

GN2 MicroPlate™

A1 Water	A2 α-Cyclodextrin	A3 Dextrin	A4 Glycogen	A5 Tween 40	A6 Tween 80	A7 N-Acetyl-D-Galactosamine	A8 N-Acetyl-D-Glucosamine	A9 Adonitol	A10 L-Arabinose	A11 D-Arabitol	A12 D-Cellobiose
B1 i-Erythritol	B2 D-Fructose	B3 L-Fucose	B4 D-Galactose	B5 Gentiobiose	B6 α-D-Glucose	B7 m-Inositol	B8 α-D-Lactose	B9 Lactulose	B10 Maltose	B11 D-Mannitol	B12 D-Mannose
C1 D-Melibiose	C2 β-Methyl-D-Glucoside	C3 D-Psicose	C4 D-Raffinose	C5 L-Rhamnose	C6 D-Sorbitol	C7 Sucrose	C8 D-Trehalose	C9 Turanose	C10 Xylitol	C11 Pyruvic Acid Methyl Ester	C12 Succinic Acid Mono-Methyl-Ester
D1 Acetic Acid	D2 Cis-Aconitic Acid	D3 Citric Acid	D4 Formic Acid	D5 D-Galactonic Acid Lactone	D6 D-Galacturonic Acid	D7 D-Gluconic Acid	D8 D-Glucosaminic Acid	D9 D-Glucuronic Acid	D10 α-Hydroxybutyric Acid	D11 β-Hydroxybutyric Acid	D12 γ-Hydroxybutyric Acid
E1 p-Hydroxy Phenylacetic Acid	E2 Itaconic Acid	E3 α-Keto Butyric Acid	E4 α-Keto Glutaric Acid	E5 α-Keto Valeric Acid	E6 D,L-Lactic Acid	E7 Malonic Acid	E8 Propionic Acid	E9 Quinic Acid	E10 D-Saccharic Acid	E11 Sebacic Acid	E12 Succinic Acid
F1 Bromosuccinic Acid	F2 Succinamic Acid	F3 Glucuronamide	F4 L-Alaninamide	F5 D-Alanine	F6 L-Alanine	F7 L-Alanyl-glycine	F8 L-Asparagine	F9 L-Aspartic Acid	F10 L-Glutamic Acid	F11 Glycyl-L-Aspartic Acid	F12 Glycyl-L-Glutamic Acid
G1 L-Histidine	G2 Hydroxy-L-Proline	G3 L-Leucine	G4 L-Ornithine	G5 L-Phenylalanine	G6 L-Proline	G7 L-Pyroglutamic Acid	G8 D-Serine	G9 L-Serine	G10 L-Threonine	G11 D,L-Carnitine	G12 γ-Amino Butyric Acid
H1 Urocanic Acid	H2 Inosine	H3 Uridine	H4 Thymidine	H5 Phenylethylamine	H6 Putrescine	H7 2-Aminoethanol	H8 2,3-Butanediol	H9 Glycerol	H10 D,L-α-Glycerol Phosphate	H11 α-D-Glucose-1-Phosphate	H12 D-Glucose-6-Phosphate

FIGURE 1. Carbon Sources in GN2 MicroPlate

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 developing 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.

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 4×10^{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.

Manufacturer	Number of Aerobic Species in Database	Number of Tests Used for Identification
Biolog, Inc MicroLog	501	95
BioMérieux Vitek® GNI+	104	29
bioMérieux API 20E® & NFT	~180	20
BBL® Crystal™	~105	28

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

To 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:

% Correct to the Species Level	Biolog, Inc MicroLog	Molecular Method
Fermenters	80%	72%
Nonfermenters	88%	100%
Overall	85%	89%

Figure 3: Comparison of Phenotypic and Genotypic Techniques¹

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 # 1101).
- 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 # 22601D), and a result is determined.

REFERENCES:

- [1] Comparison of Phenotypic and Genotypic Techniques of Identification of Unusual Aerobic Pathogenic Gram Negative Bacilli. Y.W. Tang, N.M. Ellis, M.K. Hopkins, D.E. Dodge, and D.H. Persing, Journal of Clinical Microbiology, December 1998, p. 3674-3679

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: