EVALUATION OF THE REDOX INTERACTION OF RUTIN WITH SOME MEDICINAL SUBSTANCES BY CYCLIC VOLTAMMETRY

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INTRODUCTION AND AIM

Rutin, a common flavonoid glycoside posses polyphenolic structure that could be easily subjected to redox reactions, which allows its analysis by different electrochemical methods.

The aim of this study was to evaluate the interactions between rutin and certain medicinal substances, as a potential food-drug interaction, after consuming them in the same time.

Figure 1. Laboratory equipment for experiments

MATERIALS AND METHODS

Standard solutions of rutin, diazepam, lorazepam, glimepiride, α-lipoic acid, acetylsalicylic acid and L-ascorbic acid in concentrations of 0.001 mol L^{-1} have been used as materials. All experiments were performed in a phosphate buffer (pH =7.00) and 0.1 mol L^{-1} KCL added as electrolyte.

The interactions between rutin and lorazepam, diazepam, α-lipoic acid, glimepiride, acetylsalicylic acid and ascorbic acid, have been evaluated by the means of cyclic voltammetry. The experiments have been performed on a glassy carbon electrode as working electrode at potential range from -0.4 to 0.6 V. As a reference electrode was used platinum electrode and a graphite stick has been employed as counter electrode.

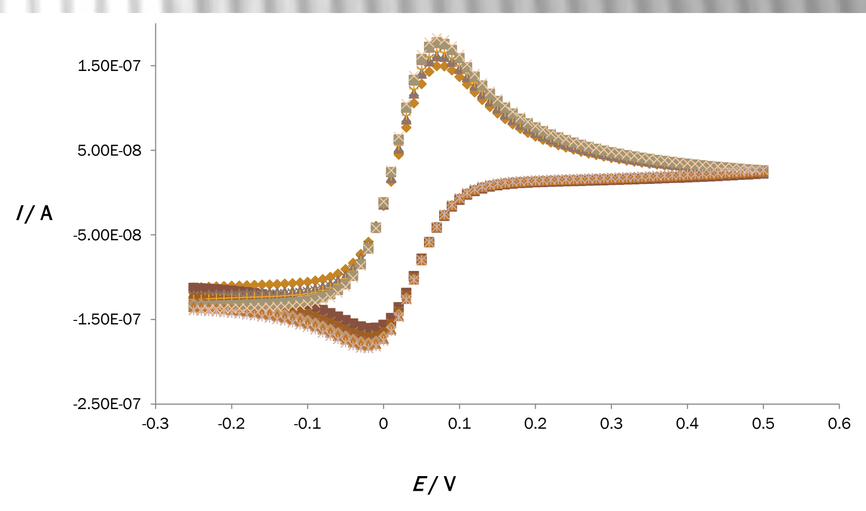


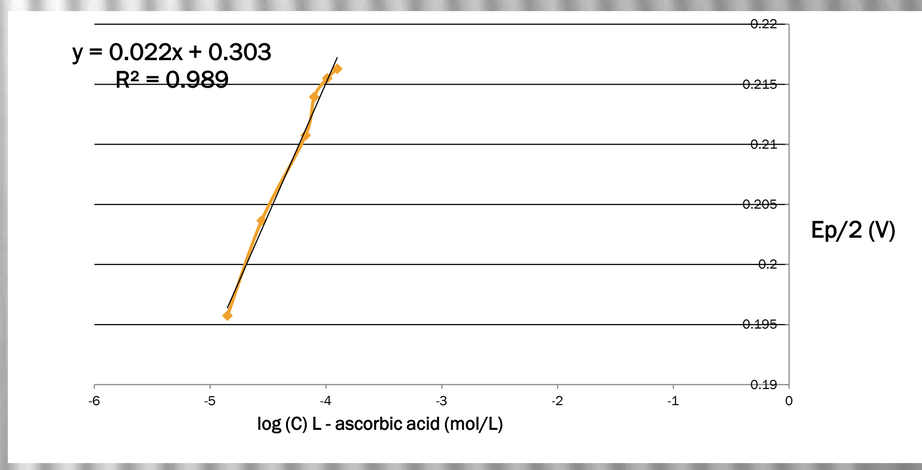
Figure 2. Simulated cyclic voltammograms of the interactions between rutin and lorazepam

RESULTS

The obtained results were used for further calculation of the kinetic parameters in a specially designed theoretical models.

The highest interactions were observed when rutin reacted with acetylsalicylic acid and L-ascorbic acid. The half-wave potential after their interaction have been moved for about 25 mV.

The estimated values of the chemical rate constants for the interactions between rutin and the investigated compounds read (in mol^{-1} L s^{-1}): 0.0025, 0.0022; 0.0024; 0.0020; 0.0550 and 0.0620 for lorazepam, diazepam, α-lipoic acid, glimepiride, acetylsalicylic acid and L-ascorbic acid, respectively.



