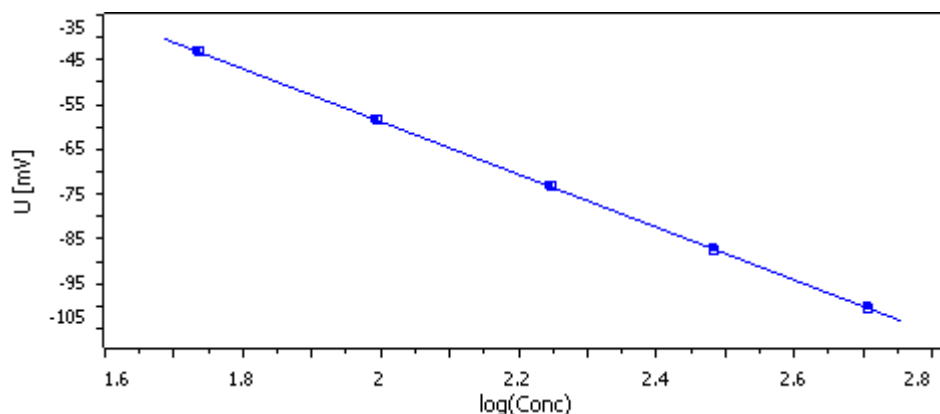


Titration Application Note I-018

Ammonium in liquid fertilizer

Reliable determination by standard addition with NH_4
- ISE



As nitrogen is essential nutrient for plants, it is an essential constituent of many fertilizers. It is present there in different forms, mainly as ammonium or nitrate. Knowing the nitrogen concentration and the form in which is present helps to select the right fertilizer for the plants. For producers of fertilizers, it is therefore necessary to indicate the concentration of ammonium nitrogen in their product.

This Application Note shows how to determine ammonium in liquid fertilizers by means of a standard addition.

Method description

Sample

Liquid fertilizer

Sample preparation

No sample preparation required.

Configuration

867 pH Module with <i>tiamo</i> TM light	2.867.0210
800 Dosino (2x)	2.800.0010
802 Stirrer	2.802.0020
2 mL ETFE Dosing unit	6.1575.120
10 mL Dosing unit	6.3032.210
NH ₃ – selective gas membrane electrode	6.0506.100

Solutions

ISA solution c(NaOH) = 10 mol/L	400 g NaOH is dissolved in approx. 500 mL deion. water containing ice cubes made of deion. water. After dissolution, the solution is transferred into a 1 L volumetric flask and filled up to the mark with deion. water.
EDTA solution c(EDTA) = 1 mol/L	29.22 g EDTA is suspended in 50 mL deion. water and c(NaOH) = 10 mol/L is added dropwise until everything is dissolved. Afterwards the solution is transferred into a 100 mL volumetric flask and filled up to the mark with deion. water.

Standard

Titrant / Standard c(NH ₄) = 10.000 g/L ~ 10000 ppm	29.7 g NH ₄ Cl is weighed into a 1 L volumetric flask, dissolved and filled up to the mark with deion. water.
--------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------

Analysis

0.1 mL fertilizer, 49.9 mL deion water as well as 1 mL c(EDTA) = 1 mol/L are pipetted into a 100 mL beaker and 1 mL c(NaOH) = 10 mol/L is added. The analysis by standard addition with $\beta(\text{NH}_4) = 10000 \text{ mg/L}$ is started directly after the addition of the c(NaOH) = 10 mol/L.

Parameters

Mode	STDADD auto
Stirring rate	6
Number of additions	4
Volume auxiliary solution	51.9 mL
Stop volume	10 mL
Dosing rate	fast
Delta U	12 mV
Signal drift	0.5 mV/min
Min. waiting time	60 s
Max. waiting time	300 s
Measuring interval	2.0 s

Results

Mean results (n = 5)

w(NH ₄) / %	2.44
s(abs) / %	0.011
s(rel) / %	0.45