**INTRODUCTION**

The Biolog GN2 MicroPlate (Figure 1) is designed for identification and characterization of a very wide range of aerobic gram-negative bacteria. Biolog’s MicroPlates and databases were first introduced in 1989, employing a novel, patented redox chemistry. This chemistry, based on reduction of tetrazolium, responds to the process of metabolism (i.e. respiration) rather than to metabolic by-products (e.g. acid). Biolog’s chemistry works as a universal reporter of metabolism and simplifies the testing process as color development chemicals do not need to be added. Since the GN2 MicroPlate is not dependent upon growth to produce identifications, it provides superior capability for all types of gram negative organisms: fermenters, non-fermenters, and fastidious organisms all are identified with a single panel. The database for the GN2 MicroPlate is now over 500 species. It is by far the largest kit-based identification database available.

![FIGURE 1. Carbon Sources in GN2 MicroPlate](image)

**GN2 MICROPLATE**

The Biolog GN2 MicroPlate performs 95 discrete tests simultaneously and gives a characteristic reaction pattern called a “metabolic fingerprint”. These fingerprint reaction patterns provide a vast amount of information conveniently contained in a single Biolog MicroPlate. The metabolic fingerprint patterns are compared and identified using the MicroLog™ database software. Other aerobic kit-based identification methods rely on a much smaller number of tests. Consequently, the significant limitation of these products is the limited number of species and organism types that they can identify. Furthermore, these products were designed to address the needs of routine clinical/hospital testing. The Biolog GN2 MicroPlate was designed to address the needs of a much wider range of users including environmental testing labs and animal and plant disease labs as well as clinical reference labs.
There are approximately 4,000 named bacterial species and this is just a fraction of the total number of species in the environment. The MicroLog™ System provides the unique feature of user defined custom databases. If an organism is outside the MicroLog database, the user can save the pattern to a custom database for future reference. If the organism is isolated again, the laboratory will have the pattern saved instead of simply getting a “no ID”. Some other methods provide supplemental off-line tests for use alongside the identification panel. This approach is inconvenient and does not produce an expanded pattern library.

An identification from the Biolog GN2 MicroPlate is superior to less precise methods, because:

- The MicroLog System bases its identification on a larger number of tests. There are over $4 \times 10^{28}$ possible patterns from a single MicroPlate.
- The MicroLog System covers far more species.
- Older methods were developed to detect routine clinical pathogens, and do not adequately identify other important organisms such as: Acinetobacter spp., Aeromonas spp., Bordetella spp., Haemophilus spp., Pseudomonas spp., Vibrio spp., and Yersinia spp.

Various methods have different numbers and types of organisms within their database. Figure 2, compares several popular kit-based methods. The Biolog GN2 MicroPlate has a much larger number of tests, which provides greater fingerprint discrimination and a larger database.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Number of Aerobic Species in Database</th>
<th>Number of Tests Used for Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biolog, Inc MicroLog</td>
<td>501</td>
<td>95</td>
</tr>
<tr>
<td>BioMérieux Vitek® GNI+</td>
<td>104</td>
<td>29</td>
</tr>
<tr>
<td>bioMérieux API 20E® &amp; NFT</td>
<td>~180</td>
<td>20</td>
</tr>
<tr>
<td>BBL® Crystal™</td>
<td>~105</td>
<td>28</td>
</tr>
</tbody>
</table>

**FIGURE 2.** Comparison of Commercial Test Kits for Gram Negative Organisms

In addition to a limited number of tests used to identify an unknown, some methods rely primarily on fermentation of sugars. This approach does not provide the necessary environment for every organism of interest. Many bacteria cannot utilize sugars via a fermentative process and react weakly or not at all with these methods. The larger number and more diverse range of tests in the GN2 MicroPlate provide for greater accuracy and precision.

The GN2 MicroPlate has demonstrated accuracy comparable to molecular methods and without the expense. Figure 3, provides representative results from an independent study with non-routine isolates compared to a molecular method:

<table>
<thead>
<tr>
<th>% Correct to the Species Level</th>
<th>Biolog, Inc MicroLog</th>
<th>Molecular Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fermenters</td>
<td>80%</td>
<td>72%</td>
</tr>
<tr>
<td>Nonfermenters</td>
<td>88%</td>
<td>100%</td>
</tr>
<tr>
<td>Overall</td>
<td>85%</td>
<td>89%</td>
</tr>
</tbody>
</table>

**Figure 3: Comparison of Phenotypic and Genotypic Techniques**

**PROCEDURE FOR USING GN2 MICROPLATES**

The test procedure is fast and simple, involving only 5 steps, and requiring only 2 to 3 minutes hands-on time per sample.

1. A pure culture of a bacterium is grown on a Biolog Universal Growth w/5% Sheep Blood agar plate (Biolog catalog #70101 for a 500g jar of dehydrated powder.)
2. The bacteria are swabbed from the surface of the agar plate, and suspended to a specified density in GN/GP Inoculating Fluid (Biolog catalog #72101).
3. 150 µl of bacterial suspension is pipetted into each well of the GN2 MicroPlate (Biolog catalog #1011).
4. The MicroPlate is incubated at 30° or 35°C (depending upon the nature of the organism) for 4-24 hours.
5. The MicroPlates are read either visually or with the Biolog MicroStation™ or OmniLog™ System, compared to the GN Database (Biolog catalog #22401A), and a result is determined.

**REFERENCES:**


**CONTACT INFORMATION**

The Biolog Microbial Identification/Characterization System will be an invaluable addition to your microbiology laboratory.

For more details, contact us using the information below: