Evaluation of the autoSCAN-W/A System for Rapid (2-Hour) Identification of Members of the Family Enterobacteriaceae

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We evaluated the ability of the Baxter autoSCAN-W/A System (MicroScan Division, Baxter Diagnostics, Inc., West Sacramento, Calif.) to use the rapid (2-h) gram-negative identification panel for accurate identification of members of the family Enterobacteriaceae. At 2 h, 353 of 467 (75.6%) strains in a challenge set of biochemically typical and atypical stock cultures were correctly identified to genus and species. Another 76 (16.3%) strains were correctly identified to genus and species after the performance of recommended additional biochemical testing. Thus, at 24 h, 91.9% of the 467 strains were correctly identified. Twenty-two strains (4.7%) were identified to the correct genus but the incorrect species, and 16 strains (3.4%) were misidentified. Of these 16 strains, 9 were incorrect at 2 h, and 7 were incorrect after the additional testing. Because the system is based on fluorogenic substrates, no conventional tests were readily available with which to compare aberrant reactions. These results suggest that the autoSCAN-W/A with its rapid gram-negative panels is acceptable for the identification of the Enterobacteriaceae in a clinical microbiology laboratory.

The MicroScan Division of Baxter Diagnostics, Inc. (West Sacramento, Calif.) historically has approached bacterial identification in several ways with their identification systems. These methods have included visual reading of biochemical test panels (with or without the touch-SCAN), semiautomated reading by using the autoSCAN-4, and the new automated reading system, the autoSCAN-W/A (WalkAway). Each of these approaches provides accurate results (2-8). The autoSCAN-W/A, the Vitek (Hazelwood, Mo.) AutoMicrobic System, and the ALADIN (Analytab Products, Inc., Plainview, N.Y.) constitute the available fully automatic bacterial identification instruments.

Advances in the use of fluorogenic substrates to recognize preformed-enzyme activity has allowed a more rapid approach to organism identification. Coupled with computer-driven robotics, these instruments incubate, read, and interpret the tests, with virtually no additional manipulations after the instrument is loaded. By using this approach, 2- to 4-h identification and reporting times are common (3, 6).

Although the autoSCAN-W/A has been evaluated for its ability to accurately identify non-glucose-fermenting gram-negative rods (6) and has been tested against the Vitek AutoMicrobic System (3), the rapid panels have not been fully evaluated against standard Enterobacteriaceae reference procedures. We challenged the autoSCAN-W/A with 467 strains of the Enterobacteriaceae representing both common and rare clinical isolates in order to determine the limits of accuracy of the instrument under stringent test conditions.

MATERIALS AND METHODS

Culture collection. This study used 467 typical and atypical gram-negative fermenters taken from the stock culture collection of the Centers for Disease Control (Table 1).

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at the genus level but was incorrect at the species level when the manufacturer states that the autoSCAN-W/A can identify the organism to the species level. An "error" result indicates an incorrect genus identification, an unacceptable profile number, or a report of "very doubtful identification."

RESULTS AND DISCUSSION

Identifications rendered by the autoSCAN-W/A were grouped into four categories, i.e., those for which (i) the first identification listed was correct at ≥85% probability, (ii) the correct identification was listed among the possible choices at <85% probability but required additional biochemical tests for completion, (iii) the genus was correct but the correct species designation was not among the choices, or (iv) the correct identification was not among the choices (Table 1). At 2 h, 75.6% (353 of 467) of the strains were correctly identified at a probability of ≥85%; another 16.3% (76 of 467) required additional biochemical testing but were correctly identified at 24 h, even though the probability at 24 h was <85%. Most (16 of 22) of the strains that were correct to the genus level and incorrect to the species level were identified at 2 h. Of the 16 erroneous identifications, 9 were obtained at 2 h and 7 were obtained at 24 h.

Determinations for all misidentified strains were repeated twice to ensure that no technical error had occurred. Because the system is based on fluorogenic substrates, no conventional tests with which to compare aberrant reactions were readily available. For this reason, we were unable, in most cases, to determine why an incorrect answer was reported. No recurring problem areas were evident, with the exception of the genus Escherichia (Table 2). Escherichia hermannii and Escherichia vulneris were misidentified for 30% of the strains belonging to either of the two species. Of five atypical Salmonella strains, two were misidentified. One strain was identified as Enterobacter gergoviae, at a probability of 94.6%; the other was identified as Escherichia coli, at a probability of 99.9%. Because an optional identification of the Salmonella genus was not given for either strain, the need for a serologic test was not prompted.

Of the strains identified correctly to genus only, many were Klebsiella ornithinolytica (ornithine-positive Klebsiella pneumoniae). The error resulted because the panels were ornithine negative at 2 h. The manufacturer is aware of this problem. The low concentration of ornithine also adversely affected 3 of 10 of the P. mirabilis identifications. They required additional biochemical testing before being correctly identified at the low probabilities of 13 to 16%.

These results suggest that the autoSCAN-W/A, with its rapid gram-negative panels, is acceptable for the identification of members of the family Enterobacteriaceae.

REFERENCES


