

GRAYSCALE MEASUREMENTS OF MICROBIAL COLONIES

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This work presents a facile technique that employs flatbed scanners for the measurement of colony grayscale values. Use of grayscale conversion of sRGB-based color images simplifies initially complex three dimensional color space attributes into a single dimension, allowing for a simplified approach to the detection and monitoring of colony chromogenesis. The performance of 4 often-used grayscale conversions is assessed using Lethen agar in combination with two chromogenic dyes, triphenyl tetrazolium chloride (TTC), and tetrazolium violet (TV) in cultures of three model microorganisms (*Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*). The effects of different concentrations of the chromogens and the differences in color development over time are evaluated.

Affordable approaches to interpret derived data are suggested and insights related to analysis of color development are supplied. Metrological aspects of the technique are duly addressed. Thus, particular care is devoted to characterize the measurement technique employed, to highlight its limitations, and to assess cross-device reproducibility of obtained results. The suggested method is simple and resorts to affordable and readily available devices and software. This technique can be applied in culture media enhancement, phenotypic characterization of microorganisms, especially in the detection of colony color development.

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