF SCHIFF BASES OF CINNAMALDEHYDE WITH SOME AROMATIC AMINES AND THEIR SPECTRAL STUDY

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In recent years, the synthesis of new biologically active compounds based on naturally derived organic substances has become one of the important research directions in chemistry and pharmaceutical sciences. In particular, Cinnamaldehyde is distinguished by its broad spectrum of biological activity and is widely used as an important starting material in many pharmacological studies. The imino compounds (Schiff bases) formed as a result of its reaction with aromatic amines are of great scientific and practical significance. According to literature data, cinnamaldehyde and its derivatives exhibit significant biological activity in various biological systems. A number of studies have reported that Schiff bases synthesized from aromatic amines demonstrate considerable antimicrobial activity. In addition, such compounds may actively participate in oxidation–reduction processes and influence cellular metabolism. Therefore, the synthesis of imino derivatives based on cinnamaldehyde and the investigation of their properties remain one of the relevant scientific research areas.

Taking the above into consideration, condensation reactions of Cinnamaldehyde

with various amino compounds (4-amino-m-cresol and p-aminophenol) were carried out in the course of this study. The reactions were performed in ethanol medium at the boiling temperature of the solvent (78–80°C). The progress of the reaction was monitored by thin-layer chromatography (TLC). After completion of the reaction, the solvent was removed from the reaction mixture using a rotary evaporator. The excess initial cinnamaldehyde present in the residue was purified by washing with hexane. The isolated main product was first dried at room temperature and then additionally dried in a vacuum dryer.The chemical structures of the purified compounds were analyzed by IR, UV spectroscopy, and mass spectrometry (LC-MS). The IR spectral analysis of the synthesized Schiff bases showed several important vibrational frequencies corresponding to functional groups confirming their structures. One of the most significant features was the intense absorption band observed at 1621 cm^{-1}, corresponding to the stretching vibration of the azomethine group (–C=N–), which confirms the formation of Schiff bases. At the same time, the disappearance of the carbonyl group (C=O) absorption band characteristic of the initial cinnamaldehyde (usually around 1670–1680 cm^{-1}) indicates the complete progress of the reaction.

According to the mass spectrometric analysis, the Schiff base formed from cinnamaldehyde and 4-amino-m-cresol showed an m/z value of 239.08151, while the derivative obtained with p-aminophenol exhibited an m/z value of 223.12729. The UV spectroscopic results additionally confirmed the structures of the synthesized Schiff bases. The absorption bands observed in the 200–280 nm region correspond to π→π* electronic transitions of the aromatic rings. In addition, relatively weaker but significant absorption maxima recorded in the 300–350 nm range were attributed to n→π* electronic transitions associated with the azomethine group (–C=N–) and the conjugated system. The obtained compounds were purified, and their chemical structures were confirmed by IR, UV spectroscopy, and mass spectrometry methods.

In particular, the appearance of the characteristic azomethine (–C=N–) absorption band at 1621 cm^{-1} in the IR spectrum and the disappearance of the aldehyde C=O absorption peak demonstrated the successful completion of the reaction. The UV spectral data confirmed the presence of a conjugated system in the molecules, while mass spectrometry further verified the structures by determining the molecular masses of the synthesized compounds. The obtained results demonstrate the possibility of synthesizing new Schiff bases based on cinnamaldehyde and provide a foundation for further investigation of their biological activity.