Studies on Cathodic Cleavage of some 2- (N-arylcarbamoyl)-4,5- dihydroimidazoles

Dr.Pratibha Sharma
School of Chemical Sciences
Devi Ahilya University, Indore-452 017,India
E-mail: drpratibhasharma@yahoo.com

The chemistry of five-membered diazoles has received considerable interest over a period of last many years. In particular context, imidazoles and its derivatives have been found associated with various types of pharmacodynamic and chemotherapeutic properties. In quest to fulfill the greater demand of better CNS depressants,and antihypertensive agents ,an impetus has been aroused to synthesize some substituted imidazoles viz., 2- (N- arylcarbamoyal)-4,5- dihydroimidazoles .Formation of these imidazoles was achieved by the chloroacetylation of some substituted arylhydrazines to afford N-chloroacetylated products at first instance.These chloroacetylated derivative on treatment with ethylenediamine in the presence of sulphur yields cyclized products upon refluxation in toluene. Structures of all the synthesized compounds have been established on the basis of their consistent elemental, IR, and ^{1}H - NMR spectral data.

In view of the fact that the physiological activity of a molecule is closely related to their redox behavior in cell membrane, efforts has been laid down to undertake comprehensive electrochemical viz., polarographic and cyclic voltammetric studies on some substituted synthesized imidazoles compounds. The electrochemical reduction of these compounds has been studied over a wide pH range at dropping mercury and glassy carbon electrodes.All the synthesized compounds were found to exhibit one well-defined, diffusion –controlled, wave. They give four- electron irreversible waves corresponding to the reduction of –NH-CO- site flanked between an aryl and imidazole nuclei. On the basis of polarography, cyclic voltammetry, coulometry, and product identification, a plausible reduction mechanism is suggested to account for the reduction mechanism of these compounds. Kinetic parameters, i.e. charge-transfer coefficient (αn) and forward rate constant ($k^{0}_{f,h}$) have also been calculated

Key Words: 2- (N- arylcarbamoyal)-4,5- dihydroimidazoles, Polarography and cyclic voltammetry, Kinetic parameters, Electrochemical synthesis, Electrochemical reduction.