SAF-RC-237
100N Area BioRemediation Soil Samples
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 11/13/13
INITIAL/DATE

COMMENTS:

SDG MILB0135 SAF-RC-237

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: UPR-100-N-17

SAF-RC-237
100N Area BioRemediation Soil Samples
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 11/13/13
INITIAL/DATE

COMMENTS:

SDG MILB0135 SAF-RC-237

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: UPR-100-N-17

RECEIVED
JUL 2013

REPORT OF ANALYSES

PREPARED BY:

MICROBE INOTECH LABORATORIES, INC.

the MiL, Inc.

Celebrating 20 Years of Excellence in Microbiology and Service

MICROBE INOTECH LABORATORIES, INC., 7259 LANSDOWNE AVENUE, SUITE 200, ST. LOUIS, MO 63119-3421
(800) 688-9144 • (314) 645-2177 • FAX (314) 645-2544 • info@microbeinotech.com

Microbe Inotech Laboratories, Inc.
Summary Report of Analysis
[MILB – 0135A] Final

Joan Kessner
Washington Closure Hanford
2620 Fermi Ave.
Richland, WA 99354
Phone: 509-375-4688
Email: jhkessner@wch-rcc.com; rlweiss@wch-rcc.com

Preliminary: June 11, 2013
Final: June 24, 2013

Description and Chain of Custody Record Information:

- Tuesday, June 04, 2013 – 9:50AM: Received by FedEx ten (10) samples for Total Aerobic Plate count, Total Anaerobic Plate count, and Yeast, Mold, and Fungi Plate counts via spread plate method.
- MiL, Inc. REPORT and Invoice No.: MILB-0135A

Sample Processing

Within 20 minutes of reception an aliquot from each sample is checked for weight or volume and serially diluted. The dilutions are aseptically transferred in a laminar flow biological cabinet and plated in the following manner(s):

- [Standard Methods 18th Edition #9215C (standard spread plate method) for Yeast, Mold, and Fungi Plate Counts] The sample dilutions are plated onto previously prepared and dried Sabouraud Dextrose Agar (SAB) medium (for Yeast, Mold, and Fungi enumeration) in Petri plates and then incubated at 24.5°C for 3 and 5 days. Results are reported as Total Colony Forming Units (of Yeast, Mold, and Fungi) per 1 milliliter or 1 gram of solution or solid (CFU/mL or CFU/g).

- [Standard Bacterial Plate Count 9215] - The dilutions are plated onto previously prepared and dried TSA medium in Petri plates. Observations for colony forming units per 1 milliliter (CFU/mL) are made after 24 and 48 hours of incubation at 30°C.

- [Standard Bacterial Plate Count 9215] (Anaerobic) - The dilutions are plated onto previously prepared and dried TSA medium in Petri plates. Observations for Colony Forming Units per 1 milliliter or 1 gram of sample (CFU/mL or CFU/g) are made after 48 to 72 hours of incubation at 37°C under anaerobic conditions.

Results:

DATA: Results Reported as Colony Forming Units per 1 milliliter or Colony Forming Units per 1gram of sample (CFU/mL or CFU/g)							
Sample Number	Sample Name	Results					
		Total Aerobic Plate Counts (TSA)		Total Anaerobic Plate Counts		Yeast and Mold Counts (SAB)	
		24h	48h	48h	72h	3 Days	5 Days
0135A-1	J1RN81	1.00×10^2	1.00×10^2	2.00×10^2	3.00×10^2	$<1.00 \times 10^2$	$<1.00 \times 10^2$
0135A-2	J1RN82	$<1.00 \times 10^2$	1.50×10^4	1.10×10^3	1.90×10^3	$<1.00 \times 10^2$	5.10×10^3
0135A-3	J1RN83	$<1.00 \times 10^2$	4.00×10^2	1.91×10^5	1.91×10^5	$<1.00 \times 10^2$	$<1.00 \times 10^2$
0135A-4	J1RN84	$<1.00 \times 10^2$	$<1.00 \times 10^2$	$<1.00 \times 10^2$	1.00×10^2	1.00×10^2	1.00×10^2
0135A-5	J1RN85	$<1.00 \times 10^2$	3.04×10^4	9.10×10^3	1.20×10^4	7.60×10^3	8.00×10^3
0135A-6	J1RN86	$<1.00 \times 10^2$	$<1.00 \times 10^2$	1.00×10^2	5.00×10^2	$<1.00 \times 10^2$	$<1.00 \times 10^2$
0135A-7	J1RN87	$<1.00 \times 10^2$	2.02×10^4	2.67×10^5	2.67×10^5	7.00×10^3	7.70×10^3
0135A-8	J1RN88	1.00×10^2	9.73×10^4	2.10×10^5	3.20×10^5	4.90×10^3	7.20×10^3
0135A-9	J1RN89	4.95×10^6	5.02×10^6	1.00×10^6	9.00×10^6	1.55×10^5	1.55×10^5
0135A-10	J1RN90	5.12×10^4	3.95×10^4	1.13×10^6	1.18×10^6	2.94×10^4	4.47×10^4

$<1.00 \times 10^1$ = None detected, TNTC = Too numerous to count

Approximate percentages of strains in each sample:

Strain	Sample Number										Type	Media
	1	2	3	4	5	6	7	8	9	10		
Aerobic Strains on TSA												
1	100	--	--	--	--	--	--	--	--	5	Bacteria	TSA
2	--	98	--	--	--	--	--	--	--	--	Bacteria	TSA
3	--	1	--	--	--	--	--	--	--	--	Bacteria	TSA
4	--	1	--	--	--	--	--	--	--	--	Bacteria	TSA
5	--	--	100	--	--	--	--	--	--	--	Bacteria	TSA
8	--	--	--	--	10	--	--	--	--	--	Fungal	TSA
9	--	--	--	--	80	--	--	--	--	--	Bacteria	TSA
10	--	--	--	--	5	--	--	--	--	--	Bacteria	TSA
11	--	--	--	--	5	--	30	75	--	--	Bacteria	TSA
12	--	--	--	--	--	--	30	5	5	--	Bacteria	TSA
13	--	--	--	--	--	--	30	--	--	--	Bacteria	TSA
14	--	--	--	--	--	--	10	5	5	--	Bacteria	TSA
15	--	--	--	--	--	--	--	5	--	--	Bacteria	TSA
16	--	--	--	--	--	--	--	10	--	5	Bacteria	TSA
17	--	--	--	--	--	--	--	--	37	5	Bacteria	TSA
18	--	--	--	--	--	--	--	--	38	--	Bacteria	TSA
19	--	--	--	--	--	--	--	--	5	--	Bacteria	TSA
20	--	--	--	--	--	--	--	--	10	10	Bacteria	TSA
21	--	--	--	--	--	--	--	--	--	26	Bacteria	TSA
23	--	--	--	--	--	--	--	--	--	24	Bacteria	TSA
24	--	--	--	--	--	--	--	--	--	15	Bacteria	TSA
25	--	--	--	--	--	--	--	--	--	5	Bacteria	TSA
48	--	--	--	--	--	--	--	--	--	5	Bacteria	TSA
Anaerobic Strains on TSA												
1	100	--	--	--	--	--	--	--	--	--	Bacteria	TSA
2	--	--	--	--	--	--	5	--	--	--	Bacteria	TSA
8	--	--	--	--	44	--	--	--	--	--	Bacteria	TSA
9	--	--	--	--	48	--	--	--	--	--	Bacteria	TSA
11	--	--	--	--	--	--	15	--	--	--	Bacteria	TSA
12	--	--	--	--	--	--	--	--	--	5	Bacteria	TSA
13	--	--	--	--	--	--	--	--	--	70	Bacteria	TSA
16	--	--	--	--	--	50	--	--	--	--	Bacteria	TSA
18	--	--	--	--	--	--	--	90	--	--	Bacteria	TSA
20	--	23	--	--	--	--	--	--	--	--	Bacteria	TSA
23	--	7	--	--	2	--	--	--	--	--	Bacteria	TSA
24	--	23	--	--	1	--	--	--	--	--	Bacteria	TSA
27	--	1	--	--	--	--	--	--	--	--	Bacteria	TSA
28	--	23	--	--	--	--	--	--	--	--	Bacteria	TSA
29	--	23	--	--	--	--	--	--	--	--	Bacteria	TSA
30	--	--	100	--	--	--	80	--	--	25	Bacteria	TSA
31	--	--	--	100	--	--	--	--	--	--	Bacteria	TSA
32	--	--	--	--	1	--	--	--	--	--	Bacteria	TSA
33	--	--	--	--	1	--	--	--	--	--	Bacteria	TSA
34	--	--	--	--	3	--	--	--	--	--	Bacteria	TSA
35	--	--	--	--	--	50	--	--	--	--	Bacteria	TSA
36	--	--	--	--	--	--	--	--	10	--	Bacteria	TSA
37	--	--	--	--	--	--	--	--	45	--	Bacteria	TSA
38	--	--	--	--	--	--	--	--	45	--	Bacteria	TSA
49	--	--	--	--	--	--	--	10	--	--	Bacteria	TSA

the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Strains on SAB												
Strain #	Sample Number										Type	Media
	1	2	3	4	5	6	7	8	9	10		
1	--	--	--	--	--	--	--	50	--	5	Bacteria	SAB
5	--	--	--	--	--	--	--	--	--	10	Bacteria	SAB
9	--	--	--	--	50	--	50	--	--	--	Bacteria	SAB
11	--	--	--	--	--	--	--	--	2	5	Bacteria	SAB
13	--	--	--	--	--	--	--	--	--	--	Bacteria	SAB
20	--	--	--	--	--	--	--	5	--	10	Bacteria	SAB
21	--	--	--	--	--	--	--	--	--	55	Bacteria	SAB
24	--	50	--	--	--	--	--	10	3	--	Bacteria	SAB
35	--	--	--	--	--	--	--	--	5	--	Bacteria	SAB
39	--	--	100	--	--	--	--	50	--	5	Bacteria	SAB
40	--	50	--	--	--	--	--	--	--	--	Bacteria	SAB
41	--	--	--	100	--	--	--	--	--	--	Fungal	SAB
42	--	--	--	--	50	--	50	5	--	10	Fungal	SAB
43	--	--	--	--	--	--	--	--	--	--	Fungal	SAB
44	--	--	--	--	--	--	--	--	5	--	Bacteria	SAB
45	--	--	--	--	--	--	--	80	--	--	Bacteria	SAB
46	--	--	--	--	--	--	--	--	20	--	Bacteria	SAB
47	--	--	--	--	--	--	--	--	60	--	Bacteria	SAB
50	--	--	--	--	--	--	--	--	5	--	Bacteria	SAB

Total number of morphologically unique strains: **47**

Thank you from the staff on project:

Bruce C. Hemming, Ph. D
President and CEO

Benjamin M. Winkler
Research Laboratory Manager

the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

the MiL, inc. ATTENTION: Joan Kessner Fax:

Sample Receipt Confirmation Form

This notice is to confirm receipt of samples at Microbe Inotech Laboratories, Inc., at 7259 Lansdowne Avenue Suite 200, St. Louis, MO 63119-3421
Telephone: 1-800-688-9144 Fax: 1-314-645-2544
Reach Us Online At: www.microbeinotech.com

Client Information:

Contact:	Joan Kessner
Firm:	Washington Closure Hanford
Phone Number:	
Project Name:	
Project Number:	

the MiL, inc. Information:

Receiving Staff Member:	BMW
Assigned MiL Project Number:	MILB-0135A
Client Fax (If Different From Above):	
Shipment Carrier:	FedEx
Shipment Tracking Number:	

Sample Information:

Total Number of Sample Containers: 10 Representing Total Number of Samples: 10.

ELECTRONIC DATE & TIME STAMP

OR Arrived Tuesday, June 04, 2013 9:50:06 AM AM PM

Day of Week Month/Day/Year Time of Day

List of Samples Received		Condition Upon Receipt	Analysis Requested	Collection Date
1	J1RN81	Intact	Bioactivity	05/29/13
2	J1RN82	Intact	Bioactivity	05/29/13
3	J1RN83	Intact	Bioactivity	05/29/13
4	J1RN84	Intact	Bioactivity	05/29/13
5	J1RN85	Intact	Bioactivity	05/29/13
6	J1RN86	Intact	Bioactivity	05/29/13
7	J1RN87	Intact	Bioactivity	05/29/13
8	J1RN88	Intact	Bioactivity	05/29/13
9	J1RN89	Intact	Bioactivity	05/29/13
10	J1RN90	Intact	Bioactivity	05/29/13
Continued On Additional Page (If Checked): ☐				

Comments or Further Requested Information:

(INTIAL

Thank You, _____.
Signature of Sender

6/4/13

the MiL, inc. 7259 Lansdowne Avenue Suite 200, St. Louis, MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-237-002

Collector: STOWE, QG	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 7L	Data Turnaround: 21 Days		
Project Designation: 100N	Sampling Location: UPR-100-N-17		SAF No.: RC-237
Ice Chest No.: RCC-07-011	Field Logbook No.: EL-1652-09	COA: 01.01.RUP117N6W0	Method of Shipment: Fed Ex
Shipped To: Microbe Inotech - St Louis	Offsite Property No.: A120828		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential Rad~~ AJ 6.3.13

Special Handling and/or Storage

Preservation	Cool-4C										
Type of Container	g/P										
No. of Container(s)	1										
Volume	475ml ~~120ml~~ * AJ 6.3.13										

SAMPLE ANALYSIS

Sample No.	Matrix	Sample Date	Sample Time	Bioactivity Evaluation (No CAS)									
J1RN81	SOIL	5-29-13	1338	X									
J1RN82	SOIL	5-29-13	1340	X									
J1RN83	SOIL	5-29-13	1342	X									
J1RN84	SOIL	5-29-13	1345	X									
J1RN85	SOIL	5-29-13	1347	X									

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	5-29-13 1405	Dennis Newman	5-29-13 1405
Dennis Newman	5-29-13 1615	Chris Bingham	5-29-13 1615
Chris Bingham	6-3-13 1012	Fed Ex	

SPECIAL INSTRUCTIONS

~~*~~ JT 5/29/13 AJ 6.3.13

REVIEWED BY AJ DATE 6.3.13

FINAL SAMPLE DISPOSITION

Disposal Method	Disposed By	Date/Time

WCH-EE-011

Generated Date/Time: 05/28/2013 14:45, PDT

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-237-002

Collector: STOWE, QG	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 7L	Data Turnaround: 21 Days		
Project Designation: 100N	Sampling Location: UPR-100-N-17		SAF No.: RC-237
Ice Chest No.: RCC-07-011	Field Logbook No.: EL-1652-09	COA: 01.01.RUP117N6W0	Method of Shipment: fed EX
Shipped To: Microbe Inotech - St Louis	Offsite Property No.: A120828		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential Rad~~ AJ 6.3.13

Special Handling and/or Storage

Preservation	Cool~4C										
Type of Container	g/P										
No. of Container(s)	1										
Volume	475ml ~~120ml~~ *	AJ 6.3.13									

SAMPLE ANALYSIS

Sample No.	Matrix	Sample Date	Sample Time	Bioactivity Evaluation (No CAS)									
J1RN86	SOIL	5-29-13	1349	X									
J1RN87	SOIL	5-29-13	1350	X									
J1RN88	SOIL	5-29-13	1351	X									
* J1RN89	SOIL	5-29-13	1235	X									
* J1RN90	SOIL	5-29-13	1250	X									

CHAIN OF POSSESSION / **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	5/29/13 1405	Dennis Newman	5-29-13 1405
Dennis Newman	5-29-13 1615	Chad Ingham	5-29-13 1060#3 1615
Chad Ingham	6-3-13 1012	fed EX	

FINAL SAMPLE DISPOSITION

Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

* J1RN89 & J1RN90 are in 125mL aG containers
6-3-13
CMB

REVIEWED BY AJ
DATE 6-3-13

Generated Date/Time: 05/28/2013 14:45, PDT

American Society for Testing and Materials

ASTM INTERNATIONAL
ORGANIZATIONAL MEMBER

National Registry of Environmental Professionals

American Council of Independent Laboratories

ACIL

The Scientific Association Dedicated to Excellence in Analytical Methods.

AOAC INTERNATIONAL

MISSOURI BIOTECHNOLOGY ASSOCIATION
MOBIO

Plant and Life Sciences Technology Gateway-Regional Commerce Growth Association of St. Louis, Missouri

BioBelt
The Center of Plant and Life Sciences

CSREES
EDUCATION • USDA • RESEARCH • EXTENSION

Cooperative State Research, Education And Extension Service [SBIR Recipient]

the MiL, Inc. 7259 Lansdowne Avenue Suite 200 St. Louis MO 63119-3421
Phone: (800) 688-9144 Fax: (314) 645-2544

Warranty And Limits Of Liability

In accepting analytical work, we warrant the accuracy of test results under the conditions employed in the laboratory. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. We disclaim any other warranties, expressed or implied, including a Warranty of Fitness for Particular Purpose and Warranty of Merchantability. We accept no legal responsibility for the purposes for which the client uses the test results.

RECEIVED
AUG 2013

REPORT OF ANALYSES

PREPARED BY:

MICROBE INOTECH LABORATORIES, INC.

the MiL, Inc.

Celebrating 20 Years of Excellence in Microbiology and Service

MICROBE INOTECH LABORATORIES, INC., 7259 LANSDOWNE AVENUE, SUITE 200, ST. LOUIS, MO 63119-3421
(800) 688-9144 • (314) 645-2177 • FAX (314) 645-2544 • info@microbeinotech.com

Microbe Inotech Laboratories, Inc.
Summary Report of Analysis
[MILB – 0135B]

Joan Kessner
Washington Closure Hanford
2620 Fermi Ave.
Richland, WA 99354
Phone: 509-375-4688
Email: jhkessner@wch-rcc.com; rlweiss@wch-rcc.com

August 15, 2013

Description and Chain of Custody Record Information:

- Thursday, June 27, 2013 – 10:09AM: Received by FedEx two (2) samples for use in a biofeasablity assay. Ten (10) strains from MILB0135A were identified by Vitek, Biolog or 16s. These strains were then used in the Biofeasability Endpoint for a total of two (2) endpoint plate sets.
- MiL, Inc. REPORT and Invoice No.: MILB-0135B

Sample Processing

Processing---VITEK® Identification:

The sample is Gram stained for classification (i.e. Gram-positive or Gram-negative, see above). A sterile swab is used to aliquot sample from original agar plate. The aliquot is diluted in a saline solution to an OD absorbance between 0.53-0.69. The diluted sample is then transferred to a VITEK® plate and incubated in the instrument until a positive identification is obtained.

Results:

VITEK® Identification Database			
Strain Number	**Closest Match**	**Percent Probability**	**Confidence Level**
0135B-38	***Comamonas testosteroni***	**95%**	**Species**

Disclaimer: the MiL, inc. is not a human clinical diagnostic laboratory and makes no warranty to the fitness of this data for such purposes.

Interpretation Summary:

In order to create the database that we use to identify your organisms, thousands of species of bacteria and yeast had to be tested. In fact each species itself had to be tested hundreds of times to determine a set of characteristics unique to each species. The species characteristics that are in our database are an "average" of the characteristics of hundreds of tested bacteria of the same species.

For VITEK Data:

- **A good match is one with a probability approaching 100% and a confidence level of species.**

Processing---Biolog® Identification (Gen III):

Bacteria were streaked onto BiOLOG® Universal Growth agar (BUG) and allowed to incubate at 30°C for 24 hours. After 24 hours the sample strain was suspended into an inoculating fluid, and then the solution was loaded into the GEN III microplate. The plate was incubated at 30°C and then, using an automated micro-plate reader, examined at 24-48 hours and compared against the Biolog ® Gen III database to obtain the bacterial identification.

Summary Results by BiOLOG®:

Strain Number	Plate Type	ID by Biolog Aerobic Method	Probability	Sim. Coef.	Dist. Coef.
0135B-2	GEN III	*Serpens flexibilis*	0.522	0.522	7.154
0135B-11	GEN III	*Microbacterium resistens*	0.503	0.503	7.486
0135B-17	GEN III	*Pseudomonas corrugate*	0.653	0.653	4.973
0135B-18	GEN III	*Serratia proteamaculans*	0.624	0.624	5.445
0135B-20	GEN III	*Pseudomonas chlororaphis* ss *aurantiaca*	0.638	0.638	5.187
0135B-24	GEN III	*Bacillus galactosidilyticus*	0.682	0.682	4.507
0135B-28	GEN III	*Pseudomonas stuzeri*	0.589	0.589	6.009
0135B-36	GEN III	*Microbacterium maritypicum*	0.689	0.689	4.461

Disclaimer: the MiL, inc. is not a human clinical diagnostic laboratory and makes no warranty to the fitness of this data for such purposes.

Similarity and Distance Coefficient:

In order to create the database that we use to identify your organisms, thousands of species of bacteria had to be tested. In fact each species itself had to be tested hundreds of times to determine a set of characteristics unique to each species. The species characteristics that are in our database are an "average" of the characteristics of hundreds of tested bacteria of the same species. The Similarity and Distance Coefficient of your organism refers to the similarity and distance to the hypothetical 'mean' organism in the database. The database organism has a similarity coefficient of one and a distance of zero. So the closer your strain is to one and zero the more closely it matches the mean organism in the database.

- **A good match is one with a similarity coefficient greater than 0.5, a distance coefficient of less than 7.0, and a probability approaching 1.**

The client is strongly urged to examine the data sheets accompanying the chromatogram of the strains for alternate possible identities not summarized here. Should a question be raised on the basis of sample history, ecology and source, this additional information may be enlightening.

Processing – 16S rRNA Gene Sequencing:

The 16S rRNA gene was PCR amplified from genomic DNA isolated from pure bacterial colonies. Primers used for the amplification correspond to E. coli positions 005 and 1540 (full-length packages) and 005 and 531 (500 bp packages). Amplification products were purified from excess primers and dNTP's using Microcon 100 (Millipore) molecular weight cut-off membranes and checked for quality and quantity by running a portion of the products on an agarose gel.

Cycle sequencing of the 16S rRNA amplification products was carried out using AmpliTaq FS DNA polymerase and dRhodamine dye terminators. Excess dye-labeled terminators were removed from the sequencing reactions using a Sephadex G-50 spin column. The products were collected by centrifugation, dried under vacuum and frozen at -20°C until ready to load. Samples were resuspended in a solution of formamide/blue dextran/EDTA and denatured prior to loading. The samples were electrophoresed on an ABI Prism 377 DNA Sequencer. Data was analyzed using Applied Biosystems DNA editing and assembly software and sequence comparisons are obtained using the MicroSeq software.

16S rRNA Gene Sequence Alignment with MicroSeq Database:

16S rRNA Gene Sequence Analysis (500 bp) – MicroSeq Database			
Strain Number	**MicroSeq ID**	**Percent Difference**	**Confidence Level**
0135B-9	***Streptomyces cellulosae***	**0.00**	**Species**

Key:
MiL ID# – Sample number assigned in MiL, inc.
Closest match – Closest match to sample when aligned in a pairwise manner against the MicroSeq Database.
Percent difference – Percent difference between the sample and the closest match. Mismatched basepairs, gaps, and ambiguity codes are all accounted for in this percentage.
Confidence Level – This indicates the level of identification.

* GenBank: GenBank is a public database supported by The National Center of Biotechnology Information. The GenBank closest match is provided for reference purposes only.

Endpoint Assay Processing:

The tested bacterial strains were grown overnight on Trypticase Soy (Broth) Agar (TSA) at 30°C and then suspended in sterile saline to a turbidity of 40%-50%T. The strains are then aliquotted into a 96-well microtiter plate that contains an undisclosed growth medium of mineral salts, vitamins and buffer without a major carbon source. The wells also contain a tetrazolium dye redox indicator system. Bacterial growth (metabolic respiration/oxidation of carbon sources) is monitored by tetrazolium reduction as measured at 590nm in a microplate reader. **J1RPT1** (Supplied by the client) as well as Diesel #2 (@1µL) was added to selected wells to serve as the major carbon source. Trypticase Soy Broth (TSB) serves as the positive control for bacterial growth and water serves as the negative control for bacterial growth in this assay. Total volume of each well is 150µL.

Total growth is measured after 48 hours of incubation at 30°C. The data is processed and given with background blank values subtracted. Bar-chart interpretation of the data is provided on the pages following the executive summary report of analysis. The design template of the experiment is located in the raw data section of this report. The template shows the arrangement and position of strains in the matrix. Individual strain feasibility for biodegradation potential is reported as one of the following classifications:

- Excellent Degrader
- Good Degrader
- Fair Degrader
- Minimal Degrader
- No Effect
- Growth Inhibited

Aerobic Endpoint Assay Results:

(Please also see graphical results at end of Summary Report)

Carbon Source ⇒ Strain ⇓	**J1RPT1**	**Diesel #2**
0135B-2	Excellent	Excellent
0135B-9	Inhibited	Inhibited
0135B-11	Good	Good
0135B-17	Excellent	Excellent
0135B-18	Excellent	Excellent
0135B-20	Inhibited	Inhibited
0135B-24	Excellent	Inhibited
0135B-28	Excellent	Excellent
0135B-36	Excellent	Excellent
0135B-38	Excellent	Inhibited

0135B-9

TGGAGAGTTTGATCCTGGCTCAGGACGAACGCTGGCGGCGTGCTTAACACA
TGCAAGTCGAACGATGAACCACTTCGGTGGGGATTAGTGGCGAACGGGTGA
GTAACACGTGGGCAATCTGCCCTGCACTCTGGGACAAGCCCTGGAAACGGG
GTCTAATACCGGATACTGATCGCCTTGGGCATCCTTGGTGATCGAAAGCTC
CGGCGGTGCAGGATGAGCCCGCGGCCTATCAGCTTGTTGGTGAGGTAATGG
CTCACCAAGGCGACGACGGGTAGCCGGCCTGAGAGGGCGACCGGCCACAC
TGGGACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTGGGGAATA
TTGCACAATGGGCGAAAGCCTGATGCAGCGACGCCGCGTGAGGGATGACG
GCCTTCGGGTTGTAAACCTCTTTCAGCAGGGAAGAAGCGAAAGTGACGGTA
CCTGCAGAAGAAGCGCCGGCTAACTACGTGCCAGCAGCCGCGGTA

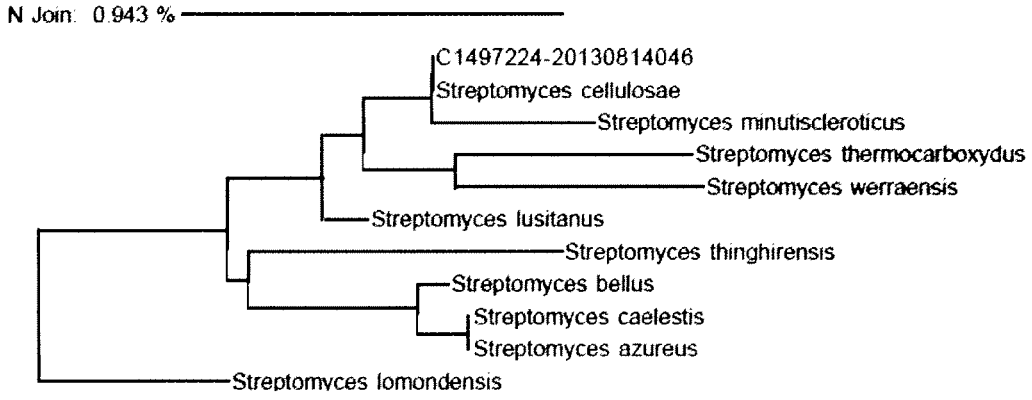
Identification Trees

0135B-9

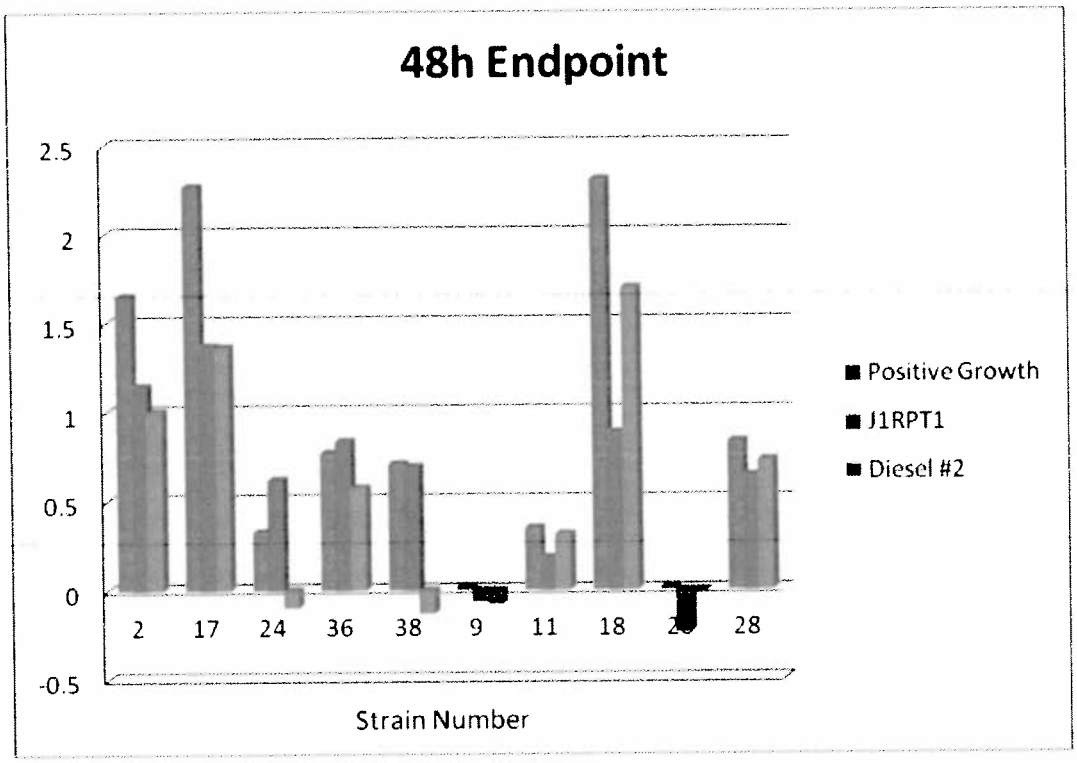
Sequence Alignment

Alignment: 501 C1497224-20130814046
0.00 % 501 Streptomyces cellulosae
0.40 % 501 Streptomyces lusitanus
0.40 % 501 Streptomyces minutiscleroticus
0.80 % 501 Streptomyces thermocarboxydus
1.00 % 501 Streptomyces bellus
1.20 % 503 Streptomyces werraensis
1.20 % 501 Streptomyces caelestis
1.20 % 501 Streptomyces azureus
1.40 % 501 Streptomyces thinghirensis
1.40 % 501 Streptomyces lomondensis

Neighbor Joining Tree



the MiL, Inc. 7259 LANSDOWNE AVENUE, SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544



Raw data can be found in appendix attached to the signed hard copy

Thank you from the staff on project:

Benjamin M. Winkler
Research Laboratory Manager

Michele R. Gossett
Laboratory Manager

the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

48hr Endpoint Assay

0135B Set 1

Plate#1

	1	2	3	4	5	6	7	8	9	10	11	12
A	-0.004	0.008	0.007	0.009	0.016	-0.028	-0.008	-0.017	-0.033	0.009	-0.034	-0.094
B	-0.012	0.007	0.006	0.018	0.036	0.007	0.015	0.014	0.002	-0.045	0.055	-0.079
C	-0.057	-0.005	1.692	1.736	2.143	2.504	0.230	0.434	0.763	0.906	0.909	0.420
D	0.258	0.392	1.685	1.497	2.164	2.262	0.228	0.410	0.718	0.687	0.912	0.584
E	1.118	1.601	2.272	2.581	2.795	2.849	2.063	2.089	2.004	2.772	2.663	2.586
F	1.124	1.655	2.581	2.657	2.772	2.577	1.814	2.016	2.116	1.954	1.521	1.499
G	0.815	2.003	2.098	2.137	2.366	2.271	1.228	1.158	2.237	2.372	1.597	0.945
H	0.312	0.723	1.670	1.969	2.345	2.345	0.493	0.582	0.586	0.956	0.558	0.225

Endpoint
Lm1 590
Automix: Once
Calibrate: On

Plate Last Read:
9:40 PM 7/20/2013

Wavelength Combination: !Lm1
Mean Temperature: 0.0
Data Mode: Absorbance
Plate Blank Used Lm1 = 0.313
Reader: Vmax ROM v--

TSB

Sample	Wells	Sample#	Values	MeanValue
TSB01	C1	1	-0.057	0.147
	C2		-0.005	
	D1		0.258	
	D2		0.392	

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
po01	C3	1	1.692	1.653
	C4		1.736	
	D3		1.685	
	D4		1.497	
po02	C5	2	2.143	2.269
	C6		2.504	
	D5		2.164	
	D6		2.262	
po03	C7	3	0.230	0.326
	C8		0.434	
	D7		0.228	
	D8		0.410	
po04	C9	4	0.763	0.769
	C10		0.906	
	D9		0.718	
	D10		0.687	
po05	C11	5	0.909	0.707
	C12		0.420	
	D11		0.912	
	D12		0.584	

pos cont

Sample	Wells	Sample#	Values	MeanValue

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01	A3	1	0.007	-0.007
	A4		0.009	
	A5		0.016	
	A6		-0.028	
	A7		-0.008	
	A8		-0.017	
	A9		-0.033	
	A10		0.009	
	A11		-0.034	
	A12		-0.094	
	B3		0.006	
	B4		0.018	
	B5		0.036	
	B6		0.007	
	B7		0.015	
	B8		0.014	
	B9		0.002	
	B10		-0.045	
	B11		0.055	
	B12		-0.079	

Copyright © 2004 Molecular Devices. All rights reserved.

neg cont

Sample	Wells	Sample#	Values	MeanValue
ne01	E1	1	1.118	1.375
	E2		1.601	
	F1		1.124	
	F2		1.655	
ne02	G1	2	0.815	0.964
	G2		2.003	
	H1		0.312	
	H2		0.723	

Controls

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV

Sample 1

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
S01	E3	1	2.272	2.523	0.171	6.776
	E4		2.581			
	F3		2.581			
	F4		2.657			
S02	E5	2	2.795	2.749	0.119	4.317
	E6		2.849			
	F5		2.772			
	F6		2.577			
S03	E7	3	2.063	1.996	0.125	6.249
	E8		2.089			
	F7		1.814			
	F8		2.016			
S04	E9	4	2.004	2.212	0.380	17.170
	E10		2.772			
	F9		2.116			
	F10		1.954			
S05	E11	5	2.663	2.068	0.644	31.163
	E12		2.586			
	F11		1.521			
	F12		1.499			

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
S01	G3	1	2.098	1.969	0.212	10.746
	G4		2.137			
	H3		1.670			
	H4		1.969			
S02	G5	2	2.366	2.332	0.042	1.788
	G6		2.271			
	H5		2.345			
	H6		2.345			
S03	G7	3	1.228	0.866	0.381	44.052
	G8		1.158			
	H7		0.493			
	H8		0.582			
S04	G9	4	2.237	1.538	0.900	58.508
	G10		2.372			
	H9		0.586			
	H10		0.956			
S05	G11	5	1.597	0.832	0.589	70.861
	G12		0.945			
	H11		0.558			
	H12		0.225			

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
S01	G3	1	0.888	0.808	0.071	8.798
	G4		0.827			
	H3		0.717			
	H4		0.798			
S02	G5	2	1.002	0.963	0.029	3.056
	G6		0.948			
	H5		0.966			
	H6		0.934			
S03	G7	3	2.318	2.332	0.068	2.920
	G8		2.432			
	H7		2.286			
	H8		2.292			
S04	G9	4	0.787	0.797	0.059	7.364
	G10		0.879			
	H9		0.740			
	H10		0.781			
S05	G11	5	1.051	0.844	0.210	24.877
	G12		0.683			
	H11		0.997			
	H12		0.644			

Endpoint 48 hrs

Plate#2

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.002	0.007	-0.012	0.008	0.083	0.049	-0.014	0.001	-0.027	-0.034	-0.060	-0.209
B	-0.011	0.001	0.001	0.025	0.088	0.078	0.010	0.021	-0.015	-0.013	0.001	-0.079
C	-0.050	-0.027	0.001	-0.005	0.290	0.265	2.230	2.348	0.002	0.041	1.094	0.564
D	-0.149	0.031	0.054	0.028	0.382	0.450	2.331	2.306	0.004	0.024	0.850	0.820
E	1.999	2.085	1.779	2.016	2.240	2.076	2.808	2.838	1.693	1.684	2.758	2.559
F	1.856	1.890	1.778	2.008	2.098	2.147	2.863	2.859	1.792	1.710	2.564	2.510
G	0.383	0.685	0.443	0.388	0.799	0.901	2.317	2.328	0.508	0.624	1.474	0.999
H	0.159	0.509	0.303	0.280	0.701	0.590	1.947	1.930	0.282	0.268	1.216	0.953

Endpoint
Lm1 590
Automix: Once
Calibrate: On

Plate Last Read:
6:28 PM 7/28/2013

Wavelength Combination: !Lm1
Mean Temperature: 0.0
Data Mode: Absorbance
Plate Blank Used Lm1 = 0.402
Reader: Vmax ROM v--

Copyright © 2004 Molecular Devices. All rights reserved.

TSB

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
TSB01	C1	1	-0.050	-0.049	0.075	154.68
	C2		-0.027			
	D1		-0.149			
	D2		0.031			

pos growth

Sample	Wells	Sample#	Values	MeanValue
po01	C3	1	0.001	0.020
	C4		-0.005	
	D3		0.054	
	D4		0.028	
po02	C5	2	0.290	0.347
	C6		0.265	
	D5		0.382	
	D6		0.450	
po03	C7	3	2.230	2.304
	C8		2.348	
	D7		2.331	
	D8		2.306	
po04	C9	4	0.002	0.018
	C10		0.041	
	D9		0.004	
	D10		0.024	
po05	C11	5	1.094	0.832
	C12		0.564	
	D11		0.850	
	D12		0.820	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01	A3	1	-0.012	-0.005
	A4		0.008	
	A5		0.083	
	A6		0.049	
	A7		-0.014	
	A8		0.001	
	A9		-0.027	
	A10		-0.034	
	A11		-0.060	
	A12		-0.209	
	B3		0.001	
	B4		0.025	
	B5		0.088	
	B6		0.078	
	B7		0.010	
	B8		0.021	
	B9		-0.015	
	B10		-0.013	
	B11		0.001	
	B12		-0.079	

neg control

Sample	Wells	Sample#	Values	MeanValue
ne01	E1	1	1.999	1.958
	E2		2.085	
	F1		1.856	
	F2		1.890	
ne02	G1	2	0.383	0.434
	G2		0.685	
	H1		0.159	
	H2		0.509	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
S01	E3	1	1.779	1.896	0.135	7.114
	E4		2.016			
	F3		1.778			
	F4		2.008			
S02	E5	2	2.240	2.141	0.073	3.402
	E6		2.076			
	F5		2.098			
	F6		2.147			
S03	E7	3	2.808	2.842	0.025	0.886
	E8		2.838			
	F7		2.863			
	F8		2.859			
S04	E9	4	1.693	1.720	0.049	2.870
	E10		1.684			
	F9		1.792			
	F10		1.710			
S05	E11	5	2.758	2.598	0.110	4.218
	E12		2.559			
	F11		2.564			
	F12		2.510			

Sample 2

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
S01	G3	1	0.443	0.354	0.076	21.375
	G4		0.388			
	H3		0.303			
	H4		0.280			
S02	G5	2	0.799	0.748	0.133	17.800
	G6		0.901			
	H5		0.701			
	H6		0.590			
S03	G7	3	2.317	2.131	0.222	10.412
	G8		2.328			
	H7		1.947			
	H8		1.930			
S04	G9	4	0.508	0.421	0.175	41.509
	G10		0.624			
	H9		0.282			
	H10		0.268			
S05	G11	5	1.474	1.161	0.238	20.538
	G12		0.999			
	H11		1.216			
	H12		0.953			

Copyright © 2004 Molecular Devices. All rights reserved.

Microbe Inotech Laboratories Inc

bioMerieux Customer: 07624
System #: C22903

Laboratory Report

Printed Jul 4, 2013 23:53 CDT
Autoprint
Report Version: 1 of 1

Isolate Group: 0135A-38

Bionumber: 4000000300500001
Selected Organism: Comamonas testosteroni

Comments:	

Identification Information	Card: GN	Lot Number: 241265240	Expires: Mar 19, 2014 13:00 CDT
	Completed: Jul 5, 2013 00:13 CDT	Status: Final	Analysis Time: 8.25 hours
Selected Organism	95% Probability	Comamonas testosteroni	
	Bionumber: 4000000300500001		Confidence: Very good identification

SRF Organism	

Analysis Organisms and Tests to Separate:

Analysis Messages:

Contraindicating Typical Biopattern(s)

Comamonas testosteroni URE(1),

Biochemical Details

2	APPA	-	3	ADO	-	4	PyrA	+	5	IARL	-	7	dCEL	-	9	BGAL	-
10	H2S	-	11	BNAG	-	12	AGLTp	-	13	dGLU	-	14	GGT	-	15	OFF	-
17	BGLU	-	18	dMAL	-	19	dMAN	-	20	dMNE	-	21	BXYL	-	22	BAlap	-
23	ProA	-	26	LIP	-	27	PLE	-	29	TyrA	+	31	URE	+	32	dSOR	-
33	SAC	-	34	dTAG	-	35	dTRE	-	36	CIT	-	37	MNT	-	39	5KG	-
40	ILATk	+	41	AGLU	-	42	SUCT	+	43	NAGA	-	44	AGAL	-	45	PHOS	-
46	GlyA	-	47	ODC	-	48	LDC	-	53	IHISa	-	56	CMT	-	57	BGUR	-
58	O129R	-	59	GGAA	-	61	IMLTa	-	62	ELLM	+	64	ILATa	-			

Installed VITEK 2 Systems Version: 05.01
MIC Interpretation Guideline:
AES Parameter Set Name:

Therapeutic Interpretation Guideline:
AES Parameter Last Modified:

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 6-26-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	24.00
Plate Number	1
Plate Type	GEN III
Protocol	A
Project Number	0135A-2
Client Name	Washington
Date	6-26-13
Field 4	
Field 5	
Date & Time of Read	Jun 26 2013 12:39 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Serpens flexibilis
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.522	0.522	7.154	GN-Nent	Serpens flexibilis
2	0.150	0.150	7.175	GN-Nent	Pseudomonas stutzeri
3	0.109	0.109	7.576	GN-Nent	Achromobacter piechaudii
4	0.095	0.095	7.743	GN-Nent	Acinetobacter ursingii

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	48	{ 82	49	45	50	60	47	50	50	< 262	< 277	54
B	50	55	58	50	51	53	54	52	55	< 284	< 282	< 264 -
C	65	54	66	63	54	{ 82	{ 92	67	52	< 302	{ 228	< 252
D	48	48	52	49	{ 77	51	{ 95	45	{ 110	< 260 -	< 272	{ 151
E	60	57	< 187	57	57	< 172	55	56	42	< 270	{ 229	< 281 -
F	52	< 250 -	50	{ 98	< 248 -	{ 100	< 250 -	54	< 210	< 271	< 401	{ 145
G	52	< 198	{ 112	< 216	< 257 -	< 206	{ 102	< 255	< 188	{ 209	< 285	{ 235
H	< 207	54	{ 90	< 214	{ 145	{ 82	{ 76	< 255	52	< 260	< 282	115

Report Date Jun 26 2013 12:39 PM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 08-05-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	24.00
Plate Number	1
Plate Type	GEN III
Protocol	A
Project Number	0135B – 11
Client Name	wash
Date	8-5-13
Field 4	
Field 5	
Date & Time of Read	Aug 05 2013 5:31 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Microbacterium resistens
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.503	0.503	7.486	GP-Rod	Microbacterium resistens
2	0.144	0.144	7.625	GP-Rod	Microbacterium flavescens
3	0.095	0.095	8.152	GP-Rod	Cellulosimicrobium cellulans
4	0.081	0.081	8.343	GP-Rod	Microbacterium arborescens

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	80	< 270	< 271	< 283	< 272	< 281	< 276	< 279	{ 130	< 267	< 248	113
B	118	< 276	{ 126	< 287	< 287	< 262	{ 176	120	109	< 264	< 243	{ 151
C	< 267	< 279	< 269	< 288	108	113	{ 133	{ 121 +	< 251	< 271	{ 132	88
D	{ 206	< 266 -	112	115	< 267	{ 141	{ 153	{ 131	109	< 230 -	< 233	109
E	107	{ 140 +	{ 161	{ 140	< 256	< 276	107	< 274	{ 156	{ 126	92 +	83
F	< 212	{ 141	80	< 281	{ 138	{ 147	{ 140	{ 132	{ 129	{ 159	{ 156	110
G	< 243	< 240	{ 155	{ 145	{ 151	< 261 -	{ 133	{ 138	{ 122	< 265	< 251	< 218
H	{ 130 +	{ 151	{ 168	{ 128	< 226	{ 206	< 273	< 271	{ 144	< 245	< 227	{ 135

Report Date Aug 05 2013 5:32 PM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 6-26-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	24.00
Plate Number	2
Plate Type	GEN III
Protocol	A
Project Number	0135A-17
Client Name	Washington
Date	6-26-13
Field 4	
Field 5	
Date & Time of Read	Jun 26 2013 12:40 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Pseudomonas corrugata
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.653	0.653	4.973	GN-Nent	Pseudomonas corrugata
2	0.235	0.235	5.025	GN-Nent	Pseudomonas fluorescens
3	0.125	0.125	5.400	GN-Nent	Pseudomonas marginalis
4	0.028	0.028	6.295	GN-Nent	Pseudomonas synxantha

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	37	63	37	51 +	43	51	{ 80 +	47	46	< 282	{ 246	< 278 -
B	47	52	56	56	55	55	54	51	52	< 305	< 253	120
C	< 263	< 202	{ 137	< 192	64	{ 126	{ 92	66	{ 174	< 325	< 255	{ 226
D	{ 88	< 217	{ 100	{ 171	< 192	48	{ 115	37	{ 97	< 314	< 289	104
E	55	59	< 246	{ 121	{ 161	< 285	{ 87	< 260	{ 109	< 315	< 294	< 309
F	51	< 243	53	< 282	< 261	{ 126	< 284	< 259	< 284	< 298	< 336	< 377
G	< 236	< 257 -	{ 110	< 273	< 277	< 287	57	< 265	{ 130	{ 230	{ 245	< 300
H	{ 86	< 216	{ 84	{ 169	{ 87	63	{ 174	< 225	{ 84	< 251 -	119	< 280

Report Date Jun 26 2013 12:40 PM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 7-31-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	48.00
Plate Number	2
Plate Type	GEN III
Protocol	A
Project Number	0135B-18
Client Name	Washintgton
Date	7-31-13
Field 4	
Field 5	
Date & Time of Read	Jul 31 2013 11:32 AM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Serratia proteamaculans
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.624	0.624	5.445	GN-Ent	Serratia proteamaculans
2	0.152	0.152	6.142	GN-Ent	Serratia liquefaciens/grimesii
3	0.057	0.057	7.002	GN-Ent	Serratia marcescens ss marcescens
4	0.048	0.048	7.158	GN-Ent	Cedecea neteri

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	137	{ 199	< 239	{ 204	< 243	< 248	{ 218	< 233	132	< 301	< 290	< 315
B	129 +	143	125 +	< 220	< 240	< 251	< 243	< 247	125	< 292	{ 253	{ 250
C	< 227	{ 216	< 233	{ 218	< 222	133	< 249	115	< 241	< 304	{ 202	< 320
D	< 237	{ 210	144	< 251	< 250	< 258	< 257	140	< 257	< 296	< 294	107
E	< 250 -	< 258	< 260	{ 170	< 263	< 252	< 259	153	< 259	< 290	< 295	< 364
F	< 232	{ 155	148 +	< 255	{ 172	136	128	140	138	< 294	< 354	< 395
G	< 258	< 232	{ 163	< 254	< 268	< 252	120	< 264	{ 202	{ 159	{ 260	69
H	< 237	{ 204	140	{ 204	93	{ 186	105	{ 217	{ 212 -	{ 242	115	78

Report Date Jul 31 2013 11:32 AM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 7-5-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	48.00
Plate Number	6
Plate Type	GEN III
Protocol	A
Project Number	0135A-20
Client Name	washington
Date	7-5-13
Field 4	
Field 5	
Date & Time of Read	Jul 05 2013 1:08 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Pseudomonas chlororaphis ss aurantiaca
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.638	0.638	5.187	GN-Nent	Pseudomonas chlororaphis ss aurantiaca
2	0.092	0.092	6.128	GN-Nent	Pseudomonas fluorescens
3	0.066	0.066	6.321	GN-Nent	Pseudomonas putida biotype B
4	0.022	0.022	6.976	GN-Nent	Pseudomonas tolaasii

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	54	{ 90	52	< 169	52	79	{ 139	56	54	< 272	< 269	< 262
B	52	53	76	54	54	{ 150	57	54	55	< 280	{ 242	115
C	< 177	{ 161	{ 159	< 191	73	{ 138	{ 107	81	{ 141	< 299	< 291	{ 243
D	52	{ 155	{ 124	53 +	{ 150	55	{ 142 -	46	{ 146	< 271	< 274	{ 243
E	68	88	< 163	< 195	< 198	< 163	{ 108 +	< 192	< 181	< 278	{ 246	< 288
F	{ 109	{ 90	54	< 172	{ 96	{ 147	< 240	< 256	< 225	< 272	< 337	< 387
G	53 +	{ 127	{ 99	< 194	< 255	< 212	68	< 236	{ 106	< 269	{ 217	< 291
H	{ 113	< 173	86	< 180	78	{ 118	< 202	< 231	76	< 267	{ 212 -	< 248

Report Date Jul 05 2013 1:08 PM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 7-5-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	48.00
Plate Number	5
Plate Type	GEN III
Protocol	A
Project Number	0135A-24
Client Name	washington
Date	7-5-13
Field 4	
Field 5	
Date & Time of Read	Jul 05 2013 1:07 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Bacillus galactosidilyticus
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.682	0.682	4.507	GP-Rod-SB	Bacillus galactosidilyticus
2	0.199	0.199	4.578	GP-Rod-SB	Bacillus panaciterrae
3	0.182	0.182	4.656	GP-Rod-SB	Bacillus ruris
4	0.077	0.077	5.408	GP-Rod-SB	Bacillus fortis

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	0	{ 85	< 99	{ 69	0	10	< 155	{ 58	16	< 277	< 584 -	{ 130
B	< 107	-21	{ 56	-5	-14	-3	-27	-21	-37	< 318	< 259	{ 163
C	{ 64	{ 42	{ 77 -	2	-34	-24	-11	-5	-8	< 309	{ 114	{ 150
D	-5	{ 50	0	-24	5	-13	-16	-24	-112	{ 146	{ 130	{ 123
E	-11	6	-53	8	-2	-2	-22	21	-22	{ 152	{ 133	{ 91
F	{ 64	-22	-13	22	26	-32	-24	26	-32	{ 126	< 309 -	< 266 -
G	-26	27	-22	10	-13	-14	-21	11	{ 35	< 323	< 450	{ 109 +
H	-13	21	-10	24	-5	{ 43	-5	5	-30	< 422	{ 232	{ 206

Report Date Jul 05 2013 1:07 PM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 7-5-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	48.00
Plate Number	1
Plate Type	GEN III
Protocol	A
Project Number	0135A-28
Client Name	washington
Date	7-5-13
Field 4	
Field 5	
Date & Time of Read	Jul 05 2013 1:04 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Pseudomonas stutzeri
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.589	0.589	6.009	GN-Nent	Pseudomonas stutzeri
2	0.089	0.089	7.551	GN-Nent	Acinetobacter ursingii
3	0.075	0.075	7.762	GN-Nent	Roseomonas cervicalis
4	0.069	0.069	7.867	GN-Nent	Pseudomonas alcaligenes

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	42	{ 69	47	45	47	43	42	45	50	< 259	< 279	44
B	51	50	40	44	46	46	50	52	46	< 275	< 269	{ 220
C	52 +	42	51	49	48	59	{ 72	58	48	< 310	{ 180	< 245 -
D	43	42	48	41	{ 71	47	{ 97	34	{ 92	< 255	< 264	{ 143 +
E	47	42	< 171	43	52 +	< 164	43	49	31	< 269	{ 220	< 272
F	42	< 239	44	{ 69	< 231	{ 110	< 245	45	< 178	< 268	< 409	{ 191
G	40	< 192 -	{ 105	< 209	< 250	< 186	{ 83	< 226	< 179 -	{ 165	< 280	{ 206
H	< 182	43	53	< 213	{ 110	{ 84	51	< 245	42	< 263	107	82

Report Date Jul 05 2013 1:04 PM

Program	MicroLog 3/5.2.01 33
Project	ML5
File Name	0135A Wash 7-5-13.D5E
User	Mil Staff
Instrument	MicroStation 1 Reader
Instrument S/N	2520
Incubation Hours	48.00
Plate Number	2
Plate Type	GEN III
Protocol	A
Project Number	0135A-36
Client Name	washuington
Date	7-5-13
Field 4	
Field 5	
Date & Time of Read	Jul 05 2013 1:05 PM
Biolog ID DB	Biolog GEN III 2_6_1_08.I5G

Result	Species ID: Microbacterium maritypicum
Comment	
Notice	

Rank	PROB	SIM	DIST	Organism Type	Species
1	0.689	0.689	4.461	GP-Rod	Microbacterium maritypicum
2	0.107	0.107	5.741	GP-Coccus	Staphylococcus lentus
3	0.056	0.056	6.315	GP-Rod-SB	Virgibacillus sediminis
4	0.027	0.027	6.954	GP-Rod-SB	Bacillus psychrosaccharolyticus (26 C)

Key: <x: positive, x: negative, <x-: mismatched positive, x+: mismatched negative, {x: borderline, -x: less than A1 well

Well Color Values

Plate	1	2	3	4	5	6	7	8	9	10	11	12
A	188	< 259	< 249	< 243	< 249	< 251	< 243	< 243	< 231	< 249	< 236	63
B	< 240	< 233 -	{ 208	< 243	< 253	< 250	{ 227	< 246	{ 192	< 249	< 236	{ 151
C	< 244	< 251	< 258	< 249	{ 194	{ 211	{ 228	< 243	{ 225	< 243	63	49
D	{ 196	< 249	{ 213	< 242 -	< 246	< 239	< 245	172	118	63	71	68
E	{ 188 +	< 235	< 241	{ 186	{ 223	< 241	112	{ 220	< 234	81	< 223	48
F	< 247	< 237	115	< 261	{ 226	{ 190	{ 193	{ 200	149	120	123	99
G	< 244	{ 180	{ 195	< 247	108	170	{ 186	< 238	99	< 249	< 241	< 235
H	{ 228	{ 195	{ 228	174 +	< 240	< 250	{ 206	< 237	156	< 242	< 235	{ 148

Report Date Jul 05 2013 1:05 PM

the MiL, inc. ATTENTION: Joan Kessner email: kessnejh@wch-rcc.com

Sample Receipt Confirmation Form

This notice is to confirm receipt of samples at Microbe Inotech Laboratories, Inc.,
at 7259 Lansdowne Avenue Suite 200, St. Louis, MO 63119-3421
Telephone: 1-800-688-9144 Fax: 1-314-645-2544
Reach Us Online At: www.microbeinotech.com

Client Information:

Contact: Joan Kessner
Firm: Washington Closure Hanford
Phone Number:
Project Name:
Project Number:

the MiL, inc. Information:

Receiving Staff Member: BMW
Assigned MiL Project Number: MILB-0135B
Client Fax (If Different From Above):
Shipment Carrier: FedEx
Shipment Tracking Number:

Sample Information:

Total Number of Sample Containers: 2 Representing Total Number of Samples: 2.

