MATHEMATICAL STATISTICS : AN APPLICATION BASED STATISTICS

By

Jaydip Datta , Nino Durglishvili

ABSTRACT:

The APPLICATION part to be noted as follows: 1. RANDOM COIL BIOPOLYMERS. 2. BACTERIAL GROWTH. 3. PHYSICO-CHEMICAL ANALYSIS / ANALYTICAL CHEMISTRY. It is an experimental finding between Physical Chemistry and Analytical Chemistry Teaching methods .

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1. MATHEMATICAL MODELLING :

The random coil model is analysed to establish the mathematical support behind it. In this approach Stirling's approximation, weight factor and improper integral (gamma function) are analysed in detail. A correlation between the important modeling parameters like radius of gyration, root mean square separation, number of monomers and length of each monomer unit is established.

2 .LINEAR REGRESSION:

Statistical Analysis of Stern - Volmer equation applied on bio molecules (An Abstracted Data). It is a data relating to Abstracting of an article as Indian Science Abstract. (ISSN : 0019-6339 , Vol 43).

2. PROBABILISTIC STATISTICS :

In this note we correlate a quantum normalized probabilistic approach with Algebraic approach of Probability. The Probability Density $[\psi]^2$ may be equated as additive wave functions ie $[\psi_A] + [\psi_B]$. In real probability algebra we also know that $P(A) + P(B) = P(A \cup B)$. This is termed as multiplicative rule of Probability. Greater is $P(A \cup B) = [\psi]^2$ greater will be the Probability Density $F(x)$.

3. EXPONENTIAL FIT :

The data of some BIOPOLYMERS (N=Number of Monomers vs Rrms = An Important Statistical Properties ROOT MEAN SQ END TO END SEPARATION is a F(X) of RADIUS OF GYRATION (Rg)) are analysed a BEST FIT STATISTICA shows an EXP fit .The output of the CURVE is expressed as $N = 267.136 \cdot \exp(0.042 \cdot R_{rms})$. By expanding in exp series we get $N = 267.136 [1 + 0.042 \cdot R_{rms}]$ (Taking 1st term of e series) .

The above work is the continuation work of the REFERENCE work mentioned for the BIOPOLYMERS of interest

4. PRICIPLE OF STATISTICS :

In this review we will point out some important STATISTICAL parameters used in CHEMICAL ANALYSIS along with some important schedule. Keywords: RSD , K.P coefficient , Hypothesis

Testing , Regression , SOP , BIS , ISO .

5. CONVENTIONAL MATHEMATICS :

As we are all aware most of the bacterial growth kinetics follows four stages namely, which are the subject of my mathematical analysis. 1. LAG PHASE 2. LOG PHASE (EXPONENTIAL PHASE) 3. STATIC or STATIONARY PHASE .4. DECLINING PHASE.

6. NORMALISATION :

In this report we wish to report a most probable approach of Normalization on Partition Function and also the nature of thermal wave function as a normalized parameter. But the main duality / paradox / is shi (wave function) is an intensive property depends on electronic nature But the Molecular wave function / Thermal wave function is a molecular property rather distribution so it is an extensive property . Now our attempt is to correlate the two properties through a mathematical theorem ie NORMALISATION.

7 . BEST FIT REGRESSION ANALYSIS:

In the earlier work 1 by Datta et al the important hydrodynamic properties like radius of gyration (R_g) and root mean square end to end separation (R_{rms}) can be calculated through the known value of molecular weight (M). The mathematical modeling was done by polynomial regression through a standard software like curve finder. The present work correlates the most important viscometric property, Diffusion coefficient (D) 2,3 with the same hydrodynamic properties like radius of gyration (R_g) i.e. $D(R_g)$ of the biopolymers. It is expected that a bulky biopolymer of Random Coil with high molecular weight diffuse more slowly through a solvent than the Random Coil of low.

In this note we have a CORRELATE the TWO most important approach Computational Fluid Dynamics (CFD) with Molecular CFD (HYDRODYNAMICS).

CONCLUSION :

In conclusion part the **APPLICATION** part to be noted as follows:

1. RANDOM COIL BIOPOLYMERS.
2. BACTERIAL GROWTH.
3. PHYSICO-CHEMICAL ANALYSIS / ANALYTICAL CHEMISTRY.

It is an experimental finding between Physical Chemistry and Analytical Chemistry Teaching methods between the Department of Chemistry, SREE CHAITANYA COLLEGE, 24, PGS (N) , W.B, INDIA .

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