

Cation Analysis by Capillary Electrophoresis

Volatile Standards (Hydrazine) dilution at 20 ppb from a stock solution of 1 g/L with eVol®

Robert Gonin, AFICIP, France. Christian Georget, SGE Analytical Science, Europe.

INTRODUCTION

AFICIP was created in 1985 by chemical industry members. AFICIP is a training center for chemical companies across a range of industries handling analysis and techniques such as: GC, LC, Electrophoresis, UV Vis Atomic Absorption and IR Spectrometry.

DESCRIPTION

For most analytical techniques the first step is sample and standard preparation. At AFICIP this involves serial dilutions at 10 ppb from a standard solution of 1 g/L. Traditionally these dilutions are performed using regular pipettes which is time consuming and use a lot of glassware and solutions.

AFICIP's objective is to analyze traces of ions (ppb), including ammonium, sodium and Hydrazine, in a Morpholinic matrix (4 to 5 ppm). This is performed via electro-kinetic injection mode using an internal standards method. Sodium is quantified using the addition of known quantities methods.

Despite the time and effort spent using this traditional methodology, AFICIP found it difficult to completely eliminate inaccuracy due to the number of dilutions required and these inaccuracies caused errors in subsequent work. AFICIP also found that due to Hydrazine being unstable in air, when using a pipette with its air displacement mechanism, the air exposure caused Hydrazine decomposition and inaccuracy.

To address these methodology issues, AFICIP have evaluated and now use eVol®, the world's first automated analytical syringe, for their sample and standard preparation.

METHOD

All stock solutions are 1 g/L. Standards are prepared in one step using eVol®. Diethanolamine is used as internal standard at 100 ppb. 3 standard ranges are prepared as described in the following table:

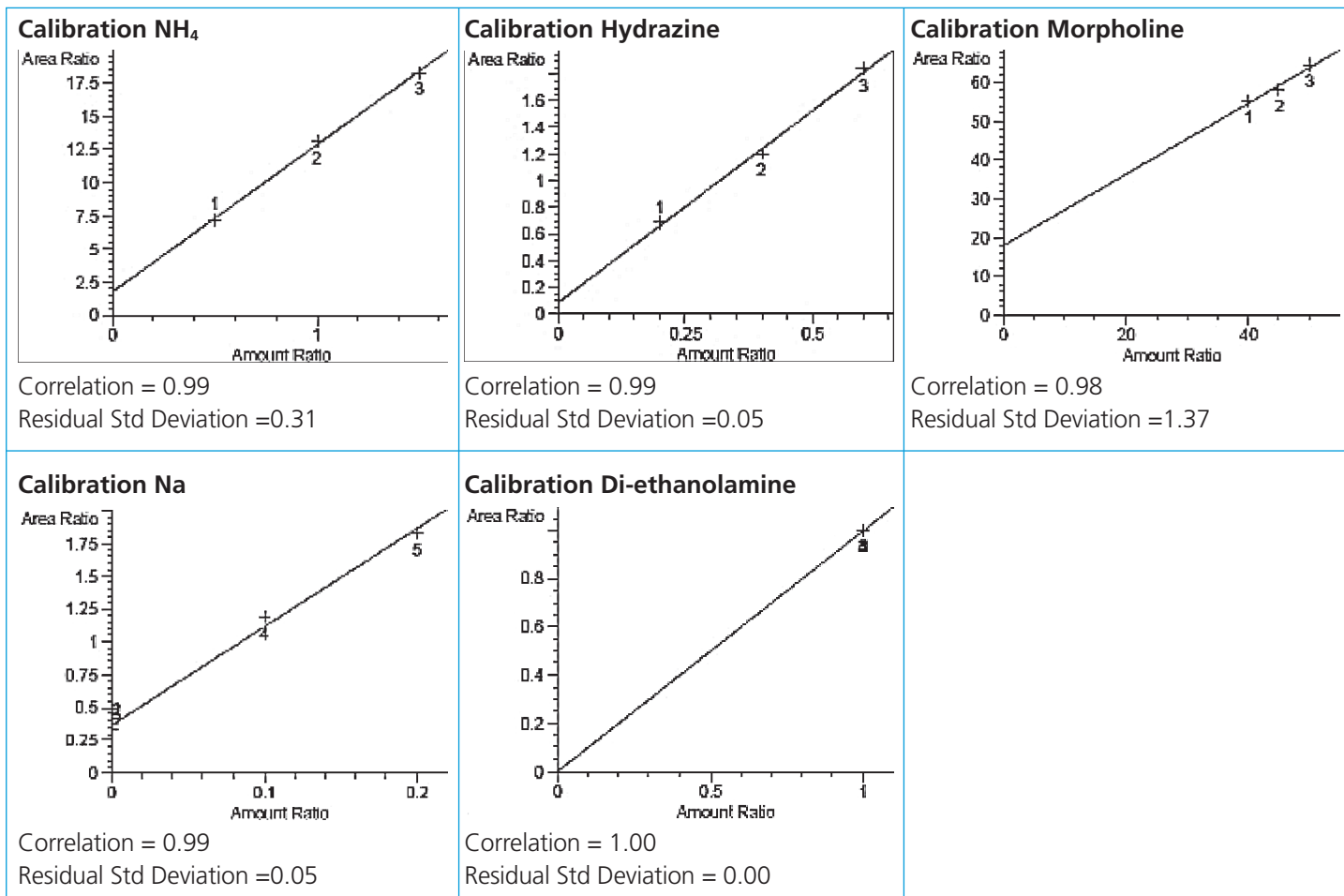
Standard	NH ₄		Hydrazine		Morpholine		Di-ethanolamine	
	ppb	Vol µL	ppb	Vol µL	ppb	Vol µL	ppb	Vol µL
1	50	5	20	2	4	400	100	10
2	100	10	40	4	4.5	450	100	10
3	150	15	60	6	5	500	100	10

