

AlCl₃-Catalyzed [3 + 2] dipolar cycloaddition of the *N,N'*-cyclic azomethine imines to the acryloylferrocene enabling access to the series of 5-substituted 6-ferrocenoyl tetrahydropyrazolo [1,2-*a*]pyrazol-1(5*H*)-ones. This facile methodology shows high substituent tolerance. Furthermore, easy chromatographic separations afford isolation of the pure diastereoisomers. Optimized reaction conditions, spectroscopic and electrochemical characteristics of the reaction products are provided. The X-ray structural analyses of three cycloadducts were done and obtained results were compared with properties of reported *N,N'*-bicyclic systems those displayed conformational similarity. Antibacterial activities of all products against two Gram-positive and two Gram-negative bacterial strains were evaluated by the experimental methods.