Synthesis, Characterization, and Tautomeric Properties of Some Azo-azomethine Compounds

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The primary azo compound 1-(3-formyl-4-hydroxyphenylazo)-4-nitrobenzene reacts with some aliphatic and aromatic diamines and yields the corresponding azo-azomethine compounds. These compounds were characterized by elemental analysis, IR, UV/Vis, and NMR spectroscopy. The primary azo compound exists entirely in the azo form in solution as well as in the solid phase. The tautomeric structure of azo-azomethine compounds heavily depends on the solvent and the substituents. Aliphatic diamine-based compounds favor the enol-imine tautomer while aromatic diamine-based compounds have structures that lie between the two enol-imine and keto-amine tautomers due to a relatively strong intramolecular hydrogen bond. The compounds exhibit positive solvatochromism (bathochromic shift) so that their absorption bands move toward longer wavelengths as the polarity of the solvents increases. In addition, UV/Vis spectrophotometry has shown that the studied compounds have molar extinction coefficients larger than 40000.

Key words: Dye, Azo-azomethine, Schiff Base, Hydrogen Bonding, Tautomerism