The Basics of N-PHURIC

Richard DeSousa • Proprietary Products Manager
What is n-pHuric?

- Urea Sulfuric Acid (urea sulfate)
- Reacted in patented process that results in a higher analysis and a more stable product.
- **15/49** is a 1:1 ratio of urea to sulfuric acid.  
  (15-0-0-16S, 49% sulfuric acid)
- 10/55 and 28/27 are other formulas.
Handling N-pHuric

- Concentrated N-pHuric is non-corrosive to human flesh.
- Eye-protection is a must.
- Avoid mist inhalation.
- Non-flammable.
- Non-volatile.
Storing and handling n-phuric

- Polyethylene, polypropylene and 316L Stainless are approved materials for storage and concentrated application.

<table>
<thead>
<tr>
<th>May Be Used:</th>
<th>Do Not Use:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic</td>
<td>Aluminum</td>
</tr>
<tr>
<td>E.P.D.M</td>
<td>Brass</td>
</tr>
<tr>
<td>Kynar</td>
<td>Buna-N</td>
</tr>
<tr>
<td>Polyethylene</td>
<td>Cast Iron</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>Celcon</td>
</tr>
<tr>
<td>P.V.C and C.P.V.C</td>
<td>Delrin</td>
</tr>
<tr>
<td>Rayton</td>
<td>Epoxy</td>
</tr>
<tr>
<td>316L Stainless Steel</td>
<td>Fiberglass</td>
</tr>
<tr>
<td><strong>Teflon</strong></td>
<td>Galvanized Steel</td>
</tr>
<tr>
<td><strong>Viton</strong></td>
<td>Hypalon</td>
</tr>
<tr>
<td>Zalak</td>
<td>Mild Steel</td>
</tr>
<tr>
<td></td>
<td>Natural Rubber</td>
</tr>
<tr>
<td></td>
<td>Neoprene</td>
</tr>
<tr>
<td></td>
<td>Nylon</td>
</tr>
<tr>
<td></td>
<td>Polyester FRP</td>
</tr>
</tbody>
</table>

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Treating Irrigation Water

Sulfuric acid reaction with bicarbonate in water:

\[ \text{H}_2\text{SO}_4 + 2\text{HCO}_3^- \rightarrow \text{SO}_4^{2-} + 2\text{CO}_2 + 2\text{H}_2\text{O} \]

This makes carbonate and bicarbonate un-reactive with Ca, so it will not cause scale buildup in micro-irrigation and will not cause additional liming of the soil.

Prevents PO$_4$ fertilizer from reacting with Ca.
Treating water
Irrigation Water Buffer Curve

Log In #: 305264
Grower: BRANCH
Description: Colorado River Water

Branch Name: SOUTHWEST DIVISION
Fieldman: SETH SHERRY
Date Sampled: 4/5/2010

Initial pH: 7.81
Initial Ecw (ds/m): 1.64

7.5-26-0-8
N-pHuric 10/55
Phos acid 0-52-0
Sulfuric Acid
N-pHuric 15/49

<table>
<thead>
<tr>
<th>Desired pH</th>
<th>7.5-26-0-8</th>
<th>N-pHuric 10/55</th>
<th>Phos acid 0-52-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH 6.5</td>
<td>29 gal/acre-ft</td>
<td>11 oz/1000gal</td>
<td>28 gal/acre-ft</td>
</tr>
<tr>
<td>pH 4.5</td>
<td>102</td>
<td>40</td>
<td>76</td>
</tr>
<tr>
<td>pH 3.0</td>
<td>143</td>
<td>56</td>
<td>101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Desired pH</th>
<th>Sulfuric Acid</th>
<th>N-pHuric 15/49</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH 6.5</td>
<td>14 gal/acre-ft</td>
<td>5 oz/1000gal</td>
</tr>
<tr>
<td>pH 4.5</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>pH 3.0</td>
<td>47</td>
<td>18</td>
</tr>
</tbody>
</table>
What does the buffer curve mean?

• Water samples tell you how much acid is needed to treat water effectively.
  – 6.5 pH to treat water.
  – 4.5 pH for moderate cleaning and mild soil treatment.
  – 2.5 pH shock treatments.

“pH only tells you which way the train is headed, a buffer curve tells you how fast.”
Shock Treatment

- Run enough N-pHuric to lower water pH to (approx. 2.5)
- Ensure adequate agitation to disperse acid in water column.
- Run for 2-3 hours through poly irrigation system (or until emitters are cleared).
- Stop acid, and flush lines with untreated water.
Acid in SOIL

Sulfuric acid and N-pHuric both react in the same way.

\[ \text{H}_2\text{SO}_4 + \text{CaCO}_3 \rightarrow \text{Ca}^{++} + \text{SO}_4^{2-} + \text{CO}_2 + \text{H}_2\text{O} \]

The application of acids addresses the cause of lime induced chlorosis.
What does it do?

• Solubilizes Calcium.
• Calcium replaces Sodium on clay particles.
  – Ca^{++} has stronger adhesion than Na^{+}
• **Improves soil structure, water infiltration and drainage.**
• Ameliorates Na toxicity.
• Need irrigation to flush salts below root zone.
• Can also solubilize PO_{4}, Zn, Fe and Mn.
Examples of uses

• Water Treatment
• Drip Grade Fertilizer
  – PO$_4$ through drip
• Soil Applied Fertilizer
  – Sidedress, Pop-ups, Starters
• Stubble digestion
• Defoliant
Spinach pop-up development

<10-15-0
No Weeds.
0.41 ppm AI

<GSP
No Weeds.
0.45 ppm AI

UTC
(not pictured)
No Weeds.
## Acid Fertilizer Options

<table>
<thead>
<tr>
<th>Products</th>
<th>Compatible Blends:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric Acid</td>
<td>7.5 – 26 – 0</td>
</tr>
<tr>
<td>N-pHuric</td>
<td>3 – 40 – 0</td>
</tr>
<tr>
<td>PeK Acid</td>
<td>10 – 20 – 0</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>5 – 5 – 5</td>
</tr>
<tr>
<td>pHospHuric</td>
<td>2 – 10 – 6</td>
</tr>
<tr>
<td>NPKpHuric</td>
<td>6 - 16 - 0</td>
</tr>
<tr>
<td></td>
<td><strong>7 - 7 - 0</strong></td>
</tr>
<tr>
<td></td>
<td>5 – 25 – 5</td>
</tr>
<tr>
<td></td>
<td>5 – 26 – 2</td>
</tr>
</tbody>
</table>
More blend options

• Zn, Fe, Mn Sulfates up to 2% total elemental analysis.
• Zn, Fe, Mn Polysaccharides up to 2% total elemental analysis.
• 15/49 is compatible with Watermaxx2® (soil surfactant)
Components of injection system
(Center pivots)


Automatic Controller. Regulates on pH, EC and proportional injection.

pH Probe. Inline or w/ sampling canister.

Varitator Unit. Inverter varies the pump speed based on input from controller.
Components of injection system
(centre pivots)

pH probe in a sampling canister.

Example of complete setup.
Check pH of Your Water

A good, durable pH meter costs approx. $100. Useful for most applications.
Summary

- Remember the benefits:
  - Treating water and soil.
  - Gains in nutrient efficiency.
  - Source of S and N while solubilizing other elements.
  - Cleans drip systems.

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