ELECTRONIC DATE & TIME STAMP

OR Arrived Thursday, June 27, 2013 10:09:18 AM AM PM

Day of Week Month/Day/Year Time of Day

	List of Samples Received	Condition Upon Receipt	Analysis Requested	Collection Date
1	J1RPT1	Intact	Endpoint	06/25/13
2	J1RPT2	Intact	Endpoint	06/25/13
3				
4				
5				
6				
7				
8				
9				
10				

Continued On Additional Page (If Checked): ☐

Comments or Further Requested Information:

CINTIAL

Thank You, _____.
Signature of Sender

6/27/13

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-237-003

ollector: STOWE, QG	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 7L	Data Turnaround: 21 Days		
roject Designation: 100N	Sampling Location: 100-N-84:2		SAF No.: RC-237
e Chest No.: WCH-11-027	Field Logbook No.: EL-1652-09	COA: 01N8422600	Method of Shipment: fed Ex
hipped To: Microbe Inotech - St Louis	Offsite Property No.: A120885		Bill of Lading/Air Bill No.: See OSPC

OSSIBLE SAMPLE HAZARDS/REMARKS

one

pecial Handling and/or Storage

ool 4C

Preservation	Cool~4C										
Type of Container	g/P										
No. of Container(s)	1										
Volume	120mL										

SAMPLE ANALYSIS

Sample No.	Matrix	Sample Date	Sample Time	Bioactivity Evaluation (No CAS)									
J1RPT1	SOIL	6/25/13	1025	X									
J1RPT2	SOIL	6/25/13	1008	X									

~~6-25-13 CMB~~

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1035 6/25/13	Don Heidelberg	1035 6/25/13
Don Heidelberg	1610 6/25/13	Cindy Bingham	1060 1 6-25-13 1610
Cindy Bingham WCH	1060 1 6-26-13 0725	fed EX	

SPECIAL INSTRUCTIONS

REVIEWED BY JH
DATE JH 6-26-13 6-24-13

FINAL SAMPLE DISPOSITION

Disposal Method	Disposed By	Date/Time

Generated Date/Time: 06/25/2013 08:43, PDT

the MiL, inc.

full-service analytical microbiological laboratories

American Society for Testing and Materials

ASTM INTERNATIONAL ORGANIZATIONAL MEMBER

NREP

National Registry of Environmental Professionals

American Council of Independent Laboratories

ACIL

AOAC INTERNATIONAL

The Scientific Association Dedicated to Excellence in Analytical Methods.

MISSOURI BIOTECHNOLOGY ASSOCIATION

MOBIO

BioBelt SM

The Center of Plant and Life Sciences

Plant and Life Sciences Technology Gateway-Regional Commerce Growth Association of St. Louis, Missouri

CSREES EDUCATION USDA RESEARCH • EXTENSION

Cooperative State Research, Education And Extension Service [SBIR Recipient]

the MiL, Inc. 7259 Lansdowne Avenue Suite 200 St. Louis MO 63119-3421

Phone: (800) 688-9144 Fax: (314) 645-2544

Warranty And Limits Of Liability

In accepting analytical work, we warrant the accuracy of test results under the conditions employed in the laboratory. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. We disclaim any other warranties, expressed or implied, including a Warranty of Fitness for Particular Purpose and Warranty of Merchantability. We accept no legal responsibility for the purposes for which the client uses the test results.

RECEIVED
NOV 2013

REPORT OF ANALYSES

PREPARED BY:

MICROBE INOTECH LABORATORIES, INC.

the MiL, Inc.

Celebrating 20 Years of Excellence in Microbiology and Service

MICROBE INOTECH LABORATORIES, INC., 7259 LANSDOWNE AVENUE, SUITE 200, ST. LOUIS, MO 63119-3421
(800) 688-9144 • (314) 645-2177 • FAX (314) 645-2544 • info@microbeinotech.com

Microbe Inotech Laboratories, Inc.
Summary Report of Analysis
[MILB –0135D]

Joan Kessner
Washington Closure Hanford
2620 Fermi Ave.
Richland, WA 99354
Phone: 509-375-4688
Email: jhkessner@wch-rcc.com; rlweiss@wch-rcc.com

November 4, 2013

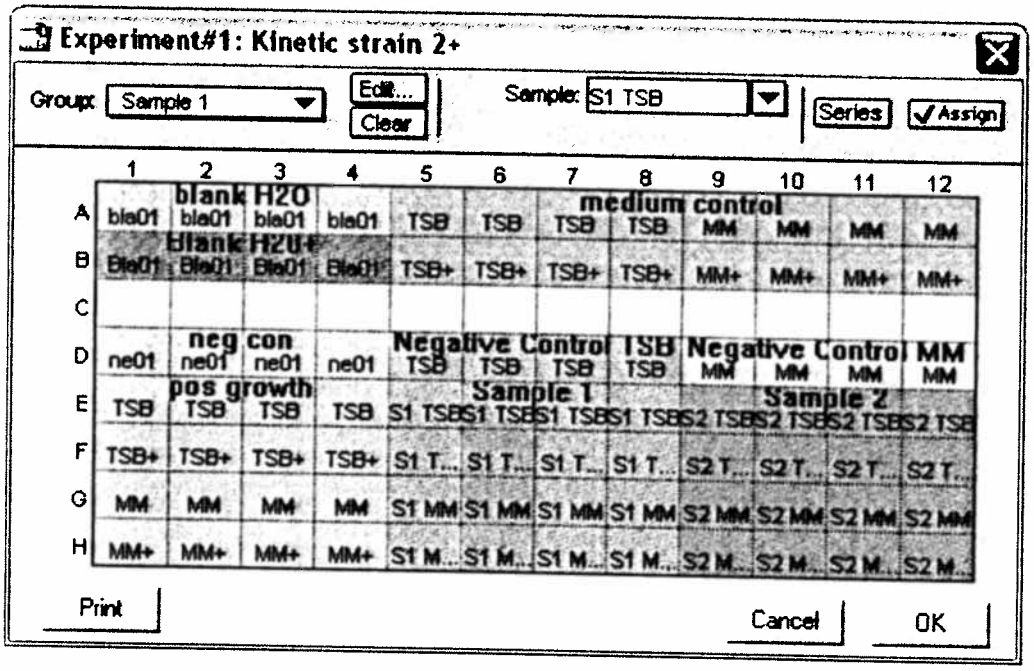
Description and Chain of Custody Record Information:

- Wednesday September11, 2013: Client requested that 6 strains be used for a kinetic assay with additional nutrients
- MiL, Inc. REPORT and Invoice No.: MILB-0135D

Processing:

The tested bacterial strains were grown overnight on Trypticase Soy (Broth) Agar (TSA) at 30°C and then suspended in sterile saline to a turbidity of 40%-50%T. The strains are then aliquotted into a 96-well microtiter plate that contains an undisclosed growth medium of mineral salts, vitamins and buffer without a major carbon source. The wells also contain a tetrazolium dye redox indicator system. Bacterial growth (metabolic respiration/oxidation of carbon sources) is monitored by tetrazolium reduction as measured at 590nm in a microplate reader. **J1RPT1** (Supplied by the client) as well as **Diesel #2** (@1μL) was added to selected wells to serve as the major carbon source. 50μL of these inocula were dispensed into the test wells.
Trypticase Soy Broth (TSB) serves as the positive control for bacterial growth and water serves as the negative control for bacterial growth in this assay. Davis Minimal Broth (MM) also served as a positive control for bacterial growth. Additionally oxygenated water was used as a bacterial growth supplement with the two agars. Total volume of each well is 150μL. Readings were taken at 20 minute intervals over a time period of 48 hours. At 48 hours and endpoint reading was taken.

96-well plate template



Template Key:
Columns 1, 2, 3, 4; Row A: Sterile Water Blank
Columns 1, 2, 3, 4; Row B: Sterile Oxygenated Water Blank
Columns 5, 6, 7, 8; Row A: Medium Control: TSB + Water
Columns 5, 6, 7, 8; Row B: Medium Control: TSB + Oxygenated Water
Columns 9, 10, 11, 12; Row A: Medium Control: MM + Water
Columns 9, 10, 11, 12; Row B: Medium Control: MM + Oxygenated Water
Columns 1, 2, 3, 4; Row D: Negative Control: Strain 2 + Water
Columns 5, 6, 7, 8; Row D: Negative Control TSB: TSB + Sample Solution 1 (J1RPT1 + DMSO)
Columns 5, 6, 7, 8; Row D: Negative Control MM: MM + Sample Solution 2 (Diesel #2 + DMSO)
Columns 1, 2, 3, 4; Row E: Positive Growth TSB: TSB + Strain 2 + Water + Inoculum
Columns 1, 2, 3, 4; Row F: Positive Growth TSB+: TSB + Strain 2 + Oxygenated Water + Inoculum
Columns 1, 2, 3, 4; Row G: Positive Growth MM: MM + Strain 2 + Water + Inoculum
Columns 1, 2, 3, 4; Row H: Positive Growth MM+: MM + Strain 2 + Oxygenated Water + Inoculum
Columns 5, 6, 7, 8; Row E: Sample 1: TSB + Sample Solution 1 + Water + Inoculum
Columns 5, 6, 7, 8; Row F: Sample 1: TSB + Sample Solution 1 + Oxygenated Water + Inoculum
Columns 5, 6, 7, 8; Row G: Sample 1: MM + Sample Solution 1 + Water + Inoculum
Columns 5, 6, 7, 8; Row H: Sample 1: MM + Sample Solution 1 + Oxygenated Water + Inoculum
Columns 9, 10, 11, 12; Row E: Sample 1: TSB + Sample Solution 1 + Water + Inoculum
Columns 9, 10, 11, 12; Row E: Sample 1: TSB + Sample Solution 2 + Water + Inoculum
Columns 9, 10, 11, 12; Row F: Sample 1: TSB + Sample Solution 2 + Oxygenated Water + Inoculum
Columns 9, 10, 11, 12; Row G: Sample 1: MM + Sample Solution 2 + Water + Inoculum
Columns 9, 10, 11, 12; Row H: Sample 1: MM + Sample Solution 2 + Oxygenated Water + Inoculum

After completion of the kinetic assay run with reading at 590nm every 20 minutes, an endpoint assay was read.

See attached for Kinetic Assay Data.

Aerobic Endpoint Assay Results for All Strains plus added Nutrients:

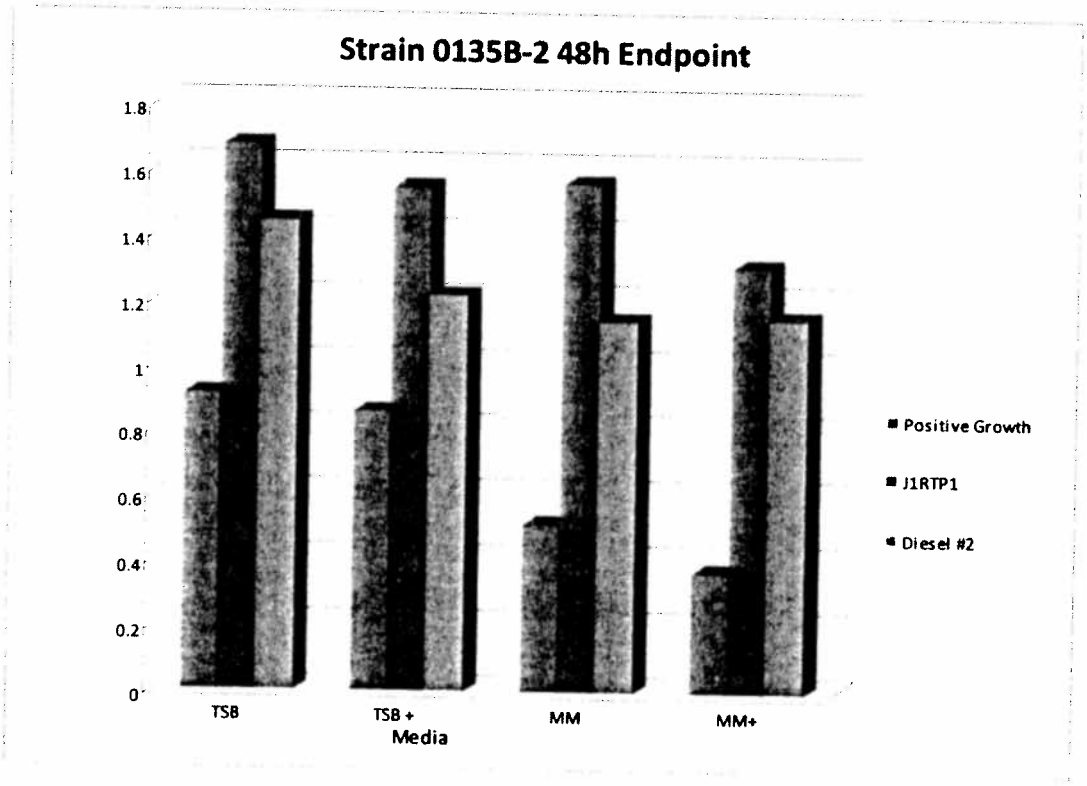
Total growth is measured after 48 hours of incubation at 30°C. The data is processed and given with background blank values subtracted. Bar-chart interpretation of the data is provided on the pages following the executive summary report of analysis. The design template of the experiment is located in the raw data section of this report. The template shows the arrangement and position of strains in the matrix. Individual strain feasibility for biodegradation potential is reported as one of the following classifications:

- Excellent Degrader
- Good Degrader
- Fair Degrader
- Minimal Degrader
- No Effect
- Growth Inhibited

(Please also see graphical results at end of Summary Report)

Strain 0135B-2

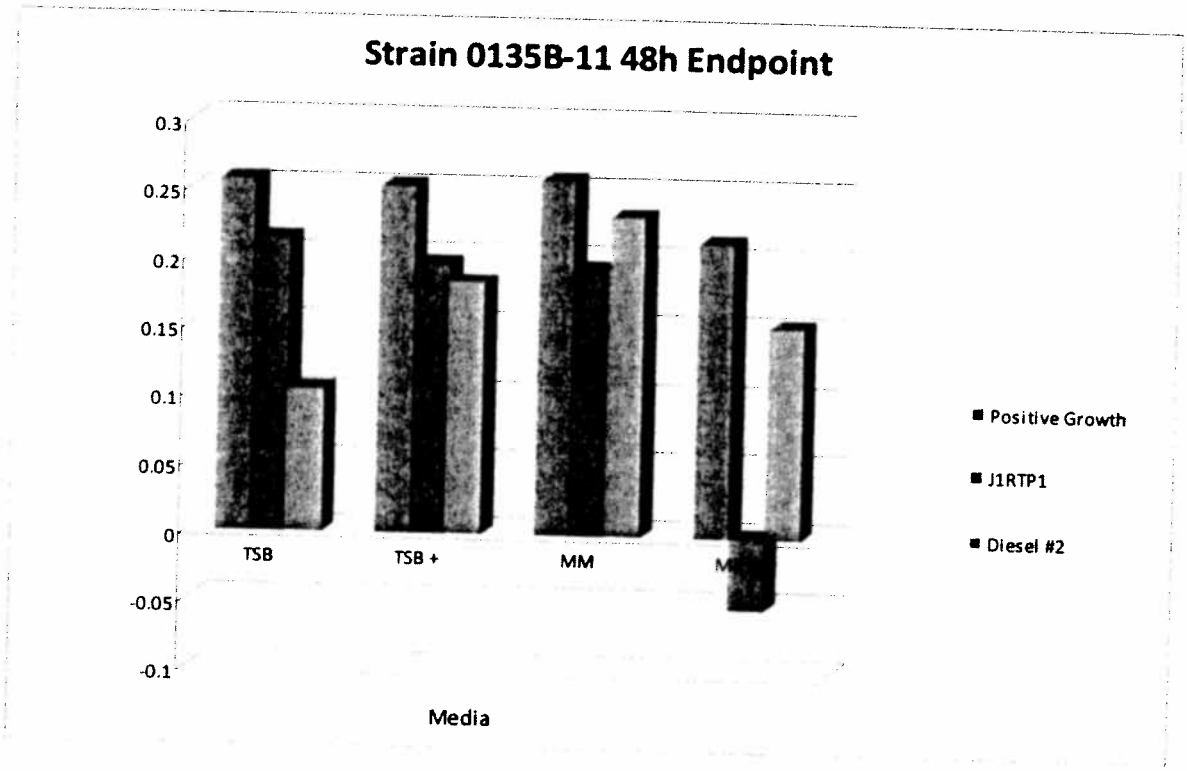
Carbon Source ⇒ Media ⇓	J1RPT1	Diesel #2
TSB	Excellent	Excellent
TSB+	Excellent	Excellent
MM	Excellent	Excellent
MM+	Excellent	Excellent



the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Strain 0135B-11

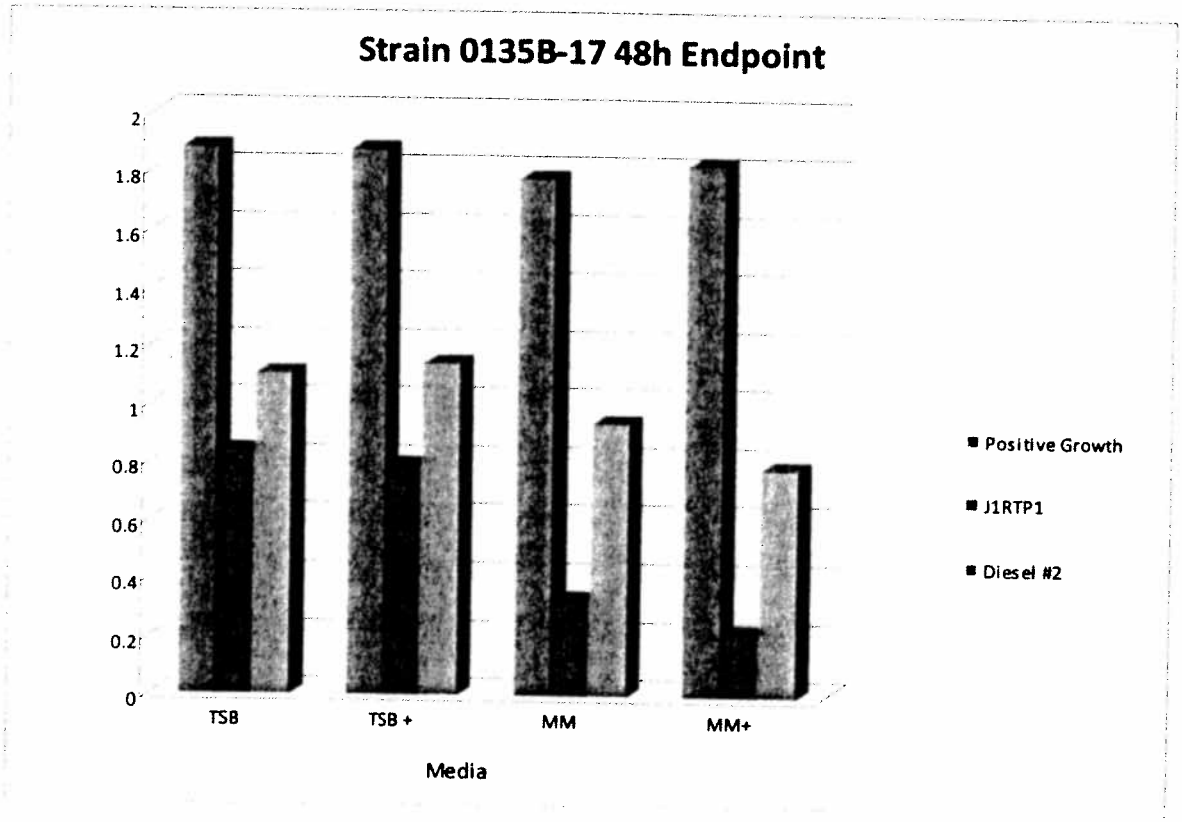
Carbon Source ⇒ Media ⇓	J1RPT1	Diesel #2
TSB	Good	Good
TSB+	Good	Good
MM	Good	Good
MM+	No Effect	Good



the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Strain 0135B-17

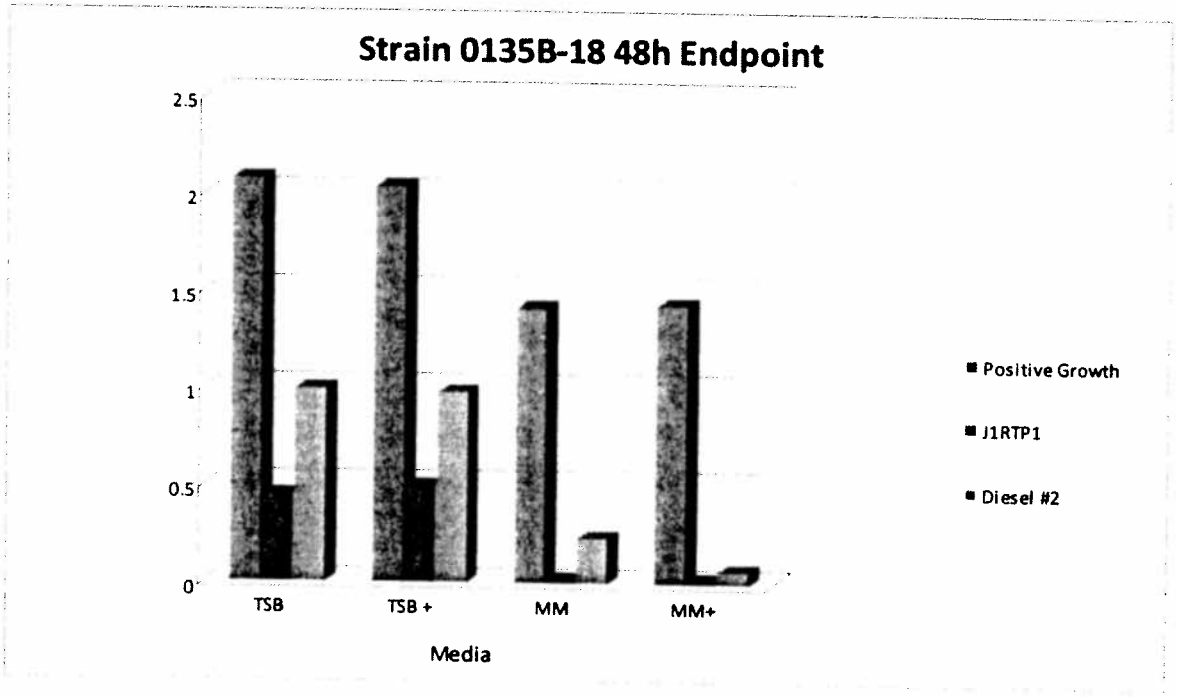
Carbon Source ⇒ Media ⇓	J1RPT1	Diesel #2
TSB	Excellent	Excellent
TSB+	Excellent	Excellent
MM	Good	Excellent
MM+	Good	Excellent



