

STATISTICAL CORRELATION ON PHYSICO CHEMICAL ANALYSIS - AN INTEGRATIVE TEACHING APPROACH

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Abstract

In this note we wish to report a general teaching methodology which correlates the most common analytical data with Relative Standard Deviation (RSD). Then there data of RSD can be introduced in standard regression software like Origin Pro 8.0, enabling the analytical ability of the Physico-Chemical experiments which are in the syllabus of our Physical Chemistry teaching approach.

Discussion

It is basically a pedagogy which can be introduced in different Physical Chemistry experiment like Conductometric, Potentiometric, and pH metric titration data. This type of integrative software analysis with Relative Standard Deviation (RSD) will readily explain precision and accuracy of the methods more readily. In analytical Chemistry, error is the most common term which is a function of RSD [1-3].

From statistics we know, $RSD = \frac{SD}{\langle x \rangle}$ (1)

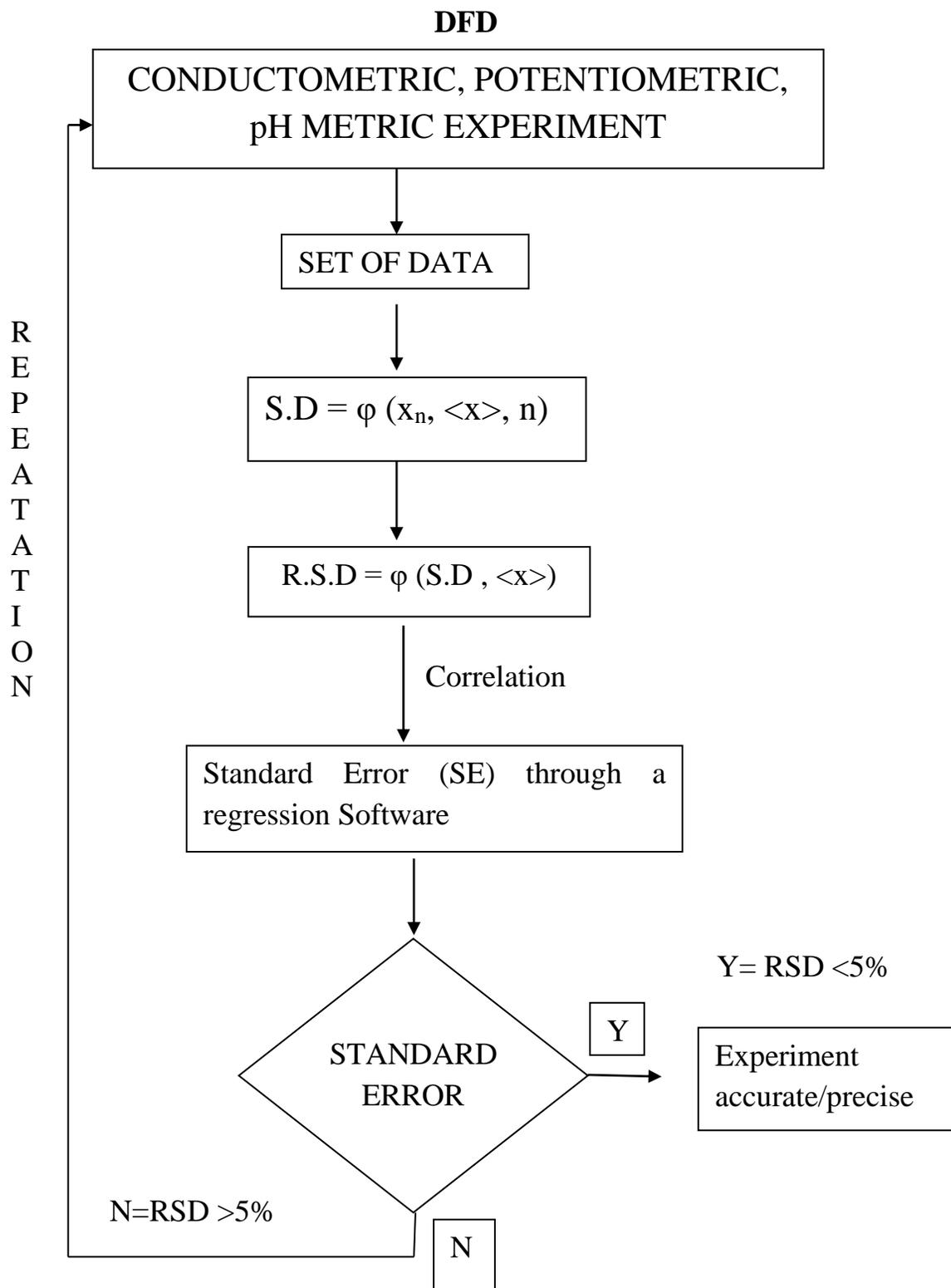
Where $\langle x \rangle$ = arithmetic mean of a set of data.

Now, $SD = \frac{\sqrt{\sum (x_n - \langle x \rangle)^2}}{(n-1)}$ (2)

n = number of observations or frequency of experiment.

The equations (1) and (2) can be correlated with the best fit regression software (for e.g. Origin Pro. 8.0 etc.). Actually RSD with a precise experiment < 5%. It should be supported with

standard software results from which we can find out standard error (SE) by default. The entire approach can be integrated by the following data flow diagram (DFD).



Conclusion

This type of teaching pedagogy will introduce an analyst with better understanding and relevance of precision. Data collected by a set of analysts for the same experiment will allow them to learn, to manage, to maintain, to interpret more accurately and the process gets consolidated with more and more sets of data. We would like to expect this type of integrated teaching approach will detect the source of error with respect to the individual and also the instrument from which the probability of error can be minimized though not completely nullified.

References

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