Some Kinetic Aspects of Analytical Interest

THESIS SUBMITTED
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M.Sc. (Chemistry) 1991

TO
CHEMISTRY DEPARTMENT
FACULTY OF SCIENCE
AIN SHAMS UNIVERSITY

FOR
DOCTOR OF PHILOSOPHY
IN CHEMISTRY

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1995

Acknowledgment

First and foremost, I would like to thank ***God*** for giving me the opportunity and will-power to accomplish this work.

I would like to express my deep gratitude and appreciation to Dr. ***T. Fukasawa***, Emeritus Prof. of Analytical Chemistry, Faculty of Engineering, Yamanashi University, Japan, for his sincere guidance, fruitful discussions and criticism during this work.

Also, I would like to express my deep gratitude and appreciation to Dr. ***M. F. El-shahat***, Prof. of Analytical and Inorganic Chemistry, Faculty of Science, Ain Shams University, for his kind supervision, encouragement and support throughout this work.

Sincere thanks are extended to Dr. ***M. Iwatsuki***, Prof. of Analytical Chemistry, Faculty of Engineering, Yamanashi University, Japan, for providing the laboratory facilities and his kind guidance.

I would like to extend my thanks to all colleagues in the Faculty of Science, Ain Shams University and also in the Faculty of Engineering, Yamanashi University, for their kind assistance.

Sincere appreciation should be expressed to ***The Ministry of Education, Egypt***, for its support during my study in Japan.

Ashraf A. Mohamed

بسم الله الرحمن الرحيم

List of publications from the present dissertation:

1]-"Catalytic determination of iodide using the promethazine-hydrogen peroxide redox reaction".
Mohamed, A. A., Iwatsuki, M., El-shahat, M. F. and Fukasawa, T.;
* *Proceedings of the 43rd Annual Meeting for the Japan Society of Analytical Chemistry, Fukoka, Japan, Oct. 1994, P. 496.*
* *Analyst*, 1995, 120, 1201.

2]-"Catalytic determination of vanadium using the perphenazine-bromate redox reaction and citric acid activator".
Mohamed, A. A., Iwatsuki, M., Fukasawa, T. and El-shahat, M. F.;
* *Proceedings of the 44th Annual Meeting for the Japan Society of Analytical Chemistry, Sapporo, Japan, Sept. 1995.*
* *Analyst*, in press.

3]-"Sensitive determination of trace iodide using its catalytic effect on the hydrogen peroxide oxidation of prochlorperazine".
Mohamed, A. A., El - shahat, M. F., Fukasawa, T. and Iwatsuki, M.;
* *Proceedings of the 5 th Ibn Sina International Conference on Pure and Applied Heterocyclic Chemistry, Cairo, Egypt, to be presented, Dec. 1995.*
* *Anal. Chem. Acta*, Communicated.

4]-"Sensitive determination of nitrite using its catalytic effect on the bromate oxidation of prochloperazine".
* Idem; *Analyst*, in press.

5]-"Trace determination of nitrite using its catalytic effect on the perphenazine -bromate redox reaction".
* Idem; *Anal. Sci*, Communicated.

6]-"Determination of trace vanadium using its catalytic effect on the prochlorperazine-bromate reaction and citric acid activator".
* *Proceedings of the 5 th Ibn Sina International Conference on Pure and Applied Heterocyclic Chemistry, Cairo, Egypt, to be presented, Dec. 1995.*
* Idem; *Anal. Chem. Acta*, Communicated.

List of abbreviations

Abbr.	*Referent*
AAS	Atomic Absorption Spectrometry
CPH	Chlorpromazine-Hydrochloride
ICP-AES	Inductively coupled plasma - Atomic emission spectrometry
ICP-MS	Inductively coupled plasma - Mass spectrometry
NAA	Neutron activation analysis
PCP	Prochlorperazine
PM	Promethazine
PP	Perphenazine
PTD	Phenothiazine derivative
$PTD^{\bullet}$	Colored radical cation of phenothiazine derivative
PTD^{**}	Colorless sulphoxide derivative
PTFE	Polyteterafluoroethylene
THNS	2 - Hydroxy naphthaldehyde thiosemicarbazone

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ABSTRACT

Abstract

Some Kinetic Aspects of Analytical Interest

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Six kinetic-spectrophotometric methods were developed for catalytic determinations of traces of pollutants in natural waters. Namely, two methods were developed for determination of each of iodide, nitrite and vanadium ions, respectively.

Iodide was determined based on its catalytic effects on the H_2O_2 oxidation of promethazine (PM) and prochlorperazine (PCP). The calibration graphs are linear for up to 12.0 and 5.0 ng ml^{-1} with detection limits of 0.1 and 0.03 ng ml^{-1} iodide, respectively. The reaction mechanisms were inferred. The developed methods surpassed the standard Ce(IV)-As(III) reaction along with the existing methods of NAA and ICP-MS techniques, in sensitivity, selectivity and speed.

Nitrite was determined based on its catalytic effects on the bromate oxidations of PCP and perphenazine (PP). The calibration graphs were linear for up to 70 and 40 ng ml^{-1} with detection limits of 0.8 and 0.5 ng ml^{-1} nitrite, respectively. The methods surpassed the well established ion-chromatographic methods along with the standard method utilizing the modified Greiss reaction, in sensitivity, selectivity and speed.

Vanadium was also determined based on the bromate oxidations of PP and PCP in presence of citric acid activator. Linear calibration graphs were obtained for up to 6.5 and 5.0 ng ml^{-1} with detection limits of 0.08 and 0.05 ng ml^{-1} vanadium, respectively. The reaction mechanisms were suggested and the activating effects of citric acid were elucidated. The two methods surpassed the standard Fishman-Skougstad method along with the existing methods of NAA, AAS, ICP-AES and ICP-MS techniques in sensitivity, selectivity and speed.

***Keywords*:** *Kinetic-spectrophotometric techniques; Determinations of iodide, nitrite and vanadium; Reaction mechanisms; Activating effects ; Rain and polluted river waters.*

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