the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Strain 0135B-18

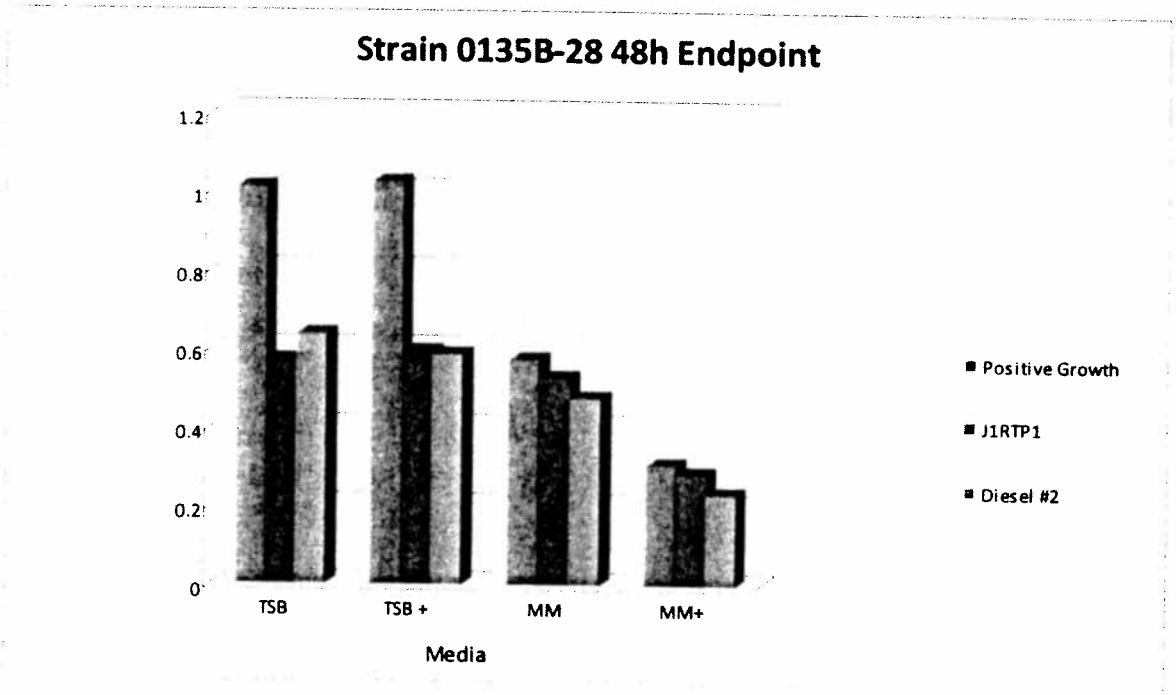
Carbon Source ⇒ Media ⇓	J1RPT1	Diesel #2
TSB	Good	Excellent
TSB+	Good	Excellent
MM	Minimal	Good
MM+	Minimal	Good



the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Strain 0135B-28

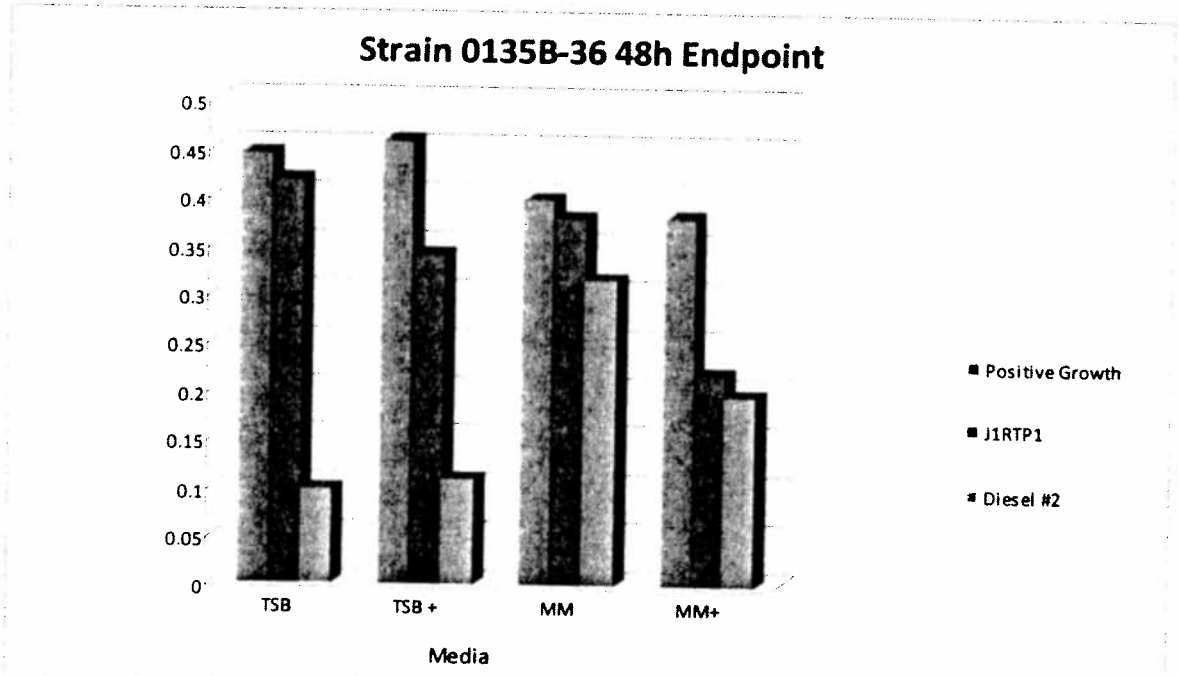
Carbon Source ⇒ Media ⇓	J1RPT1	Diesel #2
TSB	Excellent	Excellent
TSB+	Excellent	Excellent
MM	Excellent	Good
MM+	Good	Good



the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Strain 0135B-36

Carbon Source ⇒ Media ⇓	J1RPT1	Diesel #2
TSB	Good	Good
TSB+	Good	Good
MM	Good	Good
MM+	Good	Good



Raw data can be found in appendix attached to the signed hard copy

Thank you from the staff on project:

Michele R. Gossett
Laboratory Manager

Benjamin M. Winkler
Research Laboratory Manager

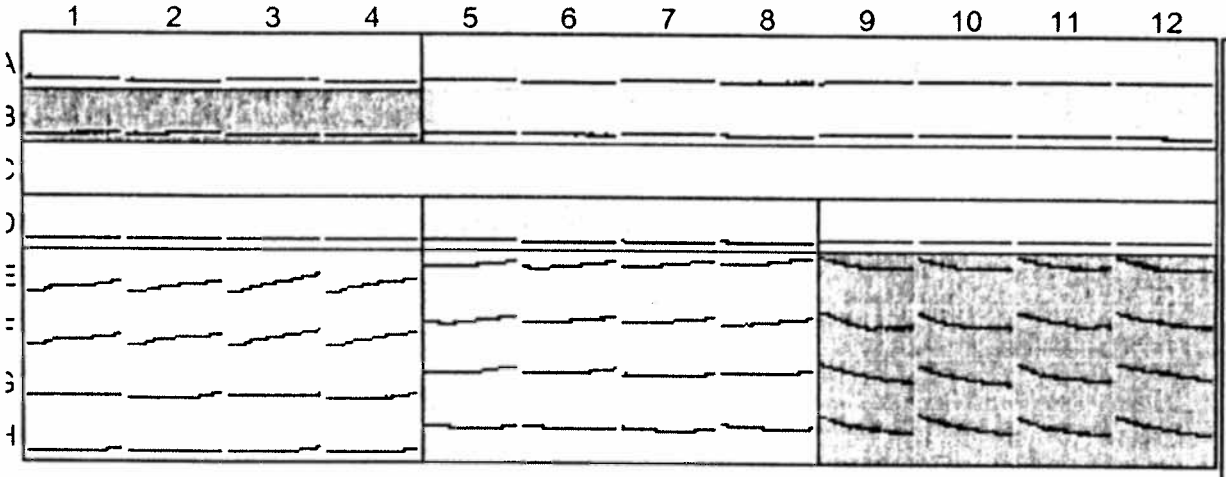
the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Experiment#1

0135C Washington Closure
Kinetic Assay: Strain 0135B-2 + added nutrients
1 Strain versus 2 Contaminants

Vmax

Kinetic strain 2+



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 24.3 Range 21.9 - 25.5
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Plate Last Read:
4:40 PM 10/24/2013

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	-0.003	-0.002
	D6		-0.002	
	D7		-0.003	
	D8		-0.002	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	-0.002	-0.002
	D10		-0.002	
	D11		-0.003	
	D12		-0.002	

Copyright © 2004 Molecular Devices. All rights reserved.

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	-0.012	-0.004
	A2		0.001	
	A3		-0.001	
	A4		-0.004	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.007	0.003
	B2		0.003	
	B3		0.002	
	B4		0.001	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.000	0.000
	A10		-0.001	
	A11		0.001	
	A12		-0.000	
MM+	B9	2	-0.002	-0.003
	B10		-0.005	
	B11		-0.001	
	B12		-0.004	
TSB	A5	3	0.001	0.000
	A6		-0.003	
	A7		0.001	
	A8		0.001	
TSB+	B5	4	0.000	-0.002
	B6		-0.003	
	B7		-0.002	
	B8		-0.004	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	-0.265	-0.243
	G10		-0.264	
	G11		-0.220	
	G12		-0.224	
S2 MM+	H9	2	-0.257	-0.254
	H10		-0.266	
	H11		-0.233	
	H12		-0.261	
S2 TSB	E9	3	-0.162	-0.157
	E10		-0.135	
	E11		-0.145	
	E12		-0.185	
S2 TSB+	F9	4	-0.226	-0.209
	F10		-0.178	
	F11		-0.216	
	F12		-0.216	

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	0.102	0.047
	G6		0.043	
	G7		0.007	
	G8		0.035	
S1 MM+	H5	2	-0.019	-0.033
	H6		-0.034	
	H7		-0.024	
	H8		-0.054	
S1 TSB	E5	3	0.103	0.104
	E6		0.105	
	E7		0.085	
	E8		0.123	
S1 TSB+	F5	4	0.125	0.106
	F6		0.090	
	F7		0.097	
	F8		0.110	

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.006	0.033
	G2		0.060	
	G3		0.018	
	G4		0.049	
MM+	H1	2	0.045	0.030
	H2		-0.000	
	H3		0.038	
	H4		0.037	
TSB	E1	3	0.158	0.210
	E2		0.189	
	E3		0.279	
	E4		0.215	
TSB+	F1	4	0.152	0.196
	F2		0.169	
	F3		0.233	
	F4		0.229	

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	-0.008	-0.003
	D2		-0.006	
	D3		0.000	
	D4		-0.000	

Experiment#2

0135C Washngton Closure
Endpoint Assay: Strain 0135B-2 +added nutrients
1 Strains versus 2 Contaminants

Copyright © 2004 Molecular Devices. All rights reserved.

Endpoint Strain 2+

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.310	0.251	0.251	0.148	0.236	0.164	0.223	0.186	0.194	0.194	0.233	0.225
B	0.298	0.287	0.221	0.210	0.256	0.236	0.241	0.225	0.250	0.225	0.243	0.171
C												
D	0.266	0.307	0.330	0.289	0.252	0.193	0.210	0.202	0.233	0.190	0.180	0.217
E	0.819	0.798	1.092	0.927	1.639	1.633	1.678	1.789	1.443	1.448	1.496	1.370
F	0.814	0.768	0.948	0.895	1.597	1.553	1.548	1.520	1.188	1.226	1.226	1.219
G	0.465	0.555	0.481	0.553	1.705	1.599	1.430	1.555	1.131	1.009	1.133	1.279
H	0.359	0.302	0.454	0.368	1.362	1.298	1.258	1.354	1.139	1.177	1.113	1.157

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
3:53 PM 10/26/2013

Wavelength Combination: !Lm1
Mean Temperature: 24.8
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	0.252	0.214
	D6		0.193	
	D7		0.210	
	D8		0.202	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	0.233	0.205
	D10		0.190	
	D11		0.180	
	D12		0.217	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.310	0.240
	A2		0.251	
	A3		0.251	
	A4		0.148	

Copyright © 2004 Molecular Devices. All rights reserved

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.298	0.254
	B2		0.287	
	B3		0.221	
	B4		0.210	

medium control

Sample	Wells	Sample#	Values	MeanValue
me01		1		
MM	A9	2	0.194	0.211
	A10		0.194	
	A11		0.233	
	A12		0.225	
MM+	B9	3	0.250	0.222
	B10		0.225	
	B11		0.243	
	B12		0.171	
TSB	A5	4	0.236	0.202
	A6		0.164	
	A7		0.223	
	A8		0.186	
TSB+	B5	5	0.256	0.239
	B6		0.236	
	B7		0.241	
	B8		0.225	

control 2

Sample	Wells	Sample#	Values	MeanValue
co02		1		

control 1

Sample	Wells	Sample#	Values	MeanValue
co01		1		

TSB

Sample	Wells	Sample#	Values	MeanValue

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	1.131	1.138
	G10		1.009	
	G11		1.133	
	G12		1.279	
S2 MM+	H9	2	1.139	1.147
	H10		1.177	
	H11		1.113	
	H12		1.157	
S2 TSB	E9	3	1.443	1.439
	E10		1.448	
	E11		1.496	
	E12		1.370	
S2 TSB+	F9	4	1.188	1.215
	F10		1.226	
	F11		1.226	
	F12		1.219	
Sa01		5		
Sa02		6		
Sa03		7		

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	1.705	1.572
	G6		1.599	
	G7		1.430	
	G8		1.555	
S1 MM+	H5	2	1.362	1.318
	H6		1.298	
	H7		1.258	
	H8		1.354	
S1 TSB	E5	3	1.639	1.685
	E6		1.633	
	E7		1.678	
	E8		1.789	
S1 TSB+	F5	4	1.597	1.555
	F6		1.553	
	F7		1.548	
	F8		1.520	
Sa01		5		
Sa02		6		
Sa03		7		

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.465	0.513
	G2		0.555	
	G3		0.481	
	G4		0.553	
MM+	H1	2	0.359	0.371
	H2		0.302	
	H3		0.454	
	H4		0.368	
po01		3		
po02		4		
po03		5		
TSB	E1	6	0.819	0.909
	E2		0.798	
	E3		1.092	
	E4		0.927	
TSB+	F1	7	0.814	0.856
	F2		0.768	
	F3		0.948	
	F4		0.895	

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01		1		
ne02		2		
ne03		3		

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.266	0.298
	D2		0.307	
	D3		0.330	
	D4		0.289	

CuvetteSet#1

A1

Data: No Data
Ref: No Reference

Endpoint
Lm1 450

Wavelength Combination: !Lm1
Data Mode: Absorbance

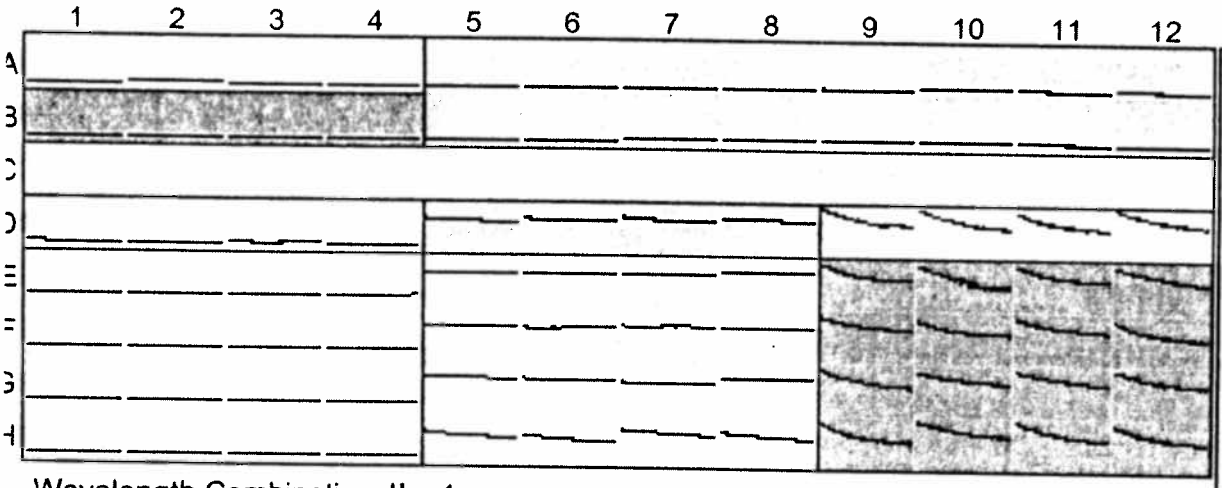
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

0135C Washington Closure
Kinetic Assay: Strain 0135B-11 + added nutrients
1 Strain versus 2 Contaminants

Vmax

Kinetic strain 11+



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 24.9 Range 24.1 - 25.3
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Plate Last Read:
5:15 PM 10/26/2013

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	-0.043	-0.043
	D6		-0.042	
	D7		-0.055	
	D8		-0.032	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	-0.239	-0.247
	D10		-0.277	
	D11		-0.226	
	D12		-0.245	

Copyright © 2004 Molecular Devices. All rights reserved.

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	-0.002	0.002
	A2		0.003	
	A3		0.001	
	A4		0.006	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.002	0.001
	B2		0.002	
	B3		0.000	
	B4		0.001	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	-0.243	-0.205
	G10		-0.154	
	G11		-0.196	
	G12		-0.227	
S2 MM+	H9	2	-0.266	-0.252
	H10		-0.217	
	H11		-0.274	
	H12		-0.249	
S2 TSB	E9	3	-0.226	-0.258
	E10		-0.346	
	E11		-0.209	
	E12		-0.251	
S2 TSB+	F9	4	-0.180	-0.199
	F10		-0.189	
	F11		-0.186	
	F12		-0.240	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	-0.016	-0.014
	G6		-0.008	
	G7		-0.007	
	G8		-0.025	
S1 MM+	H5	2	-0.086	-0.096
	H6		-0.097	
	H7		-0.094	
	H8		-0.109	
S1 TSB	E5	3	0.000	0.004
	E6		0.007	
	E7		0.003	
	E8		0.005	
S1 TSB+	F5	4	0.012	0.008
	F6		0.011	
	F7		0.009	
	F8		0.001	

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.008	0.007
	G2		-0.002	
	G3		0.005	
	G4		0.019	
MM+	H1	2	0.005	-0.000
	H2		-0.002	
	H3		-0.002	
	H4		-0.001	
TSB	E1	3	-0.002	0.008
	E2		0.002	
	E3		0.016	
	E4		0.017	
TSB+	F1	4	0.002	0.006
	F2		-0.001	
	F3		0.004	
	F4		0.021	

neg growth

Sample	Wells	Sample#	Values	MeanValue

Experiment#2

0135C Washngton Closure
Endpoint Assay: Strain 0135B-11+added nutrients
1 Strains versus 2 Contaminants

Copyright © 2004 Molecular Devices. All rights reserved

Endpoint Strain 11+

	1	2	3	4	5	6	7	8	9	10	11	12
	0.150	0.264	0.176	0.173	0.132	0.138	0.162	0.146	0.161	0.215	0.159	0.164
	0.116	0.140	0.170	0.176	0.128	0.146	0.182	0.178	0.204	0.177	0.171	0.159
	0.156	0.167	0.194	0.174	1.210	1.239	1.246	1.331	1.194	1.087	1.084	1.281
	0.208	0.235	0.284	0.300	1.304	1.289	1.326	1.379	1.122	0.961	1.145	1.130
	0.222	0.248	0.287	0.253	1.295	1.260	1.355	1.324	1.276	1.138	1.221	1.045
	0.246	0.236	0.287	0.263	1.323	1.313	1.229	1.359	1.133	1.282	1.265	1.198
	0.240	0.200	0.207	0.209	1.061	0.906	1.202	1.070	0.988	1.313	1.169	1.089

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
4:20 PM 10/28/2013

Wavelength Combination: !Lm1
Mean Temperature: 24.9
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	1.210	1.256
	D6		1.239	
	D7		1.246	
	D8		1.331	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	1.194	1.162
	D10		1.087	
	D11		1.084	
	D12		1.281	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.150	0.191
	A2		0.264	
	A3		0.176	
	A4		0.173	

Copyright © 2004 Molecular Devices. All rights reserved.

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.116	0.150
	B2		0.140	
	B3		0.170	
	B4		0.176	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.161	0.175
	A10		0.215	
	A11		0.159	
	A12		0.164	
MM+	B9	2	0.204	0.178
	B10		0.177	
	B11		0.171	
	B12		0.159	
TSB	A5	3	0.132	0.144
	A6		0.138	
	A7		0.162	
	A8		0.146	
TSB+	B5	4	0.128	0.158
	B6		0.146	
	B7		0.182	
	B8		0.178	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	1.133	1.219
	G10		1.282	
	G11		1.265	
	G12		1.198	
S2 MM+	H9	2	0.988	1.140
	H10		1.313	
	H11		1.169	
	H12		1.089	
S2 TSB	E9	3	1.122	1.090
	E10		0.961	
	E11		1.145	
	E12		1.130	
S2 TSB+	F9	4	1.276	1.170
	F10		1.138	
	F11		1.221	
	F12		1.045	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	1.323	1.306
	G6		1.313	
	G7		1.229	
	G8		1.359	
S1 MM+	H5	2	1.061	1.060
	H6		0.906	
	H7		1.202	
	H8		1.070	
S1 TSB	E5	3	1.304	1.325
	E6		1.289	
	E7		1.326	
	E8		1.379	
S1 TSB+	F5	4	1.295	1.308
	F6		1.260	
	F7		1.355	
	F8		1.324	

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.246	0.258
	G2		0.236	
	G3		0.287	
	G4		0.263	
MM+	H1	2	0.240	0.214
	H2		0.200	
	H3		0.207	
	H4		0.209	
TSB	E1	3	0.208	0.256
	E2		0.235	
	E3		0.284	
	E4		0.300	
TSB+	F1	4	0.222	0.252
	F2		0.248	
	F3		0.287	
	F4		0.253	

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.156	0.173
	D2		0.167	
	D3		0.194	
	D4		0.174	

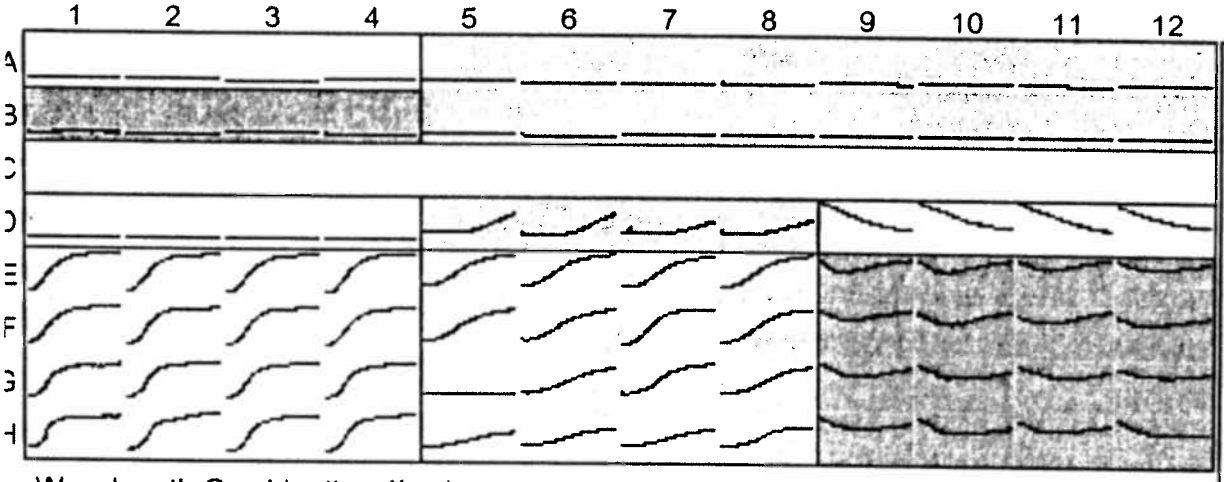
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

0135C Washington Closure
Kinetic Assay: Strain 0135B-17 + added nutrients
1 Strain versus 2 Contaminants

Vmax

Kinetic strain 17+



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 25.1 Range 22.3 - 25.6
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Plate Last Read:
3:52 PM 10/15/2013

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	0.266	0.237
	D6		0.319	
	D7		0.168	
	D8		0.195	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	-0.431	-0.393
	D10		-0.400	
	D11		-0.424	
	D12		-0.320	

Pos Growth TSB

Sample	Wells	Sample#	Values	MeanValue

Copyright © 2004 Molecular Devices. All rights reserved.

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.004	0.000
	B2		0.001	
	B3		-0.000	
	B4		-0.003	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	-0.021	-0.044
	G10		-0.040	
	G11		-0.067	
	G12		-0.049	
S2 MM+	H9	2	-0.046	-0.075
	H10		-0.080	
	H11		-0.012	
	H12		-0.160	
S2 TSB	E9	3	0.146	0.097
	E10		0.128	
	E11		0.102	
	E12		0.013	
S2 TSB+	F9	4	0.081	0.101
	F10		0.116	
	F11		0.150	
	F12		0.058	

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	-0.012	0.382
	G6		0.461	
	G7		0.576	
	G8		0.501	
S1 MM+	H5	2	0.267	0.320
	H6		0.319	
	H7		0.308	
	H8		0.388	
S1 TSB	E5	3	0.576	0.572
	E6		0.569	
	E7		0.572	
	E8		0.572	
S1 TSB+	F5	4	0.581	0.594
	F6		0.558	
	F7		0.620	
	F8		0.618	

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.494	0.532
	G2		0.536	
	G3		0.548	
	G4		0.548	
MM+	H1	2	0.444	0.554
	H2		0.595	
	H3		0.606	
	H4		0.573	
TSB	E1	3	0.573	0.590
	E2		0.575	
	E3		0.608	
	E4		0.604	
TSB+	F1	4	0.562	0.578
	F2		0.566	
	F3		0.596	
	F4		0.591	

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.000	0.001
	D2		-0.003	
	D3		0.002	
	D4		0.003	

Experiment#2

0135C Washngton Closure
Endpoint Assay: Strain 0135B-17 +added nutrients
1 Strains versus 2 Contaminants

Copyright © 2004 Molecular Devices. All rights reserved.

Endpoint Strain 17+

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.261	0.290	0.168	0.238	0.187	0.146	0.172	0.163	0.173	0.205	0.167	0.187
B	0.200	0.159	0.211	0.177	0.210	0.171	0.193	0.200	0.244	0.199	0.223	0.182
C												
D	0.209	0.210	0.213	0.205	1.370	1.399	1.096	1.173	0.819	0.969	0.848	1.011
E	1.890	1.860	1.863	1.898	1.926	1.949	1.885	1.950	1.825	1.842	1.911	1.742
F	1.901	1.848	1.869	1.876	1.847	1.860	1.876	1.926	1.903	1.881	1.973	1.710
G	1.700	1.816	1.797	1.796	0.464	1.627	1.854	1.732	1.733	1.648	1.648	1.627
H	1.735	1.904	1.819	1.834	1.128	1.331	1.302	1.467	1.615	1.485	1.624	1.329

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
2:56 PM 10/17/2013

Wavelength Combination: !Lm1
Mean Temperature: 24.8
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	1.370	1.259
	D6		1.399	
	D7		1.096	
	D8		1.173	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	0.819	0.912
	D10		0.969	
	D11		0.848	
	D12		1.011	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.261	0.239
	A2		0.290	
	A3		0.168	
	A4		0.238	

Copyright © 2004 Molecular Devices. All rights reserved.

