# Lab #10:

# Determination of Na and K by Flame Emission Spectroscopy

Chem. 216

Mohammad Shour

Walid Malki

Tarek Balshi

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## Purpose:

In this experiment, we try to find the mass of Ca. Na, and K in 2 mineral water samples, Sohha, and Tannourine using flame emission spectroscopy.

## Procedure:

We followed exactly the procedure of the lab manual except for the dilutions of the sample from which we injected samples into the Flame Photometer:

| Metal | Na+ | | K+ | | Ca2+ | | Na+ | K+ | Ca2+ | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc. Mg/l | Concentration of stock solution (ppm) | | | | | | Conc. Of prepared std.(ppm) | | | Final V |
| ppm | 50 | | 100 | | 500 | | Na | K | Ca | Vf |
| Vml | Vml | Df | V microl | Df | Vml | Df | | | | |
| stds | VNa+ | Na | VK+ | K | VCa2+ | Ca | | | | 25 |
| Std1 | 0.25 | 100 | 125 | 200 | 0.5 | 50 | 0.5 | 0.5 | 10 | 25 |
| Std2 | 0.5 | 50 | 250 | 100 | 1.25 | 20 | 1 | 1 | 25 | 25 |
| Std3 | 1.25 | 20 | 375 | 66.7 | 2.5 | 10 | 2.5 | 1.5 | 50 | 25 |
| Std4 | 2.5 | 10 | 500 | 50 | 3.75 | 6.67 | 5 | 2 | 75 | 25 |
| Std5 | 3.75 | 6.67 | 625 | 40 | 5 | 5 | 7.5 | 2.5 | 100 | 25 |
| Std6 | 5 | 5 | 1250 | 20 | 6.25 | 4 | 10 | 5 | 125 | 25 |

## Data/results:

| | Na(ppm) | K(ppm) | Ca(ppm) |
|---|---|---|---|
| Tannourine1 | 2.0 | 0.2 | 129.8 |
| Tannourine 2 | 2.3 | 0.1 | 123.1 |
| average | 2.15 | 0.15 | 126.45 |
| Sohha 1 | 1.4 | 0.1 | 126 |
| Sohha 2 | 1.3 | 0.2 | 125.5 |
| average | 1.35 | 1.15 | 125.75 |

| Na (ppm) | Raw | K (ppm) | Raw | Ca(ppm) | Raw |
|---|---|---|---|---|---|
| 0 | 688 | 0 | 304 | 0 | 977 |
| 0.5 | 684 | 0.5 | 318 | 10 | 937 |
| 1 | 685 | 1 | 322 | 25 | 941 |
| 2.5 | 707 | 1.5 | 336 | 50 | 962 |
| 5 | 740 | 2 | 335 | 75 | 959 |
| 7.5 | 788 | 2.5 | 356 | 100 | 934 |
| 10 | 815 | 5 | 416 | 125 | 986 |

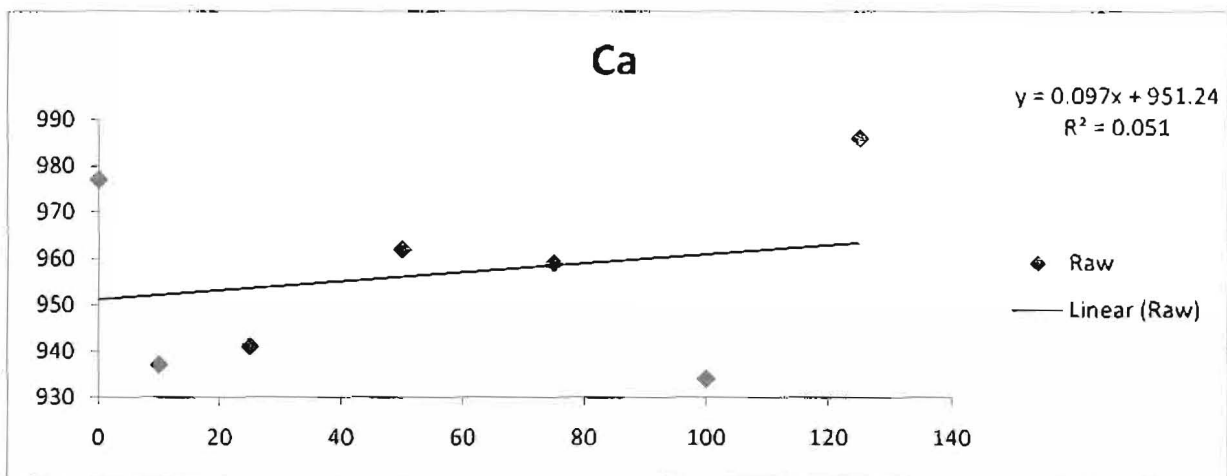Table1: results of the standards
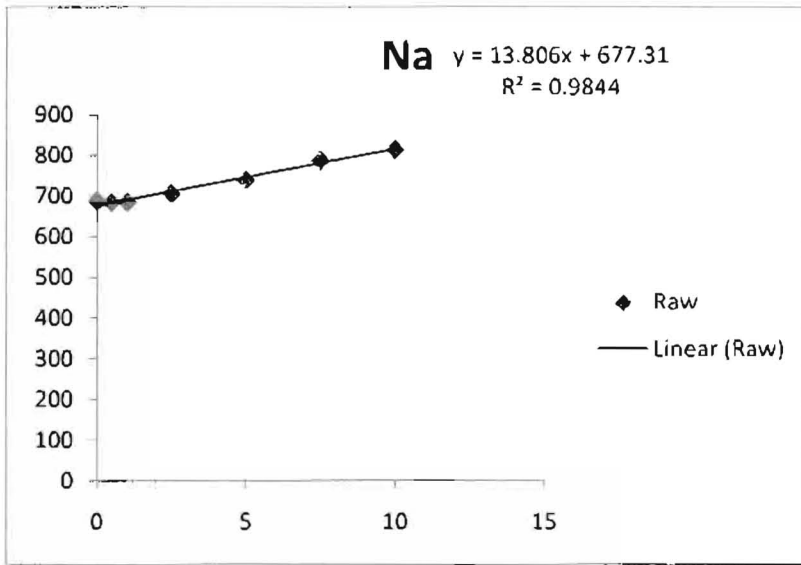


