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Versatile Platform for Spectrofluorimetric Determination of Some Chemical Drugs by Redox or Diazotization Reaction with Nitrite

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Abstract

Nitrite and nitrate determinations received a special consideration in our research and more convenient analytical methods have been developed on this goal, based either on biamperometry1, spectrophotometry2 or fluorimetry3, coupled sometimes by flow injection1,2. However, the non-zero intercept of the biamperometric calibration obtained with the I2/I– redox system as indicating couple1, the perfect rectilinear response of the spectrophotometric method to the (nitrite + nitrate) molar sum as long as a photochemical reactor is coupled on-line2, and the easy development of the reaction between nitrite and proflavine in acidic conditions favoring the occurrence of a non-reactive tri-cationic species of the employed fluorimetric reagent3 reveal complex reaction mechanisms in the three cases. In the present work, those mentioned "anormal" facts are attempted to be mathematically explained by appropriate reaction mechanisms supposed to take place in the involved chemical solutions. Moreover, investigation by 1H-RMN of the trifluoroacetic acid – nitrite – proflavine mixtures is able to fully clarify the interaction between proflavine and nitrite in hydrochloric solutions and to predict the experimental conditions gathering to fluorescent and/or non-fluorescent reaction product(s). The last chemical system is especially convenient to be used in connection with different chemical drugs that either interact with nitrite or can act as a coupling agent for a diazonium ion. Accordingly, this system can be considered an extremely versatile platform for rather simple, inexpensive and sensitive spectrofluorimetric determinations of many drugs. To support this conclusion, there are presented some experimental results, obtained recently in the quantitative determination of either vitamin C or naringin from few marketed pharmaceuticals.

Biography

DAVID Vasile completed his PhD from University of Bucharest, Romania and he is Associated Professor at the Department of Analytical Chemistry from the same University. He has over 20 publications that have been cited over 200 times, and his publication H-index is 9. His research interests encompasses mainly Instrumental Methods of Trace Analysis, Separation Science and Chemometrics. He has been serving as a reviewer for reputed Journals of Analytical Chemistry. DORE Mădălina has graduated the Faculty of Chemistry, University of Bucharest and she is now enrolled as a Master Student at the same Faculty. She is preparing her Master Work in the field of Pharmaceutical Analysis.

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