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.200	0.187
	B2		0.159	
	B3		0.211	
	B4		0.177	

medium control

Sample	Wells	Sample#	Values	MeanValue
me01		1		
MM	A9	2	0.173	0.183
	A10		0.205	
	A11		0.167	
	A12		0.187	
MM+	B9	3	0.244	0.212
	B10		0.199	
	B11		0.223	
	B12		0.182	
TSB	A5	4	0.187	0.167
	A6		0.146	
	A7		0.172	
	A8		0.163	
TSB+	B5	5	0.210	0.193
	B6		0.171	
	B7		0.193	
	B8		0.200	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	1.733	1.664
	G10		1.648	
	G11		1.648	
	G12		1.627	
S2 MM+	H9	2	1.615	1.513
	H10		1.485	
	H11		1.624	
	H12		1.329	
S2 TSB	E9	3	1.825	1.830
	E10		1.842	
	E11		1.911	
	E12		1.742	
S2 TSB+	F9	4	1.903	1.867
	F10		1.881	
	F11		1.973	
	F12		1.710	
Sa01		5		
Sa02		6		
Sa03		7		

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	0.464	1.419
	G6		1.627	
	G7		1.854	
	G8		1.732	
S1 MM+	H5	2	1.128	1.307
	H6		1.331	
	H7		1.302	
	H8		1.467	
S1 TSB	E5	3	1.926	1.927
	E6		1.949	
	E7		1.885	
	E8		1.950	
S1 TSB+	F5	4	1.847	1.877
	F6		1.860	
	F7		1.876	
	F8		1.926	
Sa01		5		
Sa02		6		
Sa03		7		

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	1.700	1.777
	G2		1.816	
	G3		1.797	
	G4		1.796	
MM+	H1	2	1.735	1.823
	H2		1.904	
	H3		1.819	
	H4		1.834	
po01		3		
po02		4		
po03		5		
TSB	E1	6	1.890	1.877
	E2		1.860	
	E3		1.863	
	E4		1.898	
TSB+	F1	7	1.901	1.874
	F2		1.848	
	F3		1.869	
	F4		1.876	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01		1		
ne02		2		
ne03		3		

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.209	0.209
	D2		0.210	
	D3		0.213	
	D4		0.205	

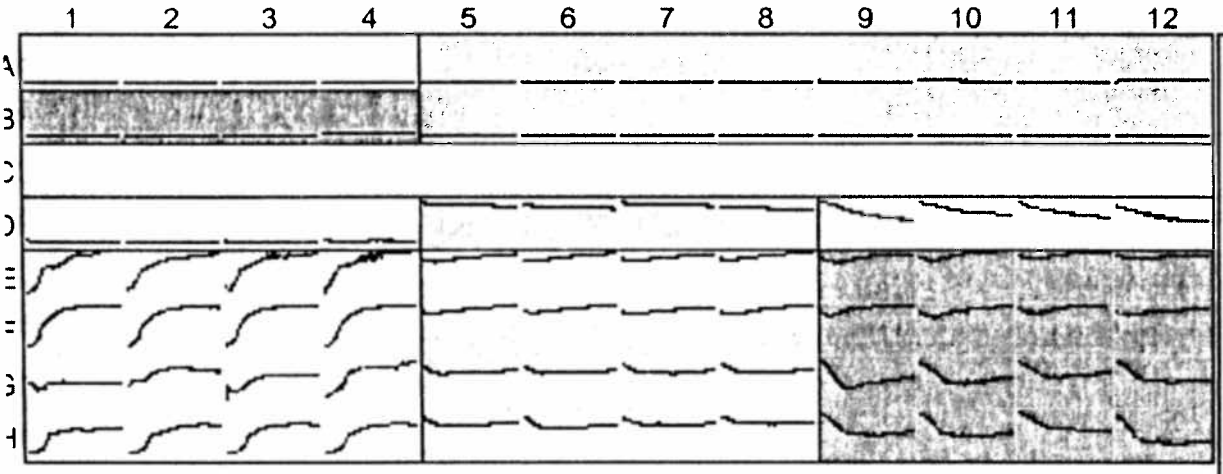
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

0135C Washington Closure
Kinetic Assay: Strain 0135B-18 + added nutrients
1 Strain versus 2 Contaminants

Vmax

Kinetic strain 18+



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 25.0 Range 24.2 - 25.7
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Plate Last Read:
4:13 PM 10/17/2013

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	-0.050	-0.050
	D6		-0.048	
	D7		-0.043	
	D8		-0.059	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	-0.295	-0.233
	D10		-0.191	
	D11		-0.212	
	D12		-0.233	

Copyright © 2004 Molecular Devices. All rights reserved.

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.007	0.003
	A2		0.003	
	A3		0.001	
	A4		0.000	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.001	0.002
	B2		0.005	
	B3		0.001	
	B4		-0.001	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	-0.071	-0.134
	G10		-0.149	
	G11		-0.099	
	G12		-0.216	
S2 MM+	H9	2	-0.207	-0.232
	H10		-0.209	
	H11		-0.233	
	H12		-0.279	
S2 TSB	E9	3	0.133	0.136
	E10		0.221	
	E11		0.129	
	E12		0.063	
S2 TSB+	F9	4	0.184	0.153
	F10		0.173	
	F11		0.157	
	F12		0.100	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	0.022	-0.006
	G6		-0.002	
	G7		-0.021	
	G8		-0.022	
S1 MM+	H5	2	-0.000	-0.024
	H6		-0.028	
	H7		-0.034	
	H8		-0.035	
S1 TSB	E5	3	0.133	0.127
	E6		0.126	
	E7		0.112	
	E8		0.137	
S1 TSB+	F5	4	0.137	0.135
	F6		0.128	
	F7		0.110	
	F8		0.166	

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.058	0.238
	G2		0.181	
	G3		0.250	
	G4		0.461	
MM+	H1	2	0.343	0.428
	H2		0.450	
	H3		0.460	
	H4		0.460	
TSB	E1	3	0.794	0.698
	E2		0.487	
	E3		0.736	
	E4		0.773	
TSB+	F1	4	0.649	0.757
	F2		0.625	
	F3		0.899	
	F4		0.854	

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	-0.008	-0.004
	D2		-0.010	
	D3		0.001	
	D4		0.000	

Experiment#2

0135C Washngton Closure

Copyright © 2004 Molecular Devices. All rights reserved.

Endpoint Assay: Strain 0135B-18 +added nutrients
1 Strains versus 2 Contaminants

Endpoint Strain 18+

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.126	0.124	0.119	0.155	0.103	0.109	0.116	0.110	0.167	0.173	0.129	0.195
B	0.108	0.146	0.142	0.211	0.135	0.137	0.166	0.131	0.146	0.164	0.107	0.113
C												
D	0.150	0.181	0.193	0.201	1.678	1.577	1.688	1.513	1.088	1.314	1.199	1.065
E	2.199	1.998	1.980	2.101	1.922	1.952	1.918	2.005	1.949	2.061	2.030	1.924
F	2.007	2.017	2.063	2.034	2.005	2.018	1.933	2.027	2.007	1.946	2.053	1.906
G	1.040	1.468	1.263	1.865	1.518	1.506	1.501	1.547	1.211	1.228	1.382	1.110
H	1.411	1.409	1.439	1.451	1.546	1.460	1.492	1.573	1.136	1.120	1.214	0.800

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
4:37 PM 10/19/2013

Wavelength Combination: !Lm1
Mean Temperature: 25.0
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	1.678	1.614
	D6		1.577	
	D7		1.688	
	D8		1.513	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	1.088	1.166
	D10		1.314	
	D11		1.199	
	D12		1.065	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.126	0.131
	A2		0.124	
	A3		0.119	
	A4		0.155	

Copyright © 2004 Molecular Devices. All rights reserved.

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.108	0.152
	B2		0.146	
	B3		0.142	
	B4		0.211	

medium control

Sample	Wells	Sample#	Values	MeanValue
me01		1		
MM	A9	2	0.167	0.166
	A10		0.173	
	A11		0.129	
	A12		0.195	
MM+	B9	3	0.146	0.133
	B10		0.164	
	B11		0.107	
	B12		0.113	
TSB	A5	4	0.103	0.109
	A6		0.109	
	A7		0.116	
	A8		0.110	
TSB+	B5	5	0.135	0.142
	B6		0.137	
	B7		0.166	
	B8		0.131	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	1.211	1.233
	G10		1.228	
	G11		1.382	
	G12		1.110	
S2 MM+	H9	2	1.136	1.067
	H10		1.120	
	H11		1.214	
	H12		0.800	
S2 TSB	E9	3	1.949	1.991
	E10		2.061	
	E11		2.030	
	E12		1.924	
S2 TSB+	F9	4	2.007	1.978
	F10		1.946	
	F11		2.053	
	F12		1.906	
Sa01		5		
Sa02		6		
Sa03		7		

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	1.518	1.518
	G6		1.506	
	G7		1.501	
	G8		1.547	
S1 MM+	H5	2	1.546	1.518
	H6		1.460	
	H7		1.492	
	H8		1.573	
S1 TSB	E5	3	1.922	1.949
	E6		1.952	
	E7		1.918	
	E8		2.005	
S1 TSB+	F5	4	2.005	1.996
	F6		2.018	
	F7		1.933	
	F8		2.027	
Sa01		5		
Sa02		6		
Sa03		7		

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	1.040	1.409
	G2		1.468	
	G3		1.263	
	G4		1.865	
MM+	H1	2	1.411	1.428
	H2		1.409	
	H3		1.439	
	H4		1.451	
po01		3		
po02		4		
po03		5		
TSB	E1	6	2.199	2.070
	E2		1.998	
	E3		1.980	
	E4		2.101	
TSB+	F1	7	2.007	2.030
	F2		2.017	
	F3		2.063	
	F4		2.034	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

. Sample	Wells	Sample#	Values	MeanValue
ne01		1		
ne02		2		
ne03		3		

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.150	0.181
	D2		0.181	
	D3		0.193	
	D4		0.201	

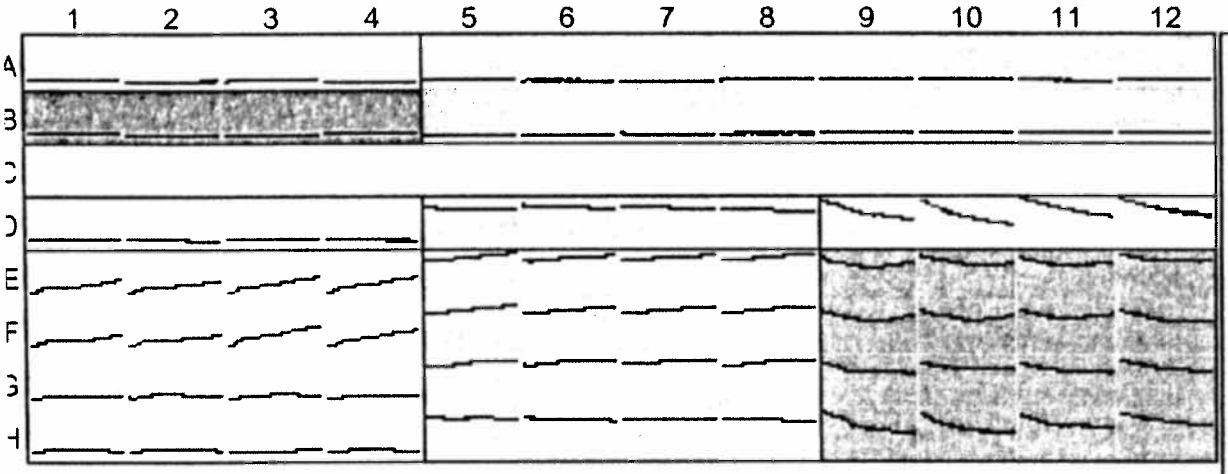
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

0135C Washington Closure
Kinetic Assay: Strain 0135B-28 + added nutrients
1 Strain versus 2 Contaminants

Vmax

Kinetic strain 28+



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 25.5 Range 22.0 - 26.1
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Plate Last Read:
5:05 PM 10/29/2013

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	-0.044	-0.050
	D6		-0.053	
	D7		-0.047	
	D8		-0.057	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	-0.288	-0.293
	D10		-0.355	
	D11		-0.275	
	D12		-0.257	

Copyright © 2004 Molecular Devices. All rights reserved.

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	-0.005	0.002
	A2		0.014	
	A3		-0.003	
	A4		0.001	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	-0.004	-0.001
	B2		-0.003	
	B3		0.000	
	B4		0.001	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	-0.004	-0.003
	A10		-0.001	
	A11		-0.004	
	A12		-0.003	
MM+	B9	2	-0.002	-0.002
	B10		-0.003	
	B11		-0.002	
	B12		-0.003	
TSB	A5	3	-0.002	-0.001
	A6		-0.001	
	A7		-0.002	
	A8		0.000	
TSB+	B5	4	0.002	0.001
	B6		0.001	
	B7		-0.006	
	B8		0.008	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	-0.124	-0.125
	G10		-0.079	
	G11		-0.129	
	G12		-0.171	
S2 MM+	H9	2	-0.331	-0.236
	H10		-0.267	
	H11		-0.156	
	H12		-0.188	
S2 TSB	E9	3	-0.050	-0.078
	E10		-0.122	
	E11		-0.048	
	E12		-0.092	
S2 TSB+	F9	4	-0.064	-0.087
	F10		-0.079	
	F11		-0.050	
	F12		-0.156	

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	0.096	0.077
	G6		0.075	
	G7		0.065	
	G8		0.071	
S1 MM+	H5	2	-0.009	-0.027
	H6		-0.037	
	H7		-0.018	
	H8		-0.044	
S1 TSB	E5	3	0.133	0.109
	E6		0.090	
	E7		0.092	
	E8		0.120	
S1 TSB+	F5	4	0.133	0.114
	F6		0.110	
	F7		0.106	
	F8		0.107	

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	-0.000	0.029
	G2		0.023	
	G3		0.046	
	G4		0.045	
MM+	H1	2	-0.007	0.010
	H2		-0.002	
	H3		0.045	
	H4		0.005	
TSB	E1	3	0.146	0.181
	E2		0.141	
	E3		0.221	
	E4		0.214	
TSB+	F1	4	0.126	0.187
	F2		0.123	
	F3		0.268	
	F4		0.230	

Experiment#2

0135C Washngton Closure
Endpoint Assay: Strain 0135B-28+added nutrients
1 Strains versus 2 Contaminants

Endpoint Strain 28+

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.236	0.387	0.347	0.321	0.225	0.178	0.161	0.186	0.187	0.195	0.174	0.208
B	0.416	0.349	0.384	0.388	0.346	0.319	0.315	0.323	0.392	0.353	0.313	0.205
C												
D	0.336	0.390	0.404	0.382	1.517	1.583	1.560	1.445	1.117	0.894	1.267	1.213
E	0.976	0.938	1.064	1.069	1.982	1.866	1.878	1.913	1.574	1.540	1.598	1.572
F	0.891	0.886	1.247	1.086	1.993	1.917	1.907	1.919	1.599	1.561	1.623	1.288
G	0.482	0.631	0.586	0.603	1.864	1.885	1.868	1.852	1.368	1.512	1.367	1.383
H	0.286	0.351	0.319	0.269	1.723	1.573	1.637	1.554	0.981	1.030	1.299	1.350

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
4:49 PM 10/31/2013

Wavelength Combination: !Lm1
Mean Temperature: 25.5
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Copyright © 2004 Molecular Devices. All rights reserved.

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	1.517	1.527
	D6		1.583	
	D7		1.560	
	D8		1.445	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	1.117	1.123
	D10		0.894	
	D11		1.267	
	D12		1.213	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.236	0.323
	A2		0.387	
	A3		0.347	
	A4		0.321	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.416	0.384
	B2		0.349	
	B3		0.384	
	B4		0.388	

Copyright © 2004 Molecular Devices. All rights reserved.

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.187	0.191
	A10		0.195	
	A11		0.174	
	A12		0.208	
MM+	B9	2	0.392	0.316
	B10		0.353	
	B11		0.313	
	B12		0.205	
TSB	A5	3	0.225	0.187
	A6		0.178	
	A7		0.161	
	A8		0.186	
TSB+	B5	4	0.346	0.326
	B6		0.319	
	B7		0.315	
	B8		0.323	

control 2

Sample	Wells	Sample#	Values	MeanValue

control 1

Sample	Wells	Sample#	Values	MeanValue

TSB

Sample	Wells	Sample#	Values	MeanValue

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	1.368	1.408
	G10		1.512	
	G11		1.367	
	G12		1.383	
S2 MM+	H9	2	0.981	1.165
	H10		1.030	
	H11		1.299	
	H12		1.350	
S2 TSB	E9	3	1.574	1.571
	E10		1.540	
	E11		1.598	
	E12		1.572	
S2 TSB+	F9	4	1.599	1.518
	F10		1.561	
	F11		1.623	
	F12		1.288	

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	1.864	1.867
	G6		1.885	
	G7		1.868	
	G8		1.852	
S1 MM+	H5	2	1.723	1.622
	H6		1.573	
	H7		1.637	
	H8		1.554	
S1 TSB	E5	3	1.982	1.910
	E6		1.866	
	E7		1.878	
	E8		1.913	
S1 TSB+	F5	4	1.993	1.934
	F6		1.917	
	F7		1.907	
	F8		1.919	

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.482	0.575
	G2		0.631	
	G3		0.586	
	G4		0.603	
MM+	H1	2	0.286	0.306
	H2		0.351	
	H3		0.319	
	H4		0.269	
TSB	E1	3	0.976	1.012
	E2		0.938	
	E3		1.064	
	E4		1.069	
TSB+	F1	4	0.891	1.027
	F2		0.886	
	F3		1.247	
	F4		1.086	

neg growth

Sample	Wells	Sample#	Values	MeanValue

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.336	0.378
	D2		0.390	
	D3		0.404	
	D4		0.382	

CuvetteSet#1

A1

Data: No Data
Ref: No Reference

Endpoint
Lm1 450

Wavelength Combination: !Lm1
Data Mode: Absorbance

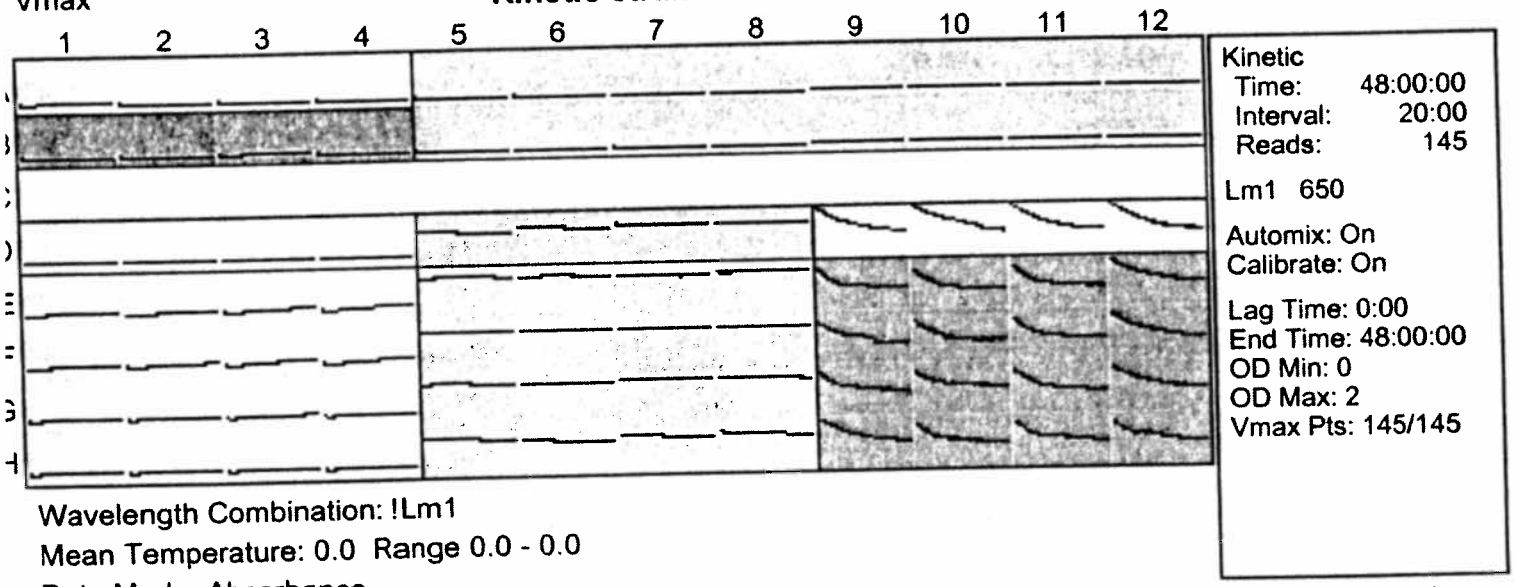
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

)135C Washington Closure
Kinetic Assay: Strain 0135B-36 + added nutrients
l Strain versus 2 Contaminants

Vmax

Kinetic strain 36+



Wavelength Combination: !Lm1
Mean Temperature: 0.0 Range 0.0 - 0.0
Data Mode: Absorbance
Reader: Vmax ROM v--

Plate Last Read:
5:23 PM 10/29/2013

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	-0.037	-0.037
	D6		-0.052	
	D7		-0.019	
	D8		-0.039	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	-0.336	-0.365
	D10		-0.378	
	D11		-0.360	
	D12		-0.386	

Copyright © 2004 Molecular Devices. All rights reserved.

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.005	0.005
	A2		0.004	
	A3		0.003	
	A4		0.006	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	-0.001	0.001
	B2		0.001	
	B3		0.005	
	B4		0.000	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.006	0.005
	A10		0.003	
	A11		0.002	
	A12		0.008	
MM+	B9	2	-0.002	-0.000
	B10		-0.001	
	B11		-0.001	
	B12		0.003	
TSB	A5	3	0.009	0.005
	A6		0.000	
	A7		0.004	
	A8		0.005	
TSB+	B5	4	0.001	0.001
	B6		0.001	
	B7		0.002	
	B8		0.001	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	-0.207	-0.228
	G10		-0.172	
	G11		-0.248	
	G12		-0.285	
S2 MM+	H9	2	-0.318	-0.245
	H10		-0.204	
	H11		-0.219	
	H12		-0.239	
S2 TSB	E9	3	-0.210	-0.242
	E10		-0.209	
	E11		-0.245	
	E12		-0.305	
S2 TSB+	F9	4	-0.291	-0.270
	F10		-0.243	
	F11		-0.227	
	F12		-0.318	

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	-0.027	-0.028
	G6		-0.025	
	G7		-0.018	
	G8		-0.043	
S1 MM+	H5	2	-0.038	-0.053
	H6		-0.057	
	H7		-0.059	
	H8		-0.057	
S1 TSB	E5	3	0.004	-0.002
	E6		0.005	
	E7		-0.017	
	E8		0.002	
S1 TSB+	F5	4	-0.003	-0.004
	F6		-0.001	
	F7		-0.004	
	F8		-0.010	

Copyright © 2004 Molecular Devices. All rights reserved.

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.027	0.036
	G2		0.036	
	G3		0.045	
	G4		0.037	
MM+	H1	2	0.029	0.030
	H2		0.034	
	H3		0.032	
	H4		0.027	
TSB	E1	3	0.044	0.064
	E2		0.049	
	E3		0.074	
	E4		0.089	
TSB+	F1	4	0.039	0.070
	F2		0.065	
	F3		0.088	
	F4		0.086	

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	-0.011	-0.007
	D2		-0.006	
	D3		-0.004	
	D4		-0.006	

Experiment#2

0135C Washngton Closure
Endpoint Assay: Strain 0135B-36 +added nutrients
1 Strains versus 2 Contaminants

Copyright © 2004 Molecular Devices. All rights reserved.

Endpoint Strain 36+

1	2	3	4	5	6	7	8	9	10	11	12
0.187	0.155	0.157	0.170	0.169	0.155	0.155	0.161	0.205	0.204	0.188	0.205
0.160	0.153	0.199	0.176	0.177	0.174	0.179	0.170	0.221	0.209	0.210	0.192
0.203	0.217	0.233	0.239	1.201	1.302	1.415	1.359	0.988	0.982	0.981	0.939
0.399	0.385	0.469	0.521	1.589	1.576	1.537	1.598	0.895	0.807	0.799	0.971
0.383	0.448	0.503	0.492	1.491	1.524	1.506	1.475	0.813	0.866	0.940	0.899
0.362	0.401	0.422	0.402	1.517	1.476	1.588	1.565	1.144	1.103	0.980	1.117
0.374	0.389	0.382	0.372	1.452	1.243	1.386	1.425	1.040	0.966	0.949	0.913

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
5:41 PM 10/31/2013

Wavelength Combination: !Lm1
Mean Temperature: 0.0
Data Mode: Absorbance
Reader: Vmax ROM v--

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB	D5	1	1.201	1.319
	D6		1.302	
	D7		1.415	
	D8		1.359	

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM	D9	1	0.988	0.973
	D10		0.982	
	D11		0.981	
	D12		0.939	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.187	0.167
	A2		0.155	
	A3		0.157	
	A4		0.170	

Copyright © 2004 Molecular Devices. All rights reserved.

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.160	0.172
	B2		0.153	
	B3		0.199	
	B4		0.176	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.205	0.201
	A10		0.204	
	A11		0.188	
	A12		0.205	
MM+	B9	2	0.221	0.208
	B10		0.209	
	B11		0.210	
	B12		0.192	
TSB	A5	3	0.169	0.160
	A6		0.155	
	A7		0.155	
	A8		0.161	
TSB+	B5	4	0.177	0.175
	B6		0.174	
	B7		0.179	
	B8		0.170	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
S2 MM	G9	1	1.144	1.086
	G10		1.103	
	G11		0.980	
	G12		1.117	
S2 MM+	H9	2	1.040	0.967
	H10		0.966	
	H11		0.949	
	H12		0.913	
S2 TSB	E9	3	0.895	0.868
	E10		0.807	
	E11		0.799	
	E12		0.971	
S2 TSB+	F9	4	0.813	0.880
	F10		0.866	
	F11		0.940	
	F12		0.899	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
S1 MM	G5	1	1.517	1.537
	G6		1.476	
	G7		1.588	
	G8		1.565	
S1 MM+	H5	2	1.452	1.377
	H6		1.243	
	H7		1.386	
	H8		1.425	
S1 TSB	E5	3	1.589	1.575
	E6		1.576	
	E7		1.537	
	E8		1.598	
S1 TSB+	F5	4	1.491	1.499
	F6		1.524	
	F7		1.506	
	F8		1.475	

pos growth

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.362	0.397
	G2		0.401	
	G3		0.422	
	G4		0.402	
MM+	H1	2	0.374	0.379
	H2		0.389	
	H3		0.382	
	H4		0.372	
TSB	E1	3	0.399	0.444
	E2		0.385	
	E3		0.469	
	E4		0.521	
TSB+	F1	4	0.383	0.457
	F2		0.448	
	F3		0.503	
	F4		0.492	

neg con

Sample	Wells	Sample#	Values	MeanValue
ne01	D1	1	0.203	0.223
	D2		0.217	
	D3		0.233	
	D4		0.239	

Copyright © 2004 Molecular Devices. All rights reserved.

