The BIOLOG System as a Teaching Tool for Bacterial Identification

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Once the initial morphological and gram-staining characteristics are determined, bacteria are differentiated primarily by their biochemistry. Biochemical tests can be tedious and expensive. Bochner (1989a, 1989b) has developed a system which can test up to 95 different substrates using a redox dye as an indicator. If the bacterium metabolizes the chemical, the colorless redox dye becomes purple. Patterns of metabolism can be compared with a computerized library of known organisms. The procedure is now outlined in Pelczar et al. (1993) and is described as one of the latest breakthroughs in automated technology for microbiology.

While a completely automated system, complete with automatic reader, is costly (over $20,000); the principle can be taught at the undergraduate level for the price of the MicroPlates, under $10 each. The MicroPlates are manufactured in several varieties, including the "GN" for Gram-negative bacteria, "GP" for Gram-positive, "ES" for Escherichia coli and Salmonella, and "MT" (empty, except for the redox dye). The GN Microplates are recommended for students, since the "MicroLog Software Demonstration Disk," features 18 gram-negative bacteria in its database. The demonstration disk is available at no cost to teachers.

Other essential equipment for the procedure are the following, per student, or pair of students:

- Pure cultures
- Sterile TSA plates
- Sterile swabs
- 2 tubes of 20 ml sterile 0.85% saline
- Sterile dispensing pipettes, to deliver 150 µl, 96 times. (We use Pasteur pipettes)
- 2 sterile cuvettes for the Spectronic 20
- Spectronic 20 or turbidimeter
- IBM-compatible computer

Complete instructions come with each set of MicroPlates, and additional literature is available from BIOLOG\(^1\) upon request. The instructions stress careful adherence to streaking technique for the preparatory culture, concentration of the inoculum at 108 - 1,010 cells/ml, and attention to the age of the inoculum when results are read.

I introduced the technique this past semester as a laboratory exercise for General Microbiology. The students commented that it was one of their favorite exercises because it was so "up-to-date." They found inoculation of 95 wells with a single pipette tedious, but after having inoculated Durham tubes the previous week, they realized how they were multiplying their data fields. They enjoyed using the demonstration software program and found it easy to use.

\(^1\)BIOLOG, Inc., 3938 Trust Way, Hayward, CA 94545

Literature Cited