Graph1: calibration curve for Na

|      | C(ppm)    |        |
|------|-----------|--------|
|      | tannourine | sohha |
| Na   | 2.15      | 1.35   |
| K    | 0.15      | 1.15   |
| Ca   | 126.45    | 125.75 |
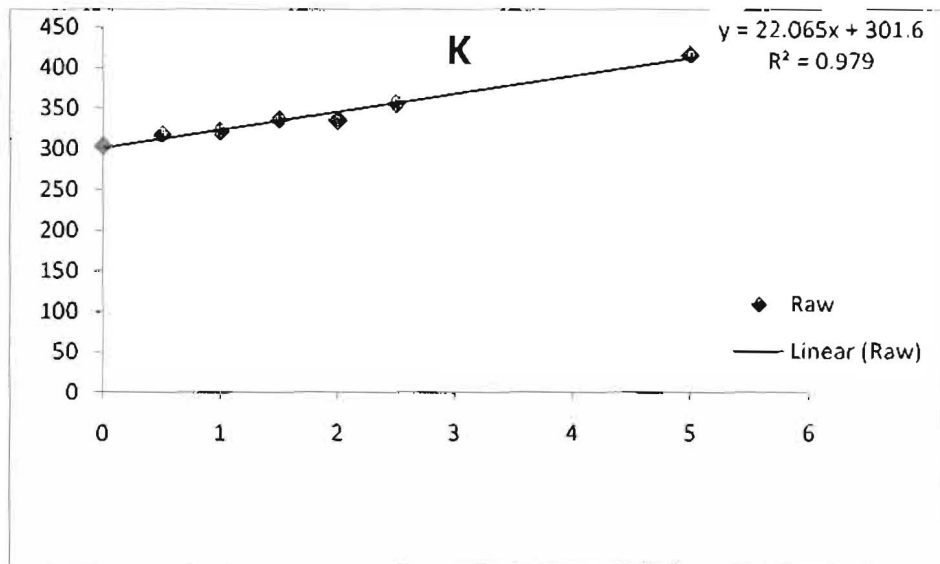


Graph2: calibration curve for K



Graph 3: calibration curve for Ca

First: results were:

|  | C(ppm) | |
| --- | --- | --- |
|  | tannourine | sohha |
| Na | 2.15 | 1.35 |
| K | 0.15 | 1.15 |
| Ca | 126.45 | 125.75 |

Table 2 mentions that the limits of detection of the instrument are:

0.02 ppm for each of Na and K and 1.0 ppm for Ca which are less than the results obtained, in addition, the optimal range is:

Na: 1000ppm

K: 1000ppm

Ca :> 1000ppm

Since we are using a multipoint calibration curve.

These specifications are in accordance with the results we obtained which are between the limit of detection and the optimal range.

The results are close to the one's given on the sample.

Conclusion:

In this experiment, we wanted to find the concentration of Ca, Na, and K for that, we used a flame emission photometer.