American Society for Testing and Materials

ASTM INTERNATIONAL ORGANIZATIONAL MEMBER

NREP

National Registry of Environmental Professionals

American Council of Independent Laboratories

ACIL

AOAC INTERNATIONAL

The Scientific Association Dedicated to Excellence in Analytical Methods.

MISSOURI BIOTECHNOLOGY ASSOCIATION

MOBIO

BioBelt SM

The Center of Plant and Life Sciences

Plant and Life Sciences Technology Gateway-Regional Commerce Growth Association of St. Louis, Missouri

CSREES

EDUCATION • RESEARCH • EXTENSION • USDA

Cooperative State Research, Education And Extension Service [SBIR Recipient]

the MiL, Inc. 7259 Lansdowne Avenue Suite 200 St. Louis MO 63119-3421

Phone: (800) 688-9144 Fax: (314) 645-2544

Warranty And Limits Of Liability

In accepting analytical work, we warrant the accuracy of test results under the conditions employed in the laboratory. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. We disclaim any other warranties, expressed or implied, including a Warranty of Fitness for Particular Purpose and Warranty of Merchantability. We accept no legal responsibility for the purposes for which the client uses the test results.

"Excellence in Microbiology"

Advanced Technology Serving The Needs Of:

Environmental Engineers
Water Quality Specialists
Commercial & Residential Realtors
Food & Beverage Processors
Packing Industry Professionals
Research & Analytical Laboratories
Law & Regulatory Agencies
Pharmaceutical Manufacturers

the MiL, Inc.

MICROBE INOTECH LABORATORIES, INC.

7259 Lansdowne Ave Suite 200
SAINT LOUIS MO, 63119-3421

TELEPHONE: **(800) 688-9144**
(314) 645-2177
FAX: **(314) 645-2544**
WEB: www.microbeinotech.com
EMAIL: info@microbeinotech.com

RECEIVED
NOV 2013

REPORT OF ANALYSES

PREPARED BY:

MICROBE INOTECH LABORATORIES, INC.

the MiL, Inc.

Celebrating 20 Years of Excellence in Microbiology and Service

MICROBE INOTECH LABORATORIES, INC., 7259 LANSDOWNE AVENUE, SUITE 200, ST. LOUIS, MO 63119-3421
(800) 688-9144 • (314) 645-2177 • FAX (314) 645-2544 • info@microbeinotech.com

Microbe Inotech Laboratories, Inc.
Summary Report of Analysis
[MILB –0135C]

Joan Kessner
Washington Closure Hanford
2620 Fermi Ave.
Richland, WA 99354
Phone: 509-375-4688
Email: jhkessne@wch-rcc.com; rlweiss@wch-rcc.com

October 31, 2013

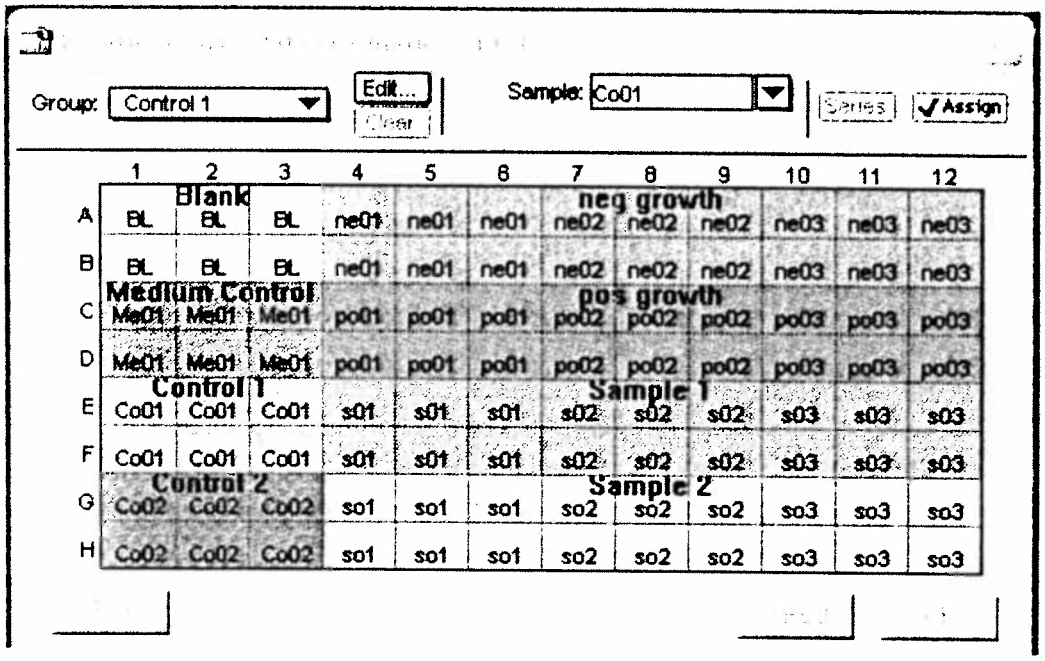
Description and Chain of Custody Record Information:

- Thursday, June 27, 2013 – 10:09AM: Received by FedEx two (2) samples for use in a biofeasibility assay. Ten (10) strains from MILB0135B were identified by Vitek, Biolog or 16s.
- Wednesday September 11, 2013: Client requested that 6 strains be used for a kinetic assay.
- MiL, Inc. REPORT and Invoice No.: MILB-0135C

Processing:

The tested bacterial strains were grown overnight on Trypticase Soy (Broth) Agar (TSA) at 30°C and then suspended in sterile saline to a turbidity of 40%-50%T. The strains are then aliquotted into two optically clear microtiter plate that contains an undisclosed growth medium of mineral salts, vitamins and buffer without a major carbon source. The wells also contain a tetrazolium dye redox indicator system. Bacterial growth (metabolic respiration/oxidation of carbon sources) is monitored by tetrazolium reduction as measured at 590nm in a microplate reader. **J1RPT1** (Supplied by the client) as well as **Diesel #2** (@1μL) was added to selected wells to serve as the major carbon source.
50μL of these inocula were dispensed into the test wells.
Trypticase Soy Broth (TSB) serves as the positive control for bacterial growth and water serves as the negative control for bacterial growth in this assay. Total volume of each well is 150μL.
Readings were taken at 20 minute intervals over a time period of 48 hours. At 48 hours and endpoint reading was taken.

96-well plate template



Template Key:
Columns 1, 2, 3; Rows A, B: Sterile Water Blank
Columns 1, 2, 3; Rows C, D: Medium Control: TSB + DMSO + H2O Blank
Columns 1, 2, 3; Rows E, F: Control 1: TSB + Sample Solution 1 (J1RPT1 + DMSO) + H2O
Columns 1, 2, 3; Rows G, H: Control 2: TSB + Sample Solution 2 (Diesel #2 + DMSO) + H2O
Columns 4, 5, 6; Rows A, B: Negative Growth: Strain 2 or 18 + H2O
Columns 4, 5, 6; Rows C, D: Positive Growth: TSB + Strain 2 or 18 + H2O
Columns 4, 5, 6; Rows E, F: Sample 1: TSB + Strain 2 or 18 + Sample Solution 1 + H2O
Columns 4, 5, 6; Rows G, H: Sample 2: TSB + Strain 2 or 18 + Sample Solution 2 + H2O
Columns 7, 8, 9; Rows A, B: Negative Growth: Strain 11 or 28 + H2O
Columns 7, 8, 9; Rows C, D: Positive Growth: TSB + Strain 11 or 28 + H2O
Columns 7, 8, 9; Rows E, F: Sample 1: TSB + Strain 11 or 28 + Sample Solution 1 + H2O
Columns 7, 8, 9; Rows G, H: Sample 2: TSB + Strain 11 or 2 + Sample Solution 2 + H2O
Columns 10, 11, 12; Rows A, B: Negative Growth: Strain 17 or 36 + H2O
Columns 10, 11, 12; Rows C, D: Positive Growth: TSB + Strain 17 or 36 + H2O
Columns 10, 11, 12; Rows E, F: Sample 1: TSB + Strain 17 or 36 + Sample Solution 1 + H2O
Columns 10, 11, 12; Rows G, H: Sample 2: TSB + Strain 17 or Sample Solution 2 + H2O

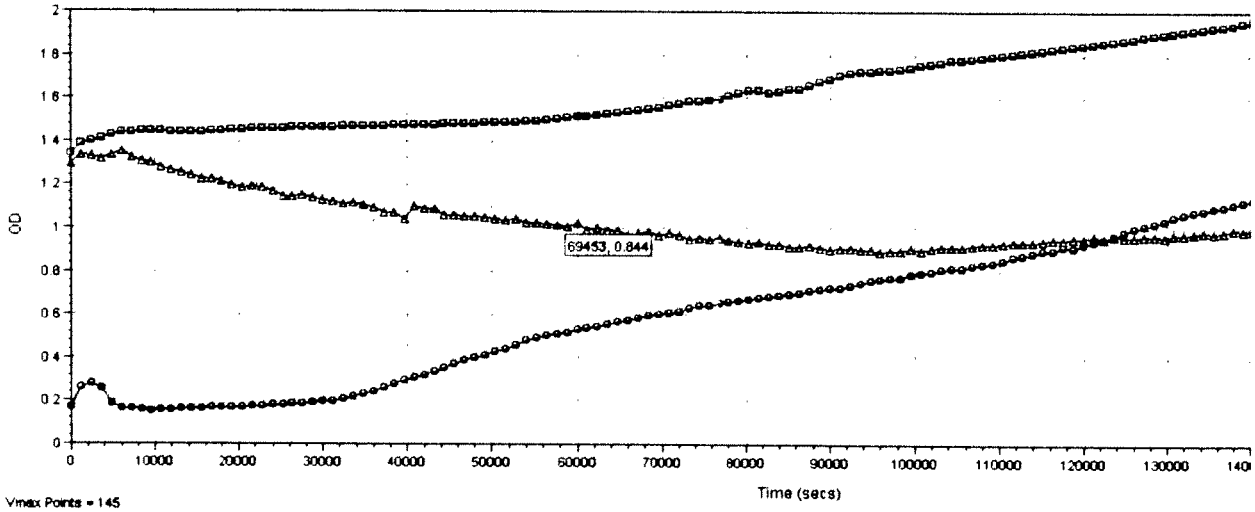
After completion of the kinetic assay run with reading at 590nm every 20 minutes, an endpoint assay was read.

See attached for Kinetic Assay Data.

Key to Representative Well Comparisons:

- ○ Positive growth control
- □ Sample 1 + Inoculum
- Δ Sample 2 + Inoculum

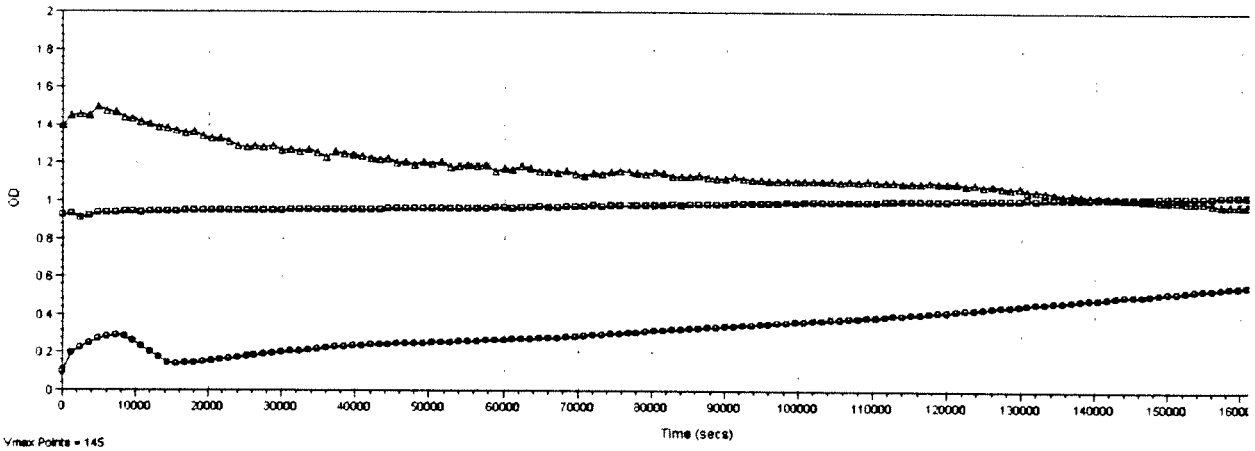
Strain 0135B-2



Vmax Points = 145

Well	○ D5	□ F5	Δ H6
Vmax	0.456	0.250	-0.070
R^2	0.966	0.948	0.251

Strain 0135B-11

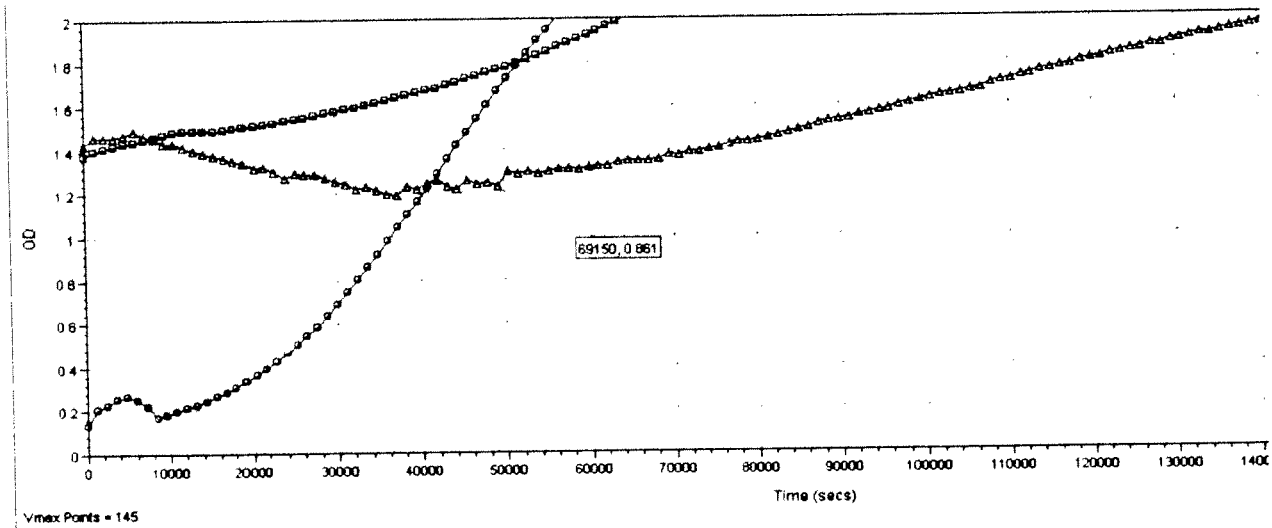


Vmax Points = 145

Well	○ C8	□ F7	Δ H9
Vmax	0.145	0.038	-0.149
R^2	0.938	0.988	0.919

the MiL, Inc. 7259 LANSDOWNE AVENUE, SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

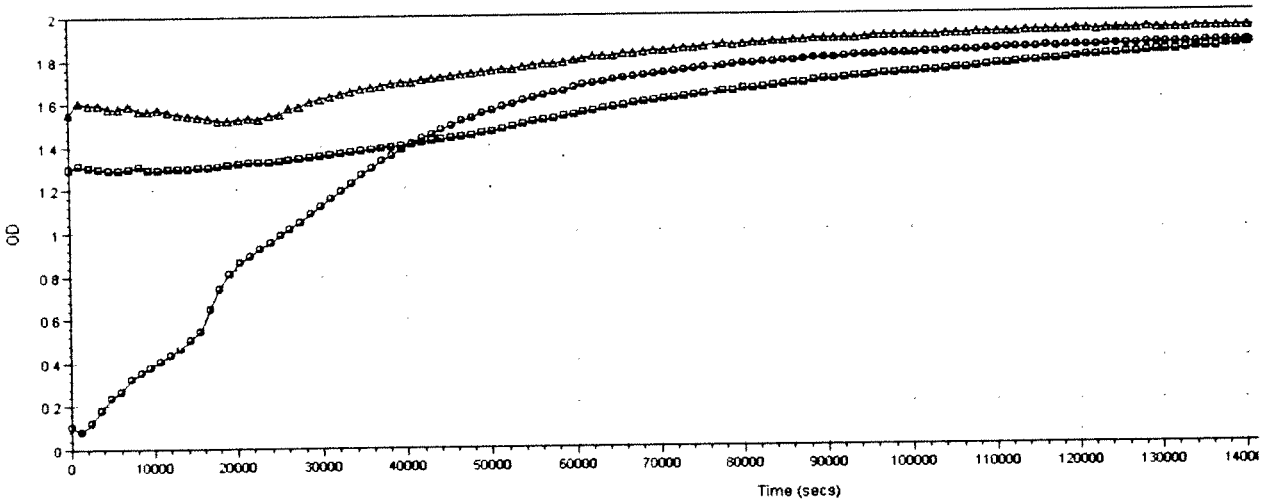
Strain 0135B-17



Vmax Points = 145

Well	C10	F11	H12
Vmax	2.042	0.517	0.283
R^2	0.919	0.960	0.721

Strain 0135B-18

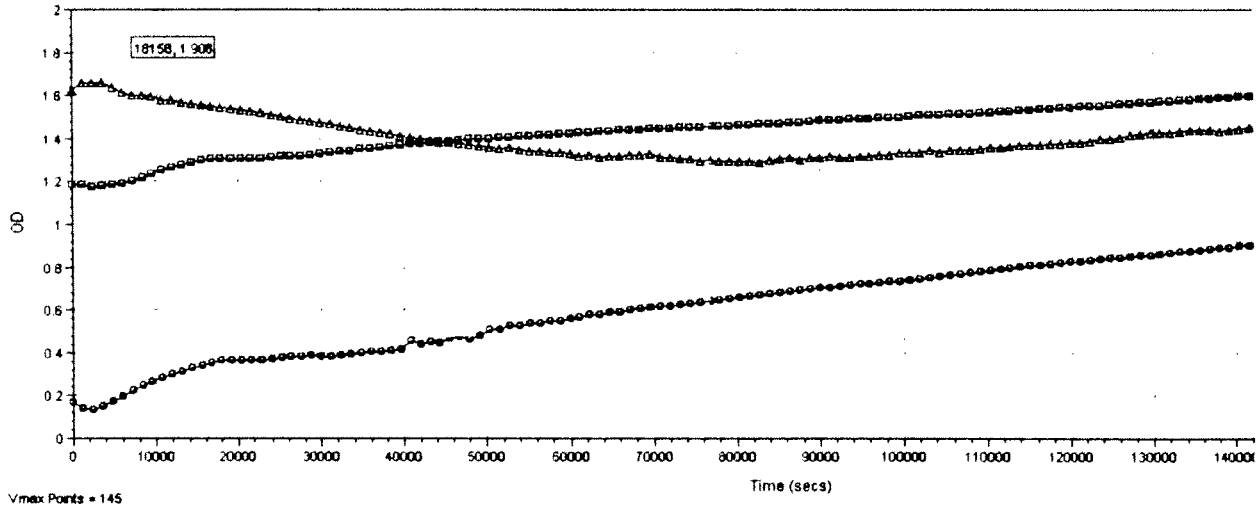


Vmax Points = 145

Well	D4	F4	H4
Vmax	0.474	0.245	0.149

the MiL, Inc. 7259 LANSDOWNE AVENUE, SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

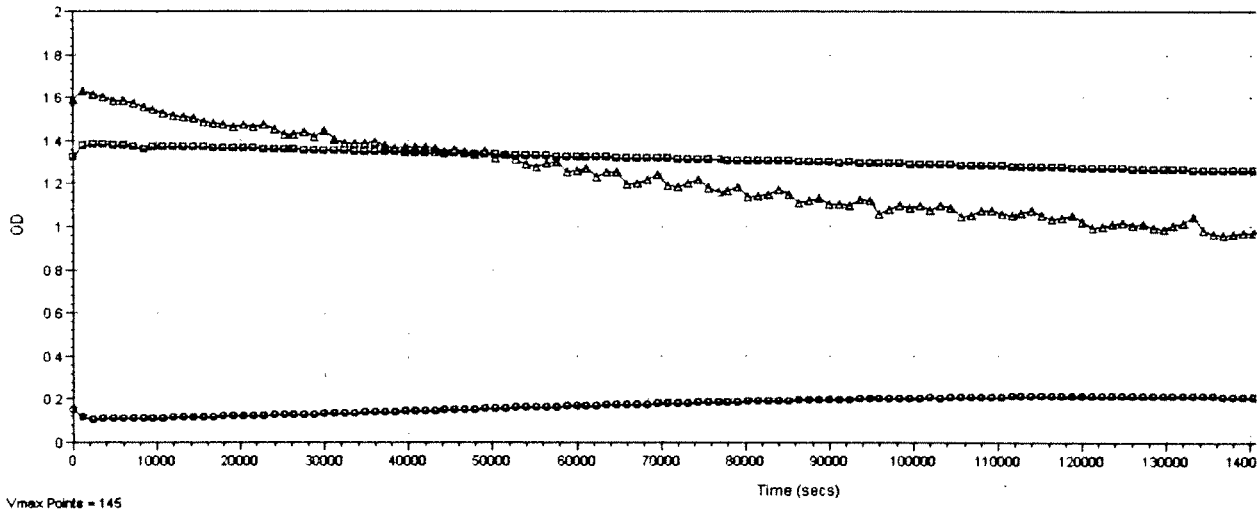
Strain 0135B-28



Vmax Points = 145

Well	D9	F8	G9
Vmax	0.282	0.151	-0.020
R^2	0.983	0.974	0.032

Strain 0135B-36



Vmax Points = 145

Well	D10	F12	H10
Vmax	0.038	-0.050	-0.249
R^2	0.824	0.988	0.972

the MiL, Inc. 7259 LANSDOWNE AVENUE, SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

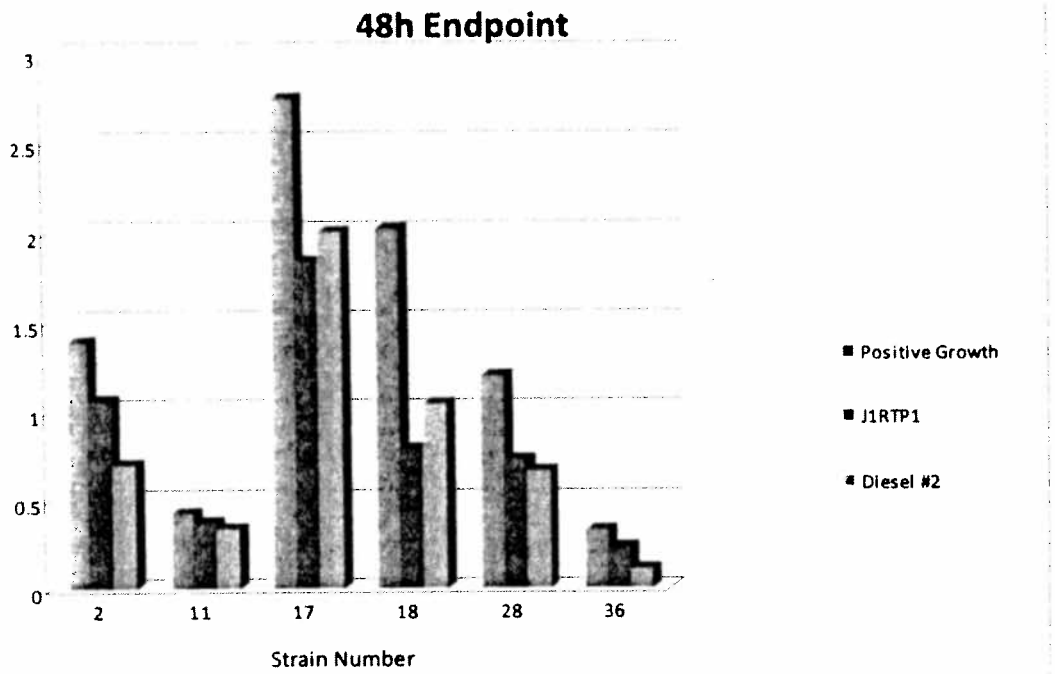
Aerobic Endpoint Assay Results:

The data is processed and given with background blank values subtracted. Bar-chart interpretation of the data is provided on the pages following the executive summary report of analysis. The design template of the experiment is located in the raw data section of this report. The template shows the arrangement and position of strains in the matrix. Individual strain feasibility for biodegradation potential is reported as one of the following classifications:

- Excellent Degrader
- Good Degrader
- Fair Degrader
- Minimal Degrader
- No Effect
- Growth Inhibited

(Please also see graphical results at end of Summary Report)

Carbon Source ⇒ Strain ⇓	**J1RPT1**	**Diesel #2**
0135B-2	Excellent	Excellent
0135B-11	Good	Good
0135B-17	Excellent	Excellent
0135B-18	Excellent	Excellent
0135B-28	Excellent	Excellent
0135B-36	Good	Good



Raw data can be found in appendix attached to the signed hard copy

Thank you from the staff on project:

Michele R. Gossett
Laboratory Manager

Benjamin M. Winkler
Research Laboratory Manager

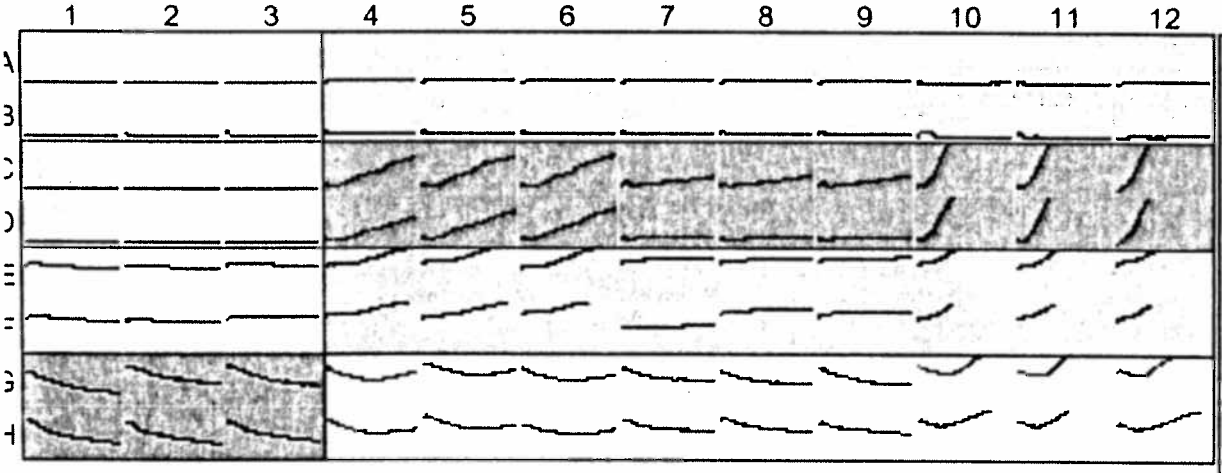
the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Kinetic Assay

MIL0135C Washington Closure
Strains 2,11,17
Kinetic Assay - 3 strains versus 2 contaminants

Vmax

Plate#1 Kinetic 2,11,17



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 590

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 0.0 Range 0.0 - 0.0
Data Mode: Absorbance
Plate Blank Used
Reader: Vmax ROM v--

Plate Last Read:
6:34 PM 9/11/2013

Medium Control

Sample	Wells	Sample#	Values	MeanValue
Me01	C1	1	-0.002	0.003
	C2		0.007	
	C3		0.001	
	D1		NoFit	
	D2		NoFit	
	D3		0.004	

Control 2

Sample	Wells	Sample#	Values	MeanValue
Co02	G1	1	-0.306	-0.295
	G2		-0.267	
	G3		-0.307	
	H1		-0.322	
	H2		-0.289	
	H3		-0.278	

Copyright © 2004 Molecular Devices. All rights reserved.

