

The Significance of Linearity of Quantities in Electrophoresed and Blotted Materials Demonstrated by BandScan© - an Analytical Program

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Abstract

There is still an undervalued need for quantitation in the biological, biochemical, and the molecular genetic sciences. Quantitation of electroblotted materials such as DNA, RNA, and proteins and the quantitation of molecular weights in electrophoresed gels is often necessary to an undistorted analysis. Quantitation would ensure, for instance, that the quantities of the substances being assayed fall within the linear range of that method by which they are being studied, once the linear range has been determined by a linearity study: the common phenomenon of saturation and its reverse, insufficient samples, could be easily detected. A biological data representation program is discussed that converts the results of gels and blots to numerical values and presents these values in a graphical display that is amenable to meaningful comparisons. The main goal of this work is to be able to quantitate electrophoresed and blotted molecular and biochemical results while insuring that the samples processed are within the linear range of the methods employed. This study demonstrates errors that can occur when a linearity study is not conducted. Versatile, easy-to-use quantitative graphics programs, such as the BandScan program, can further pipe numerical output to spreadsheets or statistical packages and provide the bridge between modern computation and traditional wet lab techniques. This analytical bioinformatics program that allows for statistical analysis is also a valuable tool for teaching purposes in Bioinformatics and Molecular Biology. BandScan is available free for academic institutions and class room work from the corresponding author.