INVESTIGATION ON ELECTRO-REDUCTION BEHAVIOUR OF SOME SYNTHESIZED 3-ARYLAZO –8- FORMYL –4- METHYL BENZOPYRONES AT SATURATED CALOMEL AND GLASSY CARBON ELECTRODES

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In recent years the number of investigations within electrochemistry has been increased tremendously .A number of analytical methods can be used to elucidate the mechanism of the electrochemical reaction.The electron is a non –polluting reagent and electrochemical reactions are easy to control automatically. In view of the fact that biologically important compounds are electoactive , or they can be transformed into electroactive substance ,electro- reduction studies on some synthesized anticogulating agents i.e., benzopyronene have been carried out. Moreover,benzopyrone derivatives have been found to exhibit remarkable activities such as fluorescent dyes,CNS depressants, antitumer agents HIV prolifirator and as powerful anticoagulants. A systematic perusal of the existing literature reveals that inspite of enormous amount of pharmaceutical importance associated with arylazo compounds, studies on electrochemical behavior of azo group containing compounds bearing benzopyrone moiety attached at one of the ends of the azo group, are hitherto uninvestigated. Hence it was thought worthwhile to undertake systematic and comprehensive electrochemical studies on some synthesized 3-arylazo –8- formyl –4- methyl benzopyrones with a view (i) to decide about the fate of electroreduction process (ii) to elucidate the mechanism of cathodic reduction and (iii) to find out the effect of varying experimental conditions.

For the sake, a series of synthesized 3-Arylazo –8- formyl –4- methyl benzopyrones was synthesized in excellent yields (80-90 %). Structures of all the synthesized compounds have been established on the basis of their consistent elemental, IR, and ^{1}H-NMR data . The electrochemical reduction of all the compounds have been studied over a wide pH range in B.R.buffers at dropping-mercury and glassy carbon electrodes. All the compounds were found to undergo cathodic reduction by the uptake of two-electrons in a diffusion –controlled and irrevrsible manner . On the basis of polarography, cyclic voltammetry and coulometry, a plausible reduction mechanism is suggested to account for the reduction of azo site in the compounds. Kinetic parameters, i.e. charge-transfer coefficient (αn) and forward rate constant ($k^{0}_{f,h}$),Diffusion-coefficient ($D_o^{1/2}$) and diffusion current constant(I) have also been calculated. An interesting correlation between half-wave potential ($E_{½}$) values of various substituents and Hammett substituent constant(σ) has also been interpreted..

Key words:

Electrochemical reduction, Electrochemical synthesis, Azo-compounds, 3-Arylazo –8- formyl –4- methyl benzopyrones , Polarography, cyclic voltammetry and coulometry, Kinetic parameters.