Control 1

Sample	Wells	Sample#	Values	MeanValue
Co01	E1	1	-0.091	-0.054
	E2		-0.055	
	E3		-0.027	
	F1		-0.089	
	F2		-0.050	
	F3		-0.010	

pos growth

Sample	Wells	Sample#	Values	MeanValue
po01	C4	1	0.487	0.481
	C5		0.515	
	C6		0.549	
	D4		0.362	
	D5		0.456	
	D6		0.516	
po02	C7	2	0.118	0.081
	C8		0.145	
	C9		0.149	
	D7		0.021	
	D8		0.028	
	D9		0.024	
po03	C10	3	2.042	2.070
	C11		2.025	
	C12		2.249	
	D10		1.909	
	D11		2.058	
	D12		2.137	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01	A4	1	0.014	0.007
	A5		0.016	
	A6		0.008	
	B4		-0.001	
	B5		0.003	
	B6		0.003	
ne02	A7	2	0.005	-0.006
	A8		0.006	
	A9		0.004	
	B7		-0.012	
	B8		-0.017	
	B9		-0.020	
ne03	A10	3	0.005	0.002
	A11		-0.008	
	A12		0.011	
	B10		0.018	
	B11		-0.014	
	B12		0.003	

Sample 1

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
s01	E4	1	0.303	0.278	0.063	22.568
	E5		0.281			
	E6		0.389			
	F4		0.223			
	F5		0.250			
	F6		0.224			
s02	E7	2	0.046	0.042	0.003	8.328
	E8		0.043			
	E9		0.044			
	F7		0.036			
	F8		0.040			
	F9		0.041			
s03	E10	3	0.499	0.529	0.062	11.795
	E11		0.573			
	E12		0.426			
	F10		0.561			
	F11		0.517			
	F12		0.597			

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
so1	G4	1	-0.040	-0.095	0.040	41.906
	G5		-0.122			
	G6		-0.071			
	H4		-0.131			
	H5		-0.136			
	H6		-0.070			
so2	G7	2	-0.170	-0.183	0.034	18.394
	G8		-0.168			
	G9		-0.241			
	H7		-0.166			
	H8		-0.206			
	H9		-0.149			
so3	G10	3	0.183	0.284	0.064	22.658
	G11		0.357			
	G12		0.319			
	H10		0.237			
	H11		0.325			
	H12		0.283			

Endpoint 481 hrs

MIL0135C Washington Closure
Strains: 2,11,17 Endpoint
3 Strains versus 2 Contaminants

Plate#1 Endpoint 2,11,17

	1	2	3	4	5	6	7	8	9	10	11	12
A	-0.003	-0.008	0.003	0.132	0.123	0.092	0.077	0.078	0.084	0.064	0.035	0.090
B	-0.017	-0.004	0.029	0.117	0.139	0.139	0.079	0.067	0.088	0.055	0.052	0.063
C	0.003	0.010	0.025	1.396	1.408	1.545	0.546	0.613	0.646	2.731	2.807	2.742
D	-0.024	-0.008	0.002	1.091	1.376	1.493	0.245	0.241	0.254	2.647	2.747	2.766
E	1.125	1.154	1.310	2.222	2.376	2.380	1.673	1.652	1.718	3.038	3.063	3.024
F	1.154	1.132	1.358	2.129	2.126	2.338	1.029	1.744	1.648	3.007	2.893	3.226
G	0.378	0.772	0.803	1.358	1.428	1.278	0.953	0.804	0.846	2.682	2.862	2.765
H	0.500	0.498	0.619	1.155	1.353	1.166	1.002	1.005	0.956	2.312	2.810	2.152

Endpoint
Lm1 590
Automix: Once
Calibrate: On

Plate Last Read:
6:56 PM 9/13/2013

Wavelength Combination: !Lm1
Mean Temperature: 0.0
Data Mode: Absorbance
Plate Blank Used Lm1 = 0.145
Reader: Vmax ROM v--

Copyright © 2004 Molecular Devices. All rights reserved.

medium control

Sample	Wells	Sample#	Values	MeanValue
me01	C1	1	0.003	0.001
	C2		0.010	
	C3		0.025	
	D1		-0.024	
	D2		-0.008	
	D3		0.002	

control 2

Sample	Wells	Sample#	Values	MeanValue
co02	G1	1	0.378	0.595
	G2		0.772	
	G3		0.803	
	H1		0.500	
	H2		0.498	
	H3		0.619	

control 1

Sample	Wells	Sample#	Values	MeanValue
co01	E1	1	1.125	1.206
	E2		1.154	
	E3		1.310	
	F1		1.154	
	F2		1.132	
	F3		1.358	

pos growth

Sample	Wells	Sample#	Values	MeanValue
po01	C4	1	1.396	1.385
	C5		1.408	
	C6		1.545	
	D4		1.091	
	D5		1.376	
	D6		1.493	
po02	C7	2	0.545	0.424
	C8		0.613	
	C9		0.646	
	D7		0.245	
	D8		0.241	
	D9		0.254	
po03	C10	3	2.731	2.740
	C11		2.807	
	C12		2.742	
	D10		2.647	
	D11		2.747	
	D12		2.766	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01	A4	1	0.132	0.124
	A5		0.123	
	A6		0.092	
	B4		0.117	
	B5		0.139	
	B6		0.139	
ne02	A7	2	0.077	0.079
	A8		0.078	
	A9		0.084	
	B7		0.079	
	B8		0.067	
	B9		0.088	
ne03	A10	3	0.064	0.060
	A11		0.035	
	A12		0.090	
	B10		0.055	
	B11		0.052	
	B12		0.063	

Sample 1

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
s01	E4	1	2.222	2.262	0.119	5.249
	E5		2.376			
	E6		2.380			
	F4		2.129			
	F5		2.126			
	F6		2.338			
s02	E7	2	1.673	1.577	0.271	17.198
	E8		1.652			
	E9		1.718			
	F7		1.029			
	F8		1.744			
	F9		1.648			
s03	E10	3	3.038	3.042	0.108	3.543
	E11		3.063			
	E12		3.024			
	F10		3.007			
	F11		2.893			
	F12		3.226			

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 2

Sample	Wells	Sample#	Values	MeanValue	StdDev	%CV
so1	G4	1	1.358	1.290	0.111	8.591
	G5		1.428			
	G6		1.278			
	H4		1.155			
	H5		1.353			
	H6		1.166			
so2	G7	2	0.953	0.928	0.084	9.008
	G8		0.804			
	G9		0.846			
	H7		1.002			
	H8		1.005			
	H9		0.956			
so3	G10	3	2.682	2.597	0.293	11.295
	G11		2.862			
	G12		2.765			
	H10		2.312			
	H11		2.810			
	H12		2.152			

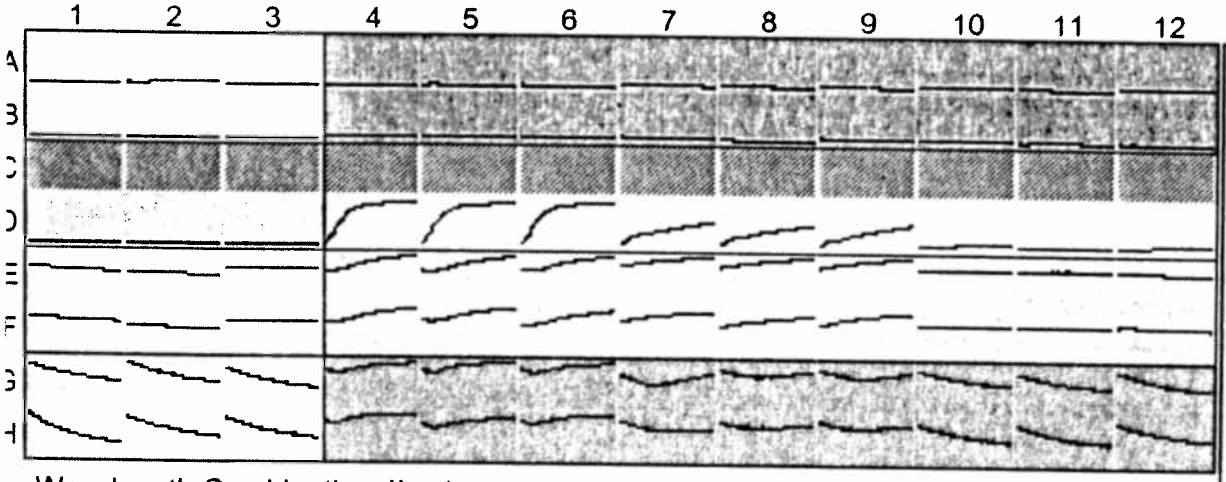
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

0135C Washington Closure
Kinetic Assay: 18,28,36
3 Strains versus 2 Contaminants

Vmax

Plate#2 Kinetic 18, 28, 36



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 25.8 Range 25.0 - 27.1
Data Mode: Absorbance
Plate Blank Used
Reader: PLUS384 ROM v1.11 7 Nov 00

Plate Last Read:
6:17 PM 9/11/2013

medium control

Sample	Wells	Sample#	Values	MeanValue
me01	C1	1	Masked	Masked
	C2		Masked	
	C3		Masked	
	D1		NoFit	
	D2		NoFit	
	D3		NoFit	

control 2

Sample	Wells	Sample#	Values	MeanValue
co01	G1	1	-0.244	-0.298
	G2		-0.289	
	G3		-0.280	
	H1		-0.401	
	H2		-0.285	
	H3		-0.288	

Copyright © 2004 Molecular Devices. All rights reserved.

control 1

Sample	Wells	Sample#	Values	MeanValue
co01	E1	1	-0.069	-0.041
	E2		-0.030	
	E3		-0.013	
	F1		-0.065	
	F2		-0.052	
	F3		-0.020	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
Sa01	G4	1	0.165	0.156
	G5		0.168	
	G6		0.147	
	H4		0.149	
	H5		0.157	
	H6		0.151	
Sa02	G7	2	0.080	-0.011
	G8		0.019	
	G9		-0.020	
	H7		-0.101	
	H8		-0.014	
	H9		-0.031	
Sa03	G10	3	-0.212	-0.242
	G11		-0.212	
	G12		-0.280	
	H10		-0.249	
	H11		-0.258	
	H12		-0.245	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
Sa01	E4	1	0.279	0.258
	E5		0.268	
	E6		0.258	
	F4		0.245	
	F5		0.237	
	F6		0.260	
Sa02	E7	2	0.135	0.148
	E8		0.145	
	E9		0.145	
	F7		0.136	
	F8		0.151	
	F9		0.173	
Sa03	E10	3	0.008	-0.017
	E11		-0.000	
	E12		-0.050	
	F10		-0.005	
	F11		-0.005	
	F12		-0.050	

pos growth

Sample	Wells	Sample#	Values	MeanValue
po01	C4	1	Masked	0.461
	C5		Masked	
	C6		Masked	
	D4		0.474	
	D5		0.444	
	D6		0.464	
po02	C7	2	Masked	0.273
	C8		Masked	
	C9		Masked	
	D7		0.279	
	D8		0.257	
	D9		0.282	
po03	C10	3	Masked	0.025
	C11		Masked	
	C12		Masked	
	D10		0.038	
	D11		0.009	
	D12		0.028	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01	A4	1	-0.009	-0.006
	A5		-0.005	
	A6		-0.010	
	B4		-0.003	
	B5		-0.002	
	B6		-0.005	
ne02	A7	2	-0.012	-0.009
	A8		-0.010	
	A9		-0.014	
	B7		-0.006	
	B8		-0.005	
	B9		-0.007	
ne03	A10	3	-0.013	-0.008
	A11		-0.016	
	A12		-0.006	
	B10		-0.003	
	B11		-0.005	
	B12		-0.007	

Experiment#2

0135C Washngton Closure
Endpoint Assay: Strains 18,28,36
3 Strains versus 2 Contaminants

Plate#2 Endpoint 18,8,36

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.143	0.205	0.133	0.167	0.189	0.154	0.203	0.193	0.196	0.223	0.180	0.225
B	0.137	0.146	0.158	0.279	0.218	0.220	0.228	0.207	0.232	0.211	0.215	0.190
C	Error	Error	Error	4.000	4.000	4.000	Error	Error	Error	Error	Error	Error
D	0.117	0.146	0.148	2.021	1.997	2.036	1.247	1.148	1.182	0.358	0.270	0.349
E	1.239	1.121	1.398	2.053	2.027	2.060	2.061	2.045	2.054	1.616	1.606	1.434
F	1.369	1.062	1.401	2.065	2.083	1.996	1.978	1.847	1.960	1.455	1.480	1.381
G	1.124	1.096	0.884	1.979	2.006	1.984	1.588	1.744	1.669	1.171	1.081	1.017
H	0.707	1.034	0.996	2.071	1.927	2.067	1.421	1.693	1.678	1.077	1.016	1.138

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
6:41 PM 9/13/2013

Wavelength Combination: !Lm1
Mean Temperature: 25.4
Data Mode: Absorbance
Reader: PLUS384 ROM v1.11 7 Nov 00

Copyright © 2004 Molecular Devices. All rights reserved.

medium control

Sample	Wells	Sample#	Values	MeanValue
me01	C1	1	Masked	0.137
	C2		Masked	
	C3		Masked	
	D1		0.117	
	D2		0.146	
	D3		0.148	

control 2

Sample	Wells	Sample#	Values	MeanValue
co02	G1	1	1.124	0.973
	G2		1.096	
	G3		0.884	
	H1		0.707	
	H2		1.034	
	H3		0.996	

control 1

Sample	Wells	Sample#	Values	MeanValue
co01	E1	1	1.239	1.265
	E2		1.121	
	E3		1.398	
	F1		1.369	
	F2		1.062	
	F3		1.401	

Sample 2

Sample	Wells	Sample#	Values	MeanValue
Sa01	G4	1	1.979	2.006
	G5		2.006	
	G6		1.984	
	H4		2.071	
	H5		1.927	
	H6		2.067	
Sa02	G7	2	1.588	1.632
	G8		1.744	
	G9		1.669	
	H7		1.421	
	H8		1.693	
	H9		1.678	
Sa03	G10	3	1.171	1.083
	G11		1.081	
	G12		1.017	
	H10		1.077	
	H11		1.016	
	H12		1.138	

Copyright © 2004 Molecular Devices. All rights reserved.

Sample 1

Sample	Wells	Sample#	Values	MeanValue
Sa01	E4	1	2.053	2.047
	E5		2.027	
	E6		2.060	
	F4		2.065	
	F5		2.083	
	F6		1.996	
Sa02	E7	2	2.061	1.991
	E8		2.045	
	E9		2.054	
	F7		1.978	
	F8		1.847	
	F9		1.960	
Sa03	E10	3	1.616	1.495
	E11		1.606	
	E12		1.434	
	F10		1.455	
	F11		1.480	
	F12		1.381	

pos growth

Sample	Wells	Sample#	Values	MeanValue
po01	C4	1	Masked	2.018
	C5		Masked	
	C6		Masked	
	D4		2.021	
	D5		1.997	
	D6		2.036	
po02	C7	2	Masked	1.192
	C8		Masked	
	C9		Masked	
	D7		1.247	
	D8		1.148	
	D9		1.182	
po03	C10	3	Masked	0.326
	C11		Masked	
	C12		Masked	
	D10		0.358	
	D11		0.270	
	D12		0.349	

Copyright © 2004 Molecular Devices. All rights reserved.

neg growth

Sample	Wells	Sample#	Values	MeanValue
ne01	A4	1	0.167	0.205
	A5		0.189	
	A6		0.154	
	B4		0.279	
	B5		0.218	
	B6		0.220	
ne02	A7	2	0.203	0.210
	A8		0.193	
	A9		0.196	
	B7		0.228	
	B8		0.207	
	B9		0.232	
ne03	A10	3	0.223	0.207
	A11		0.180	
	A12		0.225	
	B10		0.211	
	B11		0.215	
	B12		0.190	

Copyright © 2004 Molecular Devices. All rights reserved.

American Society for Testing and Materials

ASTM INTERNATIONAL ORGANIZATIONAL MEMBER

NREP

National Registry of Environmental Professionals

American Council of Independent Laboratories

ACIL

AOAC INTERNATIONAL

The Scientific Association Dedicated to Excellence in Analytical Methods.

MISSOURI BIOTECHNOLOGY ASSOCIATION

MOBIO

BioBelt SM

The Center of Plant and Life Sciences

Plant and Life Sciences Technology Gateway-Regional Commerce Growth Association of St. Louis, Missouri

CSREES EDUCATION RESEARCH EXTENSION USDA

Cooperative State Research, Education And Extension Service [SBIR Recipient]

the MiL, Inc. 7259 Lansdowne Avenue Suite 200 St. Louis MO 63119-3421
Phone: (800) 688-9144 Fax: (314) 645-2544

Warranty And Limits Of Liability

In accepting analytical work, we warrant the accuracy of test results under the conditions employed in the laboratory. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. We disclaim any other warranties, expressed or implied, including a Warranty of Fitness for Particular Purpose and Warranty of Merchantability. We accept no legal responsibility for the purposes for which the client uses the test results.

"Excellence in Microbiology"

Advanced Technology Serving The Needs Of:

- Environmental Engineers
- Water Quality Specialists
- Commercial & Residential Realtors
- Food & Beverage Processors
- Packing Industry Professionals
- Research & Analytical Laboratories
- Law & Regulatory Agencies
- Pharmaceutical Manufacturers

the MiL, Inc.

MICROBE INOTECH LABORATORIES, INC.

7259 Lansdowne Ave Suite 200
SAINT LOUIS MO, 63119-3421

TELEPHONE: (800) 688-9144
(314) 645-2177
FAX: (314) 645-2544
WEB: www.microbeinotech.com
EMAIL: info@microbeinotech.com

RECEIVED
NOV 2013

REPORT OF ANALYSES

PREPARED BY:

MICROBE INOTECH LABORATORIES, INC.

the MiL, Inc.

Celebrating 20 Years of Excellence in Microbiology and Service

MICROBE INOTECH LABORATORIES, INC., 7259 LANSDOWNE AVENUE, SUITE 200, ST. LOUIS, MO 63119-3421
(800) 688-9144 • (314) 645-2177 • FAX (314) 645-2544 • info@microbeinotech.com

Microbe Inotech Laboratories, Inc.
Summary Report of Analysis
[MILB –0135E]

Joan Kessner
Washington Closure Hanford
2620 Fermi Ave.
Richland, WA 99354
Phone: 509-375-4688
Email: jhkessner@wch-rcc.com; rlweiss@wch-rcc.com

November 6, 2013

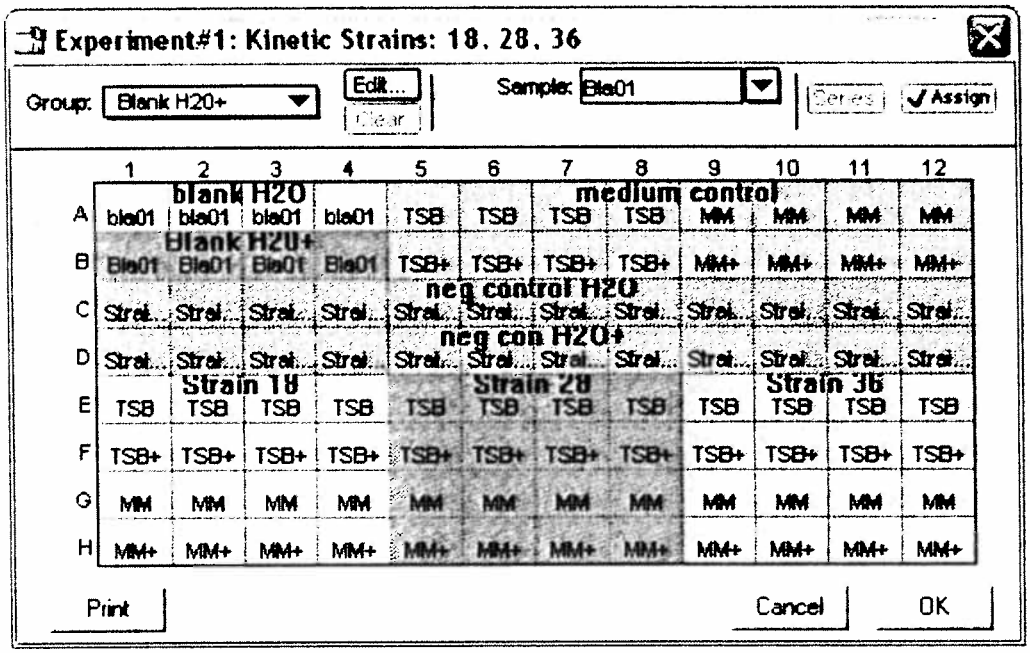
Description and Chain of Custody Record Information:

- Wednesday September11, 2013: Client requested that 6 strains be used for a kinetic assay with against nutrients
- MiL, Inc. REPORT and Invoice No.: MILB-0135E

Processing:

The tested bacterial strains were grown overnight on Trypticase Soy (Broth) Agar (TSA) at 30°C and then suspended in sterile saline to a turbidity of 40%-50%T. The strains are then aliquotted into a 96-well microtiter plate that contains an undisclosed growth medium of mineral salts, vitamins and buffer without a major carbon source. The wells also contain a tetrazolium dye redox indicator system. Bacterial growth (metabolic respiration/oxidation of carbon sources) is monitored by tetrazolium reduction as measured at 590nm in a microplate reader. Trypticase Soy Broth (TSB) serves as a major carbon source and a positive control for bacterial growth and water serves as the negative control for bacterial growth in this assay. Davis Minimal Broth (MM) also served as a major carbon source and a positive control for bacterial growth. Additionally oxygenated water was used as a bacterial growth supplement with the two agars. Total volume of each well is 150μL. Readings were taken at 20 minute intervals over a time period of 48 hours. At 48 hours an endpoint reading was taken.

96-well plate template



Template Key:
Columns 1, 2, 3, 4; Row A: Sterile Water Blank
Columns 1, 2, 3, 4; Row B: Sterile Oxygenated Water Blank
Columns 5, 6, 7, 8; Row A: Medium Control: TSB + Water
Columns 5, 6, 7, 8; Row B: Medium Control: TSB + Oxygenated Water
Columns 9, 10, 11, 12; Row A: Medium Control: MM + Water
Columns 9, 10, 11, 12; Row B: Medium Control: MM + Oxygenated Water
Columns 1, 2, 3, 4: Row C: Negative Control: Strain 2 or 18 Inoculum + Water
Columns 5, 6, 7, 8: Row C: Negative Control: Strain 11 or 28 Inoculum + Water
Columns 9, 10, 11, 12: Row C; Negative Control: Strain 17 or 36 Inoculum + Water
Columns 1, 2, 3, 4: Row D: Negative Control: Strain 2 or 18 Inoculum + Oxygenated Water
Columns 5, 6, 7, 8: Row D: Negative Control: Strain 11 or 28 Inoculum + Oxygenated Water
Columns 9, 10, 11, 12: Row D; Negative Control: Strain 17 or 36 Inoculum + Oxygenated Water
Columns 1, 2, 3, 4; Row E: Positive Growth TSB: TSB + Strain 2 or 18 Inoculum + Water
Columns 5, 6, 7, 8; Row E: Positive Growth TSB: TSB + Strain 11 or 26 Inoculum + Water
Columns 9, 10, 11, 12; Row E: Positive Growth TSB: TSB + Strain 17 or 36 Inoculum + Water
Columns 1, 2, 3, 4; Row F: Positive Growth TSB+: TSB + Strain 2 or 18 Inoculum + Oxygenated Water
Columns 5, 6, 7, 8; Row F: Positive Growth TSB+: TSB + Strain 11 or 28 Inoculum + Oxygenate Water
Columns 9, 10, 11, 12; Row F: Positive Growth TSB+: TSB + Strain 17 or 36 Inoculum + Oxygenated Water
Columns 1, 2, 3, 4; Row G: Positive Growth: MM + Strain 2 or 18 Inoculum + Water

the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Columns 5, 6, 7, 8; Row G: Positive Growth: MM + Strain 11 or 28 Inoculum+ Water
Columns 9, 10, 11, 12; Row G: Positive Growth MM: MM + Strain 17 or 36 Inoculum + Water
Columns 1, 2, 3, 4; Row H: positive Growth MM+: MM+ + Strain 2 or 18 Inoculum + Oxygenated Water
Columns 5, 6, 7, 8; Row H: Positive Growth MM+: MM + Strain 11 or 28 Inoculum + Oxygenated Water
Columns 9, 10, 11, 12; Row H: Positive Growth MM+: MM + Strain 17 or 36 Inoculum + Oxygenated Water

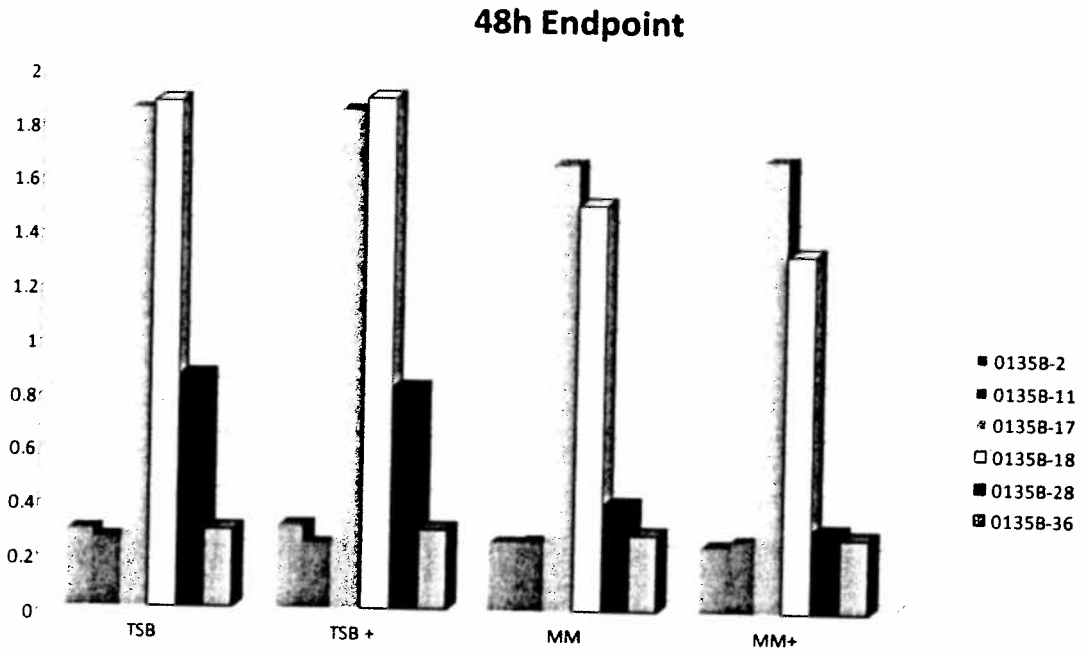
After completion of the kinetic assay run with reading at 590nm every 20 minutes, an endpoint assay was read.