Graph 1. Dependence of the half – wave potential and log (c) of L-ascorbic acid

CONCLUSIONS

The highest interactions have been noted between **rutin and L-ascorbic acid**. When the rutin and vitamin C or acetylsalicylic acid, are administered together, the effects of rutin are expected to be prolonged and enhanced. These interactions can also lead to some synergistic or antagonistic physiological effects.

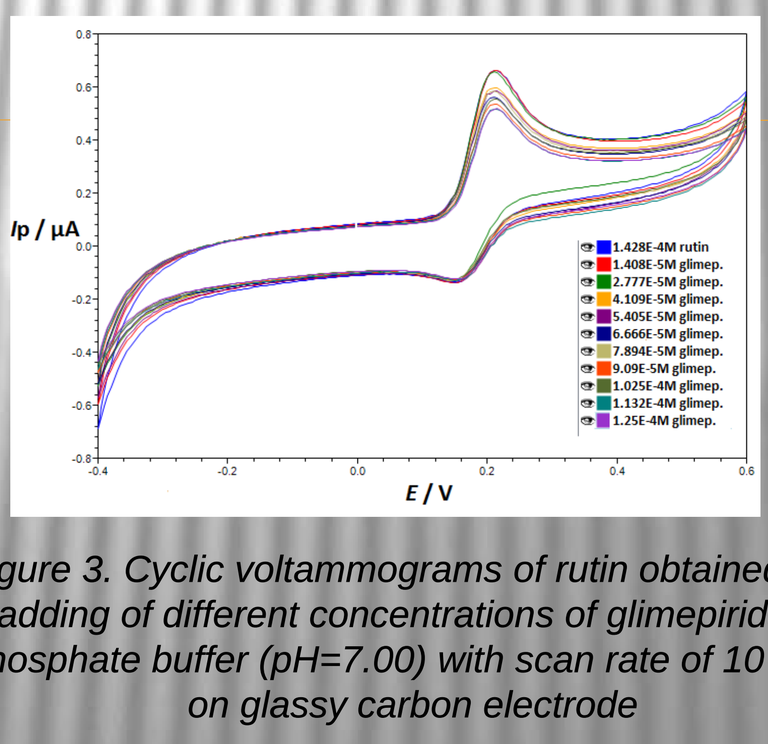


Figure 3. Cyclic voltammograms of rutin obtained with adding of different concentrations of glimepiride in phosphate buffer (pH=7.00) with scan rate of 10 mV/s on glassy carbon electrode

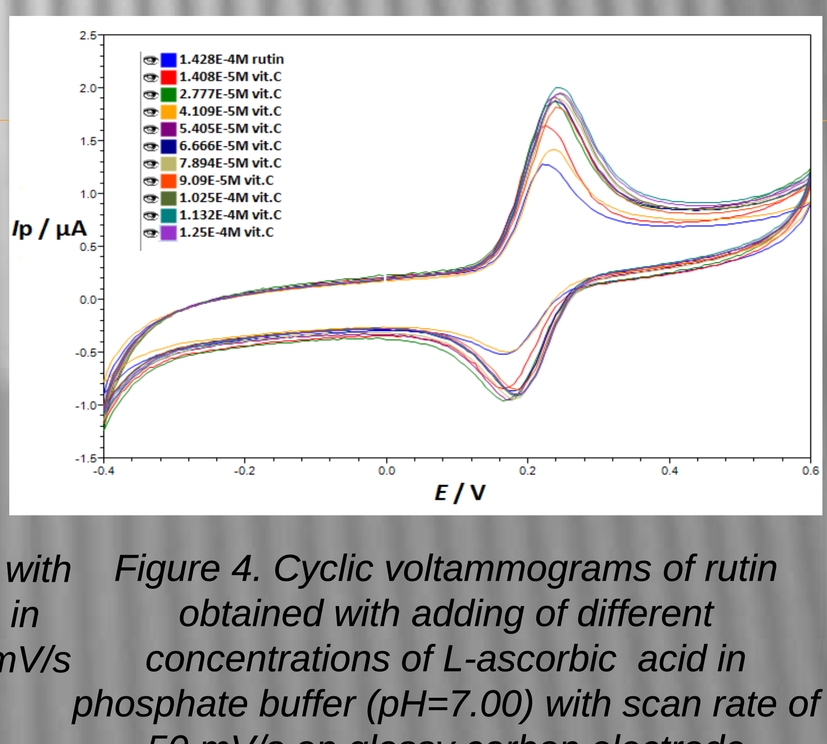


Figure 4. Cyclic voltammograms of rutin obtained with adding of different concentrations of L-ascorbic acid in phosphate buffer (pH=7.00) with scan rate of 50 mV/s on glassy carbon electrode