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# ***Ammonia Nitrogen***

***by Salicylate colorimetry  
(Instead of by Phenate)***

**The 2012 MUR makes  
new allowances for  
colorimetric Ammonia  
Nitrogen methods that use  
phenol (phenate) as a  
color reagent.**

- **EPA Method 350.1**  
**Determination of Ammonia**  
**Nitrogen by Semi-**  
**automated Colorimetry**  
**(Phenate)**
- **SM 4500-NH<sub>3</sub> F-1997**  
**Manual Phenate**

- **SM 4500-NH3 G-1997**  
**Automated Phenate Method**
- **SM 4500-NH3 H-1997**  
**Flow Injection Analysis**  
**(Phenate)**

The new allowance being made with the phenate methods is that, instead of using phenol as a color reagent, you can now use a *substituted* phenol (i.e., salicylate).

**This allowance is being made because, whether you use phenol or a substituted phenol, either way you form a blue dye (indophenol blue) that can be measured colorimetrically.**



- When phenol is used as the color reagent, optimum pH is 11.5 and optimum absorbance is at 635 nm.
- When salicylate is used as the color reagent, optimum pH is  $>12.6$  and optimum absorbance is at 665 nm.



# What are the advantages of Salicylate over Phenate?

1. No more phenol odor in the lab!

## **2. Sodium**

**salicylate is a  
safer chemical to  
use than phenol.**

# *Phenol*



**Danger**

# *Sodium Salicylate*



**Warning**

**3.** In our lab we have seen an increased sensitivity (lower MDL) by switching from phenate to salicylate.

**How do you make the switch from phenate to salicylate? Contact technical support for the instrument you use. They should have a salicylate method.**

- **AMS Systema**
- **Chinchilla Scientific**
- **Lachat**
- **OI Analytical**
- **Seal Analytical**
- **ThermoFisher Scientific**
- **Unity Scientific (Westco)**



***Total Phosphorus***  
**by Method 200.7**  
**(ICP Atomic Emission**  
**Spectroscopy)**

**Total Phosphorus by ICP-AES is a well-established technique. Phosphorus has been on the analyte list for ICP methods EPA 200.7 and SW-846 6010 for many years.**

**Prior to 2012, however,  
it was not an approved  
technique for NPDES  
compliance monitoring  
for Phosphorus.**

# The Advantages

- 1) The ability to run total phosphorous and total metals in the same run – this is especially economical in industrial monitoring.



# The Advantages

- 2) **The Phosphorus calibration curve on the ICP has a fantastic linear range (5 orders of magnitude). That means fewer dilutions.**

# The Advantages

- 3) The ICP has a number of excellent wavelengths for Phosphorous that provide a range of detection limits and linear ranges.

**Note: ICP spectrometers  
have come a long way  
since EPA Method 200.7  
and SW-846 Method 6010  
were published.**



- **EPA Method 200.7**  
**recommended wavelength:**

**214.914 nm**

- **SW-846 Method 6010**  
**recommended wavelength:**

**213.618 nm**

**Today's ICPs open up a new world of available excellent wavelengths in the low uv range:**

- 177.495 nm**
- 178.284 nm**
- 178.766 nm**
- 185.942 nm (less sensitive wavelength but higher linear range)**

**Other improvements in today's instrumentation include purging of optics and axial viewing of the plasma, both of which improve sensitivity.**

**ICPs with purged optics and axial viewing of the plasma can probably achieve the following:**

- 177.495 nm    0.02 – 50 ppm**
- 178.284 nm    0.02 – 50 ppm**
- 178.766 nm    0.02 – 50 ppm**
- 185.942 nm    0.05 – 500 ppm**