

Calculation Results:

Gravimetric Method Results:

Summary Fertilizer Analysis Data for Gravimetric Method

| Trial: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|
| Mass of Sample (g) | .916 | .910 | .910 | .913 | .911 | .910 | .910 | .912 |
| Mass of Mg(NH ₄)PO ₄ • 6H ₂ O (g) | .690 | .661 | .636 | .671 | .642 | .630 | .658 | .668 |
| Mass of P in Mg(NH ₄)PO ₄ • 6H ₂ O (g) | .087 | .083 | .080 | .085 | .081 | .079 | .083 | .084 |
| Expected % P ₂ O ₅ in sample | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| % P₂O₅ in sample: | 21.78 | 20.99 | 20.20 | 21.24 | 20.37 | 20.01 | 20.90 | 21.17 |

Calculations:

Gravimetric Fertilizer Trial 1:

Mass of phosphorous in original sample:

$$.690 \text{ g Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O} \times \frac{1 \text{ mol Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O}}{245.5 \text{ g Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O}} \times \frac{1 \text{ mol P}}{1 \text{ mol Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O}} \times \frac{30.97 \text{ g P}}{1 \text{ mol P}}$$

% of P₂O₅ in Fertilizer

$$.0870439919 \text{ g P} \times \frac{141.94 \frac{\text{g}}{\text{mol}} \text{ P}_2\text{O}_5}{61.94 \frac{\text{g}}{\text{mol}} \text{ P}} = .1994676171 \text{ g P}_2\text{O}_5$$

$$\frac{.1994676171 \text{ g P}_2\text{O}_5}{.916 \text{ g of Fertilizer measured}} \times 100 = 21.78 \%$$

Summary KH₂PO₄ Analysis Data for Gravimetric Method

| Trial: | 1 | 2 | 3 | 4 |
|--------------------|------|------|------|------|
| Mass of Sample (g) | .440 | .440 | .440 | .440 |
| Mass of | | | | |

| | | | | |
|--|-------|-------|-------|-------|
| Mg(NH ₄)PO ₄ • 6H ₂ O (g) | .667 | .650 | .643 | .659 |
| Mass of P in Mg(NH ₄)PO ₄ • 6H ₂ O (g) | .084 | .082 | .081 | .083 |
| Expected % P ₂ O ₅ in sample | 43 | 43 | 43 | 43 |
| % P₂O₅ in sample: | 43.82 | 42.71 | 42.25 | 43.29 |

Calculations:

Gravimetric KH₂PO₄ Trial 1:

Mass of phosphorous in original sample:

$$.667 \text{ g Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O} \times \left[\frac{1 \text{ mol Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O}}{245.5 \text{ g Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O}} \right] \times \left[\frac{1 \text{ mol P}}{1 \text{ mol Mg(NH}_4\text{)PO}_4 \cdot 6\text{H}_2\text{O}} \right] \times \left[\frac{30.97 \text{ g P}}{1 \text{ mol P}} \right]$$

% of P₂O₅ in Fertilizer

$$.0841325255 \text{ g P} \times \left[\frac{141.94 \frac{\text{g}}{\text{mol}} \text{ P}_2\text{O}_5}{61.94 \frac{\text{g}}{\text{mol}} \text{ P}} \right] = .1928186965 \text{ g P}_2\text{O}_5$$

$$\left[\frac{.1928186965 \text{ g P}_2\text{O}_5}{.44 \text{ g of Fertilizer measured}} \right] \times 100 = 43.82 \text{ P}_2\text{O}_5$$

Spectrophotometric Method Results:

The Spectrophotometric Method Calibration Curve

| Volume PO ₄ ³⁻ working solution (mL) | 0 | 1 | 2 | 3 | 4 | 5 |
|---|-------|-------|-------|-------|-------|-------|
| Concentration of PO ₄ ³⁻ stock solution (M) | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |
| Concentration of | | | | | | |

| | | | | | | |
|---------------------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| P in 10 mL volumetric flask (M) | 0 | 6.00×10^{-6} | 1.20×10^{-5} | 1.80×10^{-5} | 2.40×10^{-5} | 3.00×10^{-5} |
| Absorbance | 0 | 0.204 | 0.506 | 0.687 | 0.889 | 1.169 |

Analysis Performers:

Name..... & Name.....

Spectrophotometric Method Results Table

| Sample | Mass of Sample (g) | Volume Sample Solution Used (mL) | Absorbance | Concentration of P in 10 mL Colored Sample Solution, M | Mass of P in 250 mL Sample Solution (g) | Expected % P ₂ O ₅ in Sample | % P ₂ O ₅ in Sample |
|---------------------------------|--------------------|----------------------------------|------------|--|---|--|---|
| KH ₂ PO ₄ | 0.17 | 3 | 0.366 | 0.0054020546 | 0.0418254074 | 52.2 | 56.38 |
| KH ₂ PO ₄ | 0.17 | 5 | 1.002 | 0.0088735388 | 0.0687033741 | 52.2 | 92.61 |
| Average: | | | | | 0.0552643908 | Average : | 74.49 |
| Fertilizer | 0.35 | 1 | 0.435 | 0.0094327348 | 0.0730329495 | 24 | 47.82 |
| Fertilizer | 0.35 | 3 | 1.034 | 0.0074739064 | 0.0578667202 | 24 | 37.89 |
| Fertilizer | 0.35 | 5 | 1.951 | 0.0084612716 | 0.0655113952 | 24 | 42.89 |
| Average: | | | | | 0.065470355 | Average : | 42.87 |
| Fertilizer | 0.351 | 1 | 0.020 | $5.847953216 \times 10^{-4}$ | 0.0045277778 | 24 | 2.96 |
| Fertilizer | 0.351 | 3 | 0.179 | 0.0017446394 | 0.0135078704 | 24 | 8.82 |
| Fertilizer | 0.351 | 5 | 0.406 | 0.002374269 | 0.0183827777 | 24 | 12.00 |
| Average: | | | | | 0.0183827777 | Average : | 7.93 |