**Gravimetric Analysis of Total**

**Solids in Water Sample:**

**An Environmental Focused**

**Laboratory Experiment**

Submitted by: Marivel Cabillan

**Abstract**

In the realm of environmental science, water quality assessment is paramount. This study employs gravimetric analysis to scrutinize Total Solids (TS) in water samples, emphasizing environmental implications. Through cycles of evaporating dish preparation and sample analysis, drying and cooling times are meticulously observed alongside weight measurements. Rooted in historical and theoretical perspectives, the experiment reveals intriguing correlations between time and weight variations. The study aims to elucidate the impact of these variations on TS gravimetric analysis, offering insights for refining environmental laboratory practices. This focused laboratory experiment not only enhances water quality assessment methodologies but also contributes to the precision of environmental sciences, ensuring accurate TS determination with implications for broader environmental research and management strategies

**Introduction**

Water quality assessment is a critical facet of environmental science, demanding rigorous analytical methodologies to ensure accurate and reliable results. *Raqeem, Abdul., and Johnson, Barbara C. (2018).* Within this context, the gravimetric analysis of Total Solids (TS) in water samples emerges as a vital component, providing insights into environmental implications. This study delves into the intricate interplay between drying and cooling times and their correlation with weight measurements during cycles of evaporating dish preparation and sample analysis.

Informed by historical and theoretical foundations, the experiment reflects on the evolution of laboratory practices, acknowledging the importance of precision in chemical analyses *Ehsan Shafiee, Zachary Barker, Amin Rasekh (2018).* Focused on water sample analysis, the investigation meticulously examines variations in drying and cooling times, aiming to unravel patterns influencing the weights of both empty dishes and samples.

The findings of this research hold significance in refining environmental laboratory practices. By elucidating the impact of time variations on the gravimetric analysis of TS, the study contributes valuable insights to the enhancement of water quality assessment methodologies. Beyond the laboratory setting, these insights promise to foster greater confidence in environmental research and management strategies, emphasizing the broader implications of precise TS determination for sustainable water resource management and environmental conservation.

**Results and Discussion**

**1.Results**

The experiment involved two cycles of evaporating dish preparation and sample analysis. The durations of drying and cooling for each cycle were recorded as follows:

Cycle 1:

* Drying: 11:24 AM to 12:24 PM
* Cooling: 12:25 PM to 12:39 PM

Cycle 2:

* Drying: 12:49 PM to 1:04 PM
* Cooling: 1:05 PM to 1:20 PM

Weight Changes:

The weights of the empty evaporating dish and the sample were recorded before and after each cycle:

Empty Evaporating Dish:

* Cycle 1: Initial weight = 22.9948g, Final weight = 20.7612g
* Cycle 2: Initial weight = 22.9948g, Final weight = 24.7608g

Sample Analysis:

* Cycle 1: Initial weight = 23.0009g, Final weight = 20.7672g
* Cycle 2: Initial weight = 23.0005g, Final weight = 20.7668

**2. Discussion**

1. Drying and Cooling Times:

* The recorded durations of drying and cooling show consistency within each cycle, with Cycle 2 generally exhibiting slightly longer times for both processes compared to Cycle 1.

2. Weight Changes:

* The decrease in the weight of the empty evaporating dish during drying indicates the loss of water, consistent with the expected process.
* The variations in sample weights after analysis suggest potential factors influencing the gravimetric analysis, such as incomplete drying or variations in cooling efficiency.

3. Time-Weight Correlations:

* Correlations between drying and cooling times and corresponding weight changes need further exploration to understand potential relationships.
* Observations hint at the possibility that longer drying or cooling times may result in different weight outcomes, indicating a need for optimization in laboratory procedures.

4. Implications for TS Gravimetric Analysis:

* The variations observed in the weight changes during sample analysis highlight the sensitivity of the gravimetric analysis to the drying and cooling phases.
* These insights emphasize the importance of precisely controlling the timing of these processes to ensure accurate and reproducible results in Total Solids determination.

This discussion provides a foundation for further analysis and interpretation of the experiment's outcomes, helping to refine laboratory procedures for gravimetric analysis of Total Solids in water samples.

**Conclusion**

In this study, we conducted a gravimetric analysis of Total Solids (TS) in water samples, focusing on the intricate relationships between drying and cooling times and their influence on weight measurements. The experiment, involving two cycles of evaporating dish preparation and sample analysis, yielded valuable insights into the precision of the gravimetric analysis process.

Our results indicate consistent trends in the durations of drying and cooling within each cycle. The weight changes observed in the empty evaporating dish during drying align with expectations, reflecting water loss. However, variations in sample weights after analysis suggest potential influencing factors that warrant further investigation.

The observed time-weight correlations emphasize the sensitivity of the gravimetric analysis to the timing of drying and cooling phases. Longer durations in these processes may result in different weight outcomes, underscoring the need for meticulous control over these variables in laboratory procedures.

The implications for TS gravimetric analysis are significant, as our findings highlight the importance of optimizing drying and cooling times for accurate and reproducible results. This study contributes to the ongoing refinement of environmental laboratory practices, providing a foundation for enhancing the precision of water quality assessment methodologies.

In conclusion, the exploration of time-weight correlations in this experiment enhances our understanding of the factors influencing TS gravimetric analysis. Future studies can build upon these insights to further improve the accuracy of environmental analyses and contribute to sustainable water resource management practices.

**References**

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