Afterwards a quantified sodium solution is added to the standard 3. Ions concentrations are reported in the following table:

Standard	NH ₄		Na		Hydrazine		Morpholine		Di-ethanolamine	
	ppb	µL	ppb	µL	ppb	µL	ppm	µL	ppb	µL
3 + Na	150	15	10	1	60	6	5	500	100	10
3 + Na	150	15	20	2	60	6	5	500	100	10



RESULTS



CONCLUSIONS

Using eVol® for standards preparation AFICIP are able to quantify Hydrazine at 20 ppb, Sodium at 5 ppb and Ammonium at 50 ppb in a Morpholinic matrix at 5 ppm. The quantification of the Morpholine is also now possible using eVol®. As shown by the calibration curves, the linearity in these ranges of concentration is excellent for each standard. The positive displacement operation of eVol®, unlike the air displacement mechanism of pipettes, enables the preparation of standards by dilution to ppb levels in a single step, and greatly reduced exposure to air improved the standard accuracy. A high degree of precision and accuracy is maintained and both handling time and glassware usage are significantly reduced.

For more information contact our technical customer support team on: techsupport@sge.com

AUSTRALIA & PACIFIC REGION

SGE Analytical Science Pty Ltd
Toll Free: 1800 800 167
Tel: +61 (0) 3 9837 4200
Fax: +61 (0) 3 9874 5672
Email: support@sge.com

CHINA

SGE Shanghai Representative Office
Tel: +86 21 6407 9382
Fax: +86 21 6407 9386
Email: china@sge.com

MIDDLE EAST

SGE Gulf
Tel: +971 6 557 3341
Fax: +971 6 557 3541
Email: gulfsupport@sge.com

EUROPE

SGE Europe Ltd
European Head Office
Toll Free: 00800 2790 8999
Toll Free Fax: 00800 2626 2609
Tel: +44 1908 568 844
Fax: +44 1908 566 790
Tel France: +33 1 69 29 80 90
Fax France: +33 1 69 29 09 25
Tel Germany: +49 (0) 6155 / 60746 0
Fax Germany: +49 (0) 6155 / 60746 50
Email: europe@sge.com

INDIA

SGE Laboratory Accessories Pvt Ltd
Tel: +91 22 24715896
Fax: +91 22 24716592
Email: sgeindia@vsnl.com

UNITED STATES OF AMERICA

SGE Incorporated
Toll Free: (800) 945 6154
Tel: +1 512 837 7190
Fax: +1 512 836 9159
Email: usa@sge.com

JAPAN

SGE Japan Inc
Tel: +81 45 222 2885
Fax: +81 45 222 2887
Email: japan@sge.com

 **SGE Analytical Science**
www.sge.com