MQuant®
Ammonium Test

NH₄⁺

1. Method
Determination with color-card comparator
Ammonium nitrogen (NH₄⁺-N) occurs partly in the form of ammonium ions and partly as ammonia. A pH-dependent equilibrium exists between the two forms. In strongly alkaline solution ammonium nitrogen is present almost entirely as ammonia, which reacts with a chlorinating agent to form monochloramine. This in turn reacts with thymol to form a blue indophenol derivative. Due to the intrinsic yellow coloration of the reagent blank, the measurement solution is yellow-green to green in color. The ammonium concentration is measured semiquantitatively by visual comparison of the color of the measurement solution with the color fields of a color card.

2. Measuring range and number of determinations

<table>
<thead>
<tr>
<th>Measuring range / color-scale</th>
<th>Number of determinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.025 - 0.050 - 0.075 - 0.10 - 0.15 - 0.20 - 0.25 - 0.30 - 0.40 mg/l NH₄⁺</td>
<td>70</td>
</tr>
<tr>
<td>0.02 - 0.04 - 0.06 - 0.08 - 0.12 - 0.16 - 0.19 - 0.23 - 0.31 mg/l NH₄⁺</td>
<td></td>
</tr>
</tbody>
</table>

1) for conversion factors see section 8

3. Applications
This test measures both ammonium ions and dissolved ammonia.
Sample material:
Groundwater and surface water
Drinking water and mineral water
Wastewater
Agricultural water
Aqua-culture water
Cooling water
Swimming-pool water
Nutrient solutions for fertilization
Food after appropriate sample pretreatment
This test is not suited for seawater.

4. Influence of foreign substances
This was checked individually in solutions containing 0.2 and 0 mg/l NH₄⁺. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. Cumulative effects were not checked; such effects can, however, not be excluded.

<table>
<thead>
<tr>
<th>Concentrations of foreign substances in mg/l or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conc.</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Reducing agents interfere with the determination.
1) tested with methylamine
2) tested with dimethylamine

5. Reagents and auxiliaries
Please note the warnings on the packaging materials!
The test reagents are stable up to the date stated on the pack when stored closed at +15 to + 25 °C.

Package contents:
2 bottles of reagent NH₄⁺-1
1 bottle of reagent NH₄⁺-2
1 bottle of reagent NH₄⁺-3
1 graduated 3-ml plastic syringe
2 test tubes with screw caps (in comparator block)
1 color card

Other reagents and accessories:
MQuant® Universal indicator strips pH 0 – 14, Cat. No. 109535
Sodium hydroxide solution 1 mol/l Titripur®, Cat. No. 109137
Sulfuric acid 0.5 mol/l Titripur®, Cat. No. 109072
Ammonium standard solution Certipur®, 1000 mg/l NH₄⁺, Cat. No. 119812
MQuant® Flat-bottomed long tubes with screw caps for MQuant® tests with color-card comparator (12 pcs), Cat. No. 114901

6. Preparation

• Analyze immediately after sampling.
• The pH must be within the range 4 - 13.
• Adjust, if necessary, with sodium hydroxide solution or sulfuric acid.
• Filter turbid samples.

7. Procedure
Open the box and set up with both test tubes on the left.
Unfold the color card and insert it, colored end first, into the slit at the lower right-hand edge of the box.

<table>
<thead>
<tr>
<th>Measurement sample tube nearer to the tester (A)</th>
<th>Blank tube farther from the tester (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretreated sample (20 - 30 °C) 20 ml</td>
<td>20 ml</td>
</tr>
<tr>
<td>Reagent NH₄⁺-1 2 ml</td>
<td>-</td>
</tr>
<tr>
<td>Reagent NH₄⁺-2 1 level orange-colored microspoon (in the cap of the NH₄⁺-2 bottle)</td>
<td>-</td>
</tr>
</tbody>
</table>

Leave to stand for 5 min (reaction time 1).
Reagent NH₄⁺-3 2 drops 1)
Add, close the tube, and mix.

Leave to stand for exactly 7 min (reaction time 2).
Slide the color card through to the left until the closest possible color match is achieved between the two open test tubes when viewed from above.
Read off the result in mg/l NH₄⁺ from the color card at the lower right-hand edge of the box.

1) Hold the bottle vertically while adding the reagent!

Notes on the measurement:
• Ammonium-free samples turn yellow on addition of reagents NH₄⁺-1, NH₄⁺-2, and NH₄⁺-3.
• The color of the measurement solution remains stable for only a short time after the end of the reaction time 2 stated above.
• Turbidity in the measurement solution makes the color comparison more difficult.
• If the color of the measurement solution is equal to or more intense than the darkest color on the scale, repeat the measurement using fresh, diluted samples until a value of less than 0.40 mg/l NH₄⁺ is obtained.
• In the event of ammonium concentrations exceeding 25 mg/l, other reaction products are formed and false-low readings are yielded. In such cases it is advisable to conduct a plausibility check of the measurement results by diluting the sample (1:10, 1:100).
• Concerning the result of the analysis, the dilution must be taken into account.

Result of analysis = measurement value x dilution factor

8. Conversions

<table>
<thead>
<tr>
<th>Units required</th>
<th>= units given x conversion factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>mg/l NH₄⁺-N</td>
<td>mg/l NH₄⁺</td>
</tr>
<tr>
<td>mg/l NH₄⁺</td>
<td>mg/l NH₄⁺-N</td>
</tr>
</tbody>
</table>

9. Method control
To check test reagents, measurement device, and handling:
Dilute the ammonium standard solution with distilled water to 0.20 mg/l NH₄⁺ and analyze as described in section 7.
Additional notes see under www.qa-test-kits.com.

10. Notes
• Reclose the reagent bottles immediately after use.
• Rinse the test tubes and the syringe with distilled water only.
• Information on disposal can be obtained at www.disposal-test-kits.com.