See attached for Kinetic Assay Data.

Aerobic Endpoint Assay Results for All Strains plus Nutrients:

Total growth is measured after 48 hours of incubation at 30°C. The data is processed and given with background blank values subtracted. Bar-chart interpretation of the data is provided on the pages following the executive summary report of analysis. The design template of the experiment is located in the raw data section of this report. The template shows the arrangement and position of strains in the matrix.

The following chart shows the relationship between the strains and the various types of media. This information is used to compare with the results from the report 0135D.



the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Raw data can be found in appendix attached to the signed hard copy

Thank you from the staff on project:

Michele R. Gossett
Laboratory Manager

Benjamin M. Winkler
Research Laboratory Manager

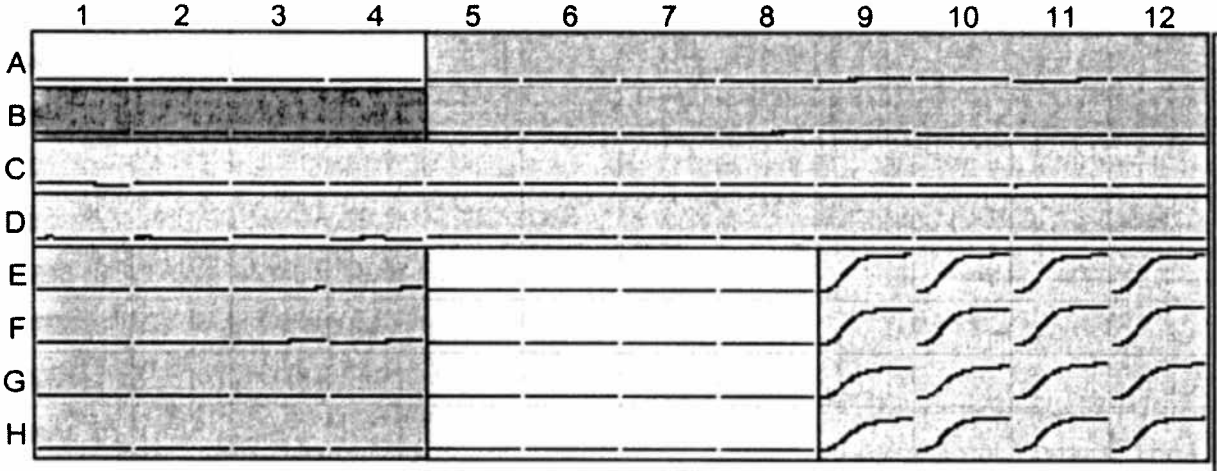
the MiL, inc. 7259 LANSDOWNE AVENUE SUITE 200 ST. LOUIS MO 63119-3421
PHONE: (800) 688-9144 FAX: (314) 645-2544

Experiment#1

0135E Washington Closure
Kinetic Assay: Strains 2, 11, and 17
3 Strains versus nutrients

Vmax

Kinetic strains: 2,11,17 nutonly



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 0.0 Range 0.0 - 0.0
Data Mode: Absorbance
Reader: Vmax ROM v--

Plate Last Read:
5:38 PM 11/1/2013

Strain 2

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.001	0.007
	G2		0.008	
	G3		0.011	
	G4		0.009	
MM+	H1	2	0.003	0.007
	H2		0.008	
	H3		0.008	
	H4		0.010	
TSB	E1	3	0.012	0.032
	E2		0.028	
	E3		0.041	
	E4		0.047	
TSB+	F1	4	0.013	0.036
	F2		0.025	
	F3		0.055	
	F4		0.050	

Copyright © 2004 Molecular Devices. All rights reserved.

Strain 17

Sample	Wells	Sample#	Values	MeanValue
MM	G9	1	0.521	0.563
	G10		0.547	
	G11		0.592	
	G12		0.591	
MM+	H9	2	0.558	0.577
	H10		0.584	
	H11		0.579	
	H12		0.586	
TSB	E9	3	0.625	0.633
	E10		0.631	
	E11		0.640	
	E12		0.635	
TSB+	F9	4	0.616	0.639
	F10		0.618	
	F11		0.660	
	F12		0.664	

Strain 11

Sample	Wells	Sample#	Values	MeanValue
MM	G5	1	0.012	0.012
	G6		0.009	
	G7		0.012	
	G8		0.014	
MM+	H5	2	0.009	0.010
	H6		0.008	
	H7		0.013	
	H8		0.009	
TSB	E5	3	0.016	0.014
	E6		0.014	
	E7		0.014	
	E8		0.014	
TSB+	F5	4	0.014	0.014
	F6		0.015	
	F7		0.013	
	F8		0.012	

Strain 1

Sample	Wells	Sample#	Values	MeanValue

Copyright © 2004 Molecular Devices. All rights reserved.

neg control H2O

Sample	Wells	Sample#	Values	MeanValue
Strain 11	C5	1	0.004	-0.000
	C6		-0.002	
	C7		-0.001	
	C8		-0.003	
Strain 17	C9	2	0.005	0.001
	C10		0.000	
	C11		-0.002	
	C12		0.001	
Strain 2	C1	3	-0.006	-0.002
	C2		-0.001	
	C3		-0.002	
	C4		0.002	

neg con S3 H2O

Sample	Wells	Sample#	Values	MeanValue

neg con S2 H2O

Sample	Wells	Sample#	Values	MeanValue

neg con S1 H2O

Sample	Wells	Sample#	Values	MeanValue

neg con H2O+

Sample	Wells	Sample#	Values	MeanValue
Strain 11	D5	1	-0.004	-0.005
	D6		-0.005	
	D7		-0.005	
	D8		-0.005	
Strain 17	D9	2	-0.000	-0.002
	D10		-0.002	
	D11		-0.004	
	D12		-0.000	
Strain 2	D1	3	-0.009	-0.003
	D2		-0.002	
	D3		0.002	
	D4		-0.002	

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue

Copyright © 2004 Molecular Devices. All rights reserved.

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.010	0.012
	A2		0.012	
	A3		0.014	
	A4		0.012	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.004	0.003
	B2		0.002	
	B3		0.005	
	B4		0.002	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.009	0.006
	A10		0.004	
	A11		0.004	
	A12		0.007	
MM+	B9	2	0.001	0.002
	B10		0.002	
	B11		0.002	
	B12		0.003	
TSB	A5	3	0.000	0.001
	A6		0.003	
	A7		0.001	
	A8		0.002	
TSB+	B5	4	0.002	0.003
	B6		0.000	
	B7		0.001	
	B8		0.011	

Sample 2

Sample	Wells	Sample#	Values	MeanValue

Sample 1

Sample	Wells	Sample#	Values	MeanValue

Copyright © 2004 Molecular Devices. All rights reserved

pos growth

Sample	Wells	Sample#	Values	MeanValue

neg con

Sample	Wells	Sample#	Values	MeanValue

Experiment#2

0135E Washngton Closure
Endpoint Assay: Strains 2,11, and 17
3 Strains versus nutrients

Endpoint Strain 2,11,17 nutonly

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.158	0.148	0.155	0.158	0.162	0.149	0.143	0.150	0.191	0.194	0.178	0.210
B	0.141	0.140	0.151	0.153	0.155	0.145	0.159	0.181	0.195	0.171	0.170	0.173
C	0.168	0.197	0.198	0.194	0.207	0.200	0.190	0.181	0.208	0.193	0.186	0.198
D	0.154	0.170	0.190	0.170	0.211	0.218	0.221	0.212	0.214	0.200	0.183	0.193
E	0.247	0.272	0.302	0.316	0.269	0.255	0.242	0.259	1.835	1.855	1.851	1.838
F	0.236	0.277	0.371	0.344	0.244	0.244	0.238	0.237	1.799	1.803	1.900	1.899
G	0.236	0.261	0.259	0.252	0.257	0.245	0.253	0.262	1.553	1.599	1.727	1.728
H	0.238	0.245	0.243	0.248	0.260	0.255	0.283	0.258	1.627	1.683	1.679	1.705

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
5:03 PM 11/3/2013

Wavelength Combination: !Lm1
Mean Temperature: 0.0
Data Mode: Absorbance
Reader: Vmax ROM v--

Copyright © 2004 Molecular Devices. All rights reserved.

Strain 2

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.236	0.252
	G2		0.261	
	G3		0.259	
	G4		0.252	
MM+	H1	2	0.238	0.244
	H2		0.245	
	H3		0.243	
	H4		0.248	
TSB	E1	3	0.247	0.284
	E2		0.272	
	E3		0.302	
	E4		0.316	
TSB+	F1	4	0.236	0.307
	F2		0.277	
	F3		0.371	
	F4		0.344	

Strain 17

Sample	Wells	Sample#	Values	MeanValue
MM	G9	1	1.553	1.652
	G10		1.599	
	G11		1.727	
	G12		1.728	
MM+	H9	2	1.627	1.674
	H10		1.683	
	H11		1.679	
	H12		1.705	
TSB	E9	3	1.835	1.845
	E10		1.855	
	E11		1.851	
	E12		1.838	
TSB+	F9	4	1.799	1.850
	F10		1.803	
	F11		1.900	
	F12		1.899	

Copyright © 2004 Molecular Devices. All rights reserved.

Strain 11

Sample	Wells	Sample#	Values	MeanValue
MM	G5	1	0.257	0.254
	G6		0.245	
	G7		0.253	
	G8		0.262	
MM+	H5	2	0.260	0.264
	H6		0.255	
	H7		0.283	
	H8		0.258	
TSB	E5	3	0.269	0.256
	E6		0.255	
	E7		0.242	
	E8		0.259	
TSB+	F5	4	0.244	0.241
	F6		0.244	
	F7		0.238	
	F8		0.237	

neg control H2O

Sample	Wells	Sample#	Values	MeanValue
Strain 11	C5	1	0.207	0.195
	C6		0.200	
	C7		0.190	
	C8		0.181	
Strain 17	C9	2	0.208	0.196
	C10		0.193	
	C11		0.186	
	C12		0.198	
Strain 2	C1	3	0.168	0.189
	C2		0.197	
	C3		0.198	
	C4		0.194	

neg con H2O+

Sample	Wells	Sample#	Values	MeanValue
Strain 11	D5	1	0.211	0.216
	D6		0.218	
	D7		0.221	
	D8		0.212	
Strain 17	D9	2	0.214	0.198
	D10		0.200	
	D11		0.183	
	D12		0.193	
Strain 2	D1	3	0.154	0.171
	D2		0.170	
	D3		0.190	
	D4		0.170	

Copyright © 2004 Molecular Devices. All rights reserved.

Negative Control TSB

Sample	Wells	Sample#	Values	MeanValue
TSB		1		

Negative Control MM

Sample	Wells	Sample#	Values	MeanValue
MM		1		

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.158	0.155
	A2		0.148	
	A3		0.155	
	A4		0.158	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.141	0.146
	B2		0.140	
	B3		0.151	
	B4		0.153	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.191	0.193
	A10		0.194	
	A11		0.178	
	A12		0.210	
MM+	B9	2	0.195	0.177
	B10		0.171	
	B11		0.170	
	B12		0.173	
TSB	A5	3	0.162	0.151
	A6		0.149	
	A7		0.143	
	A8		0.150	
TSB+	B5	4	0.155	0.160
	B6		0.145	
	B7		0.159	
	B8		0.181	

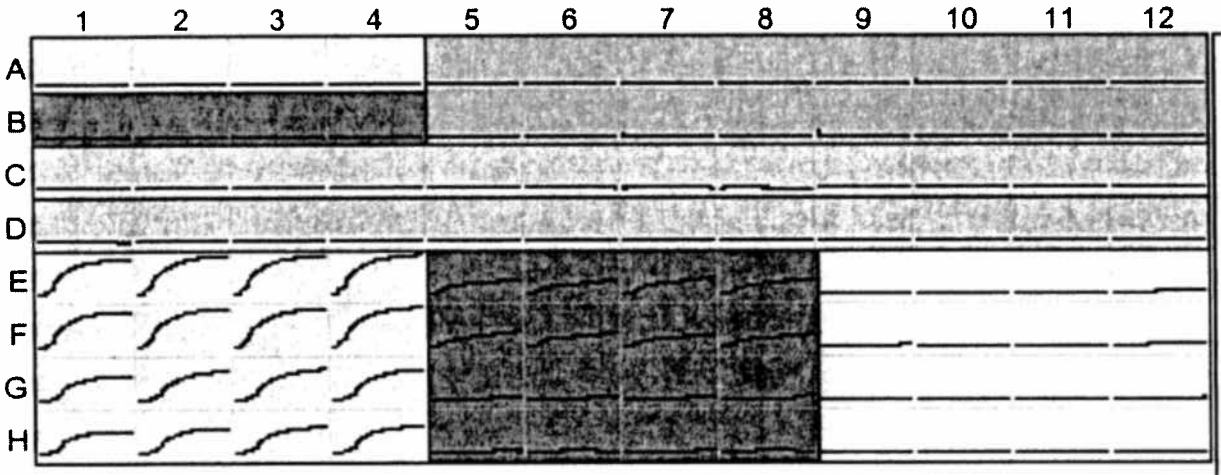
Copyright © 2004 Molecular Devices. All rights reserved.

Experiment#1

0135E Washington Closure
Kinetic Assay: Strains 18, 28, and 36
3 Strains versus nutrients

Vmax

Kinetic Strains: 18, 28, 36



Kinetic
Time: 48:00:00
Interval: 20:00
Reads: 145

Lm1 650

Automix: On
Calibrate: On

Lag Time: 0:00
End Time: 48:00:00
OD Min: 0
OD Max: 2
Vmax Pts: 145/145

Wavelength Combination: !Lm1
Mean Temperature: 0.0 Range 0.0 - 0.0
Data Mode: Absorbance
Reader: Vmax ROM v--

Plate Last Read:
5:39 PM 11/3/2013

Strain 36

Sample	Wells	Sample#	Values	MeanValue
MM	G9	1	0.015	0.013
	G10		0.014	
	G11		0.010	
	G12		0.012	
MM+	H9	2	0.012	0.011
	H10		0.011	
	H11		0.011	
	H12		0.011	
TSB	E9	3	0.010	0.026
	E10		0.021	
	E11		0.022	
	E12		0.051	
TSB+	F9	4	0.040	0.028
	F10		0.024	
	F11		0.021	
	F12		0.025	

Copyright © 2004 Molecular Devices. All rights reserved.

Strain 28

Sample	Wells	Sample#	Values	MeanValue
MM	G5	1	0.067	0.062
	G6		0.059	
	G7		0.061	
	G8		0.060	
MM+	H5	2	0.033	0.029
	H6		0.024	
	H7		0.033	
	H8		0.025	
TSB	E5	3	0.206	0.214
	E6		0.192	
	E7		0.237	
	E8		0.220	
TSB+	F5	4	0.239	0.199
	F6		0.191	
	F7		0.183	
	F8		0.182	

Strain 18

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	0.417	0.506
	G2		0.516	
	G3		0.548	
	G4		0.543	
MM+	H1	2	0.360	0.427
	H2		0.428	
	H3		0.455	
	H4		0.466	
TSB	E1	3	0.517	0.554
	E2		0.567	
	E3		0.562	
	E4		0.568	
TSB+	F1	4	0.532	0.560
	F2		0.562	
	F3		0.576	
	F4		0.570	

Copyright © 2004 Molecular Devices. All rights reserved.

neg control H2O

Sample	Wells	Sample#	Values	MeanValue
Strain 18	C1	1	-0.006	-0.002
	C2		0.001	
	C3		-0.000	
	C4		-0.002	
Strain 28	C5	2	-0.002	-0.002
	C6		-0.002	
	C7		-0.001	
	C8		-0.003	
Strain 36	C9	3	-0.003	-0.000
	C10		0.000	
	C11		0.002	
	C12		0.001	

neg con H2O+

Sample	Wells	Sample#	Values	MeanValue
Strain 18	D1	1	-0.009	-0.003
	D2		-0.001	
	D3		-0.002	
	D4		-0.001	
Strain 28	D5	2	-0.002	-0.002
	D6		-0.002	
	D7		-0.001	
	D8		-0.001	
Strain 36	D9	3	-0.001	0.001
	D10		-0.000	
	D11		0.001	
	D12		0.002	

blank H2O

Sample	Wells	Sample#	Values	MeanValue
bla01	A1	1	0.006	0.008
	A2		0.008	
	A3		0.007	
	A4		0.012	

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.003	0.003
	B2		0.004	
	B3		0.004	
	B4		0.002	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.005	0.003
	A10		0.001	
	A11		0.003	
	A12		0.003	
MM+	B9	2	-0.002	0.002
	B10		0.001	
	B11		0.003	
	B12		0.003	
TSB	A5	3	0.003	0.003
	A6		0.003	
	A7		0.002	
	A8		0.005	
TSB+	B5	4	0.001	0.002
	B6		0.002	
	B7		-0.000	
	B8		0.003	

Experiment#2

0135E Washngton Closure
Endpoint Assay: Strains 18, 28, 36
3 Strains versus nutrients

Endpoint Strains 18,28 36

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.162	0.166	0.172	0.170	0.158	0.123	0.127	0.142	0.138	0.156	0.132	0.165
B	0.174	0.138	0.162	0.162	0.153	0.122	0.162	0.121	0.166	0.139	0.131	0.130
C	0.178	0.211	0.194	0.201	0.181	0.180	0.177	0.172	0.208	0.228	0.227	0.224
D	0.177	0.187	0.200	0.190	0.202	0.191	0.191	0.191	0.222	0.204	0.211	0.211
E	1.729	1.914	1.924	1.947	0.872	0.831	0.882	0.856	0.252	0.286	0.271	0.355
F	1.773	1.919	1.930	1.956	0.913	0.820	0.765	0.788	0.306	0.271	0.283	0.318
G	1.295	1.519	1.605	1.596	0.385	0.351	0.362	0.470	0.277	0.279	0.280	0.295
H	1.175	1.316	1.394	1.415	0.296	0.276	0.358	0.281	0.277	0.270	0.277	0.290

Endpoint
Lm1 650
Automix: Once
Calibrate: On

Plate Last Read:
5:40 PM 11/5/2013

Wavelength Combination: !Lm1
Mean Temperature: 0.0
Data Mode: Absorbance
Reader: Vmax ROM v--

Copyright © 2004 Molecular Devices. All rights reserved.

Strain 36

Sample	Wells	Sample#	Values	MeanValue
MM	G9	1	0.277	0.283
	G10		0.279	
	G11		0.280	
	G12		0.295	
MM+	H9	2	0.277	0.279
	H10		0.270	
	H11		0.277	
	H12		0.290	
TSB	E9	3	0.252	0.291
	E10		0.286	
	E11		0.271	
	E12		0.355	
TSB+	F9	4	0.306	0.295
	F10		0.271	
	F11		0.283	
	F12		0.318	

Strain 28

Sample	Wells	Sample#	Values	MeanValue
MM	G5	1	0.385	0.392
	G6		0.351	
	G7		0.362	
	G8		0.470	
MM+	H5	2	0.296	0.303
	H6		0.276	
	H7		0.358	
	H8		0.281	
TSB	E5	3	0.872	0.860
	E6		0.831	
	E7		0.882	
	E8		0.856	
TSB+	F5	4	0.913	0.822
	F6		0.820	
	F7		0.765	
	F8		0.788	

Strain 18

Sample	Wells	Sample#	Values	MeanValue
MM	G1	1	1.295	1.504
	G2		1.519	
	G3		1.605	
	G4		1.596	
MM+	H1	2	1.175	1.325
	H2		1.316	
	H3		1.394	
	H4		1.415	
TSB	E1	3	1.729	1.879
	E2		1.914	
	E3		1.924	
	E4		1.947	
TSB+	F1	4	1.773	1.895
	F2		1.919	
	F3		1.930	
	F4		1.956	

neg control H2O

Sample	Wells	Sample#	Values	MeanValue
Strain 18	C1	1	0.178	0.196
	C2		0.211	
	C3		0.194	
	C4		0.201	
Strain 28	C5	2	0.181	0.178
	C6		0.180	
	C7		0.177	
	C8		0.172	
Strain 36	C9	3	0.208	0.222
	C10		0.228	
	C11		0.227	
	C12		0.224	

neg con H2O+

Sample	Wells	Sample#	Values	MeanValue
Strain 18	D1	1	0.177	0.189
	D2		0.187	
	D3		0.200	
	D4		0.190	
Strain 28	D5	2	0.202	0.194
	D6		0.191	
	D7		0.191	
	D8		0.191	
Strain 36	D9	3	0.222	0.212
	D10		0.204	
	D11		0.211	
	D12		0.211	

Copyright © 2004 Molecular Devices. All rights reserved.

Blank H20+

Sample	Wells	Sample#	Values	MeanValue
Bla01	B1	1	0.174	0.160
	B2		0.136	
	B3		0.167	
	B4		0.162	

medium control

Sample	Wells	Sample#	Values	MeanValue
MM	A9	1	0.138	0.148
	A10		0.156	
	A11		0.132	
	A12		0.165	
MM+	B9	2	0.166	0.142
	B10		0.139	
	B11		0.131	
	B12		0.130	
TSB	A5	3	0.158	0.138
	A6		0.123	
	A7		0.127	
	A8		0.142	
TSB+	B5	4	0.153	0.140
	B6		0.122	
	B7		0.162	
	B8		0.121	

Copyright © 2004 Molecular Devices. All rights reserved.

American Society for Testing and Materials

ASTM INTERNATIONAL ORGANIZATIONAL MEMBER

NREP

National Registry of Environmental Professionals

American Council of Independent Laboratories

ACIL

AOAC INTERNATIONAL

The Scientific Association Dedicated to Excellence in Analytical Methods.

MISSOURI BIOTECHNOLOGY ASSOCIATION

MOBIO

BioBelt SM

The Center of Plant and Life Sciences

Plant and Life Sciences Technology Gateway-Regional Commerce Growth Association of St. Louis, Missouri

CSREES

EDUCATION • RESEARCH • EXTENSION • USDA

Cooperative State Research, Education And Extension Service [SBIR Recipient]

the MiL, Inc. 7259 Lansdowne Avenue Suite 200 St. Louis MO 63119-3421

Phone: (800) 688-9144 Fax: (314) 645-2544

Warranty And Limits Of Liability

In accepting analytical work, we warrant the accuracy of test results under the conditions employed in the laboratory. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. We disclaim any other warranties, expressed or implied, including a Warranty of Fitness for Particular Purpose and Warranty of Merchantability. We accept no legal responsibility for the purposes for which the client uses the test results.

"Excellence in Microbiology"

Advanced Technology Serving The Needs Of:

Environmental Engineers
Water Quality Specialists
Commercial & Residential Realtors
Food & Beverage Processors
Packing Industry Professionals
Research & Analytical Laboratories
Law & Regulatory Agencies
Pharmaceutical Manufacturers

the MiL, Inc.

MICROBE INOTECH LABORATORIES, INC.

7259 Lansdowne Ave Suite 200
SAINT LOUIS MO, 63119-3421

TELEPHONE: **(800) 688-9144**
(314) 645-2177
FAX: **(314) 645-2544**
WEB: **www.microbeinotech.com**
EMAIL: **info@microbeinotech.com**

Warranty And Limits Of Liability

In accepting analytical work, we warrant the accuracy of test results under the conditions employed in the laboratory. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. We disclaim any other warranties, expressed or implied, including a Warranty of Fitness for Particular Purpose and Warranty of Merchantability. We accept no legal responsibility for the purposes for which the client uses the test results.

"Excellence in Microbiology"

Advanced Technology Serving The Needs Of:

Environmental Engineers
Water Quality Specialists
Commercial & Residential Realtors
Food & Beverage Processors
Packing Industry Professionals
Research & Analytical Laboratories
Law & Regulatory Agencies
Pharmaceutical Manufacturers

the MiL, Inc.

MICROBE INOTECH LABORATORIES, INC.

7259 Lansdowne Ave Suite 200
SAINT LOUIS MO, 63119-3421

TELEPHONE: **(800) 688-9144**
(314) 645-2177
FAX: **(314) 645-2544**
WEB: **www.microbeinotech.com**
EMAIL: **info@microbeinotech.com**