MICROGEN
BIOPRODUCTS

Microgen™ GnA+B-ID System

An identification system for all currently recognised Enterobacteriaceae and an extensive range of oxidase-positive Gram negative Bacilli

Instructions for Use

REF **MID-64CE** **A microwell test strip** 60

REF **MID-65CE** **B microwell test strip** 24

CE

IVD

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MICROGEN GN ID

Quick Reference

	GN A	GN A+B	GN A+B
OXIDASE	**NEGATIVE**	**NEGATIVE**	**POSITIVE**
INOCULUM	1 colony in 3ml saline	1 colony in 5ml saline	1 colony in 5ml saline Add 1 drop sterile horse serum /ml saline if ***Actinobacillus*** or ***Pasteurella spp.*** suspected.
INOCULATION	3-4 drops (100µl) per well	3-4 drops (100µl) per well	3-4 drops (100µl) per well
OVERLAY WITH OIL	Well 1 – Lysine Well 2 – Ornithine Well 3 – H_2S Well 9 - Urease	Wells 1, 2, 3 and 9 plus **Well 20 – Arabinose** Well 24 – Arginine	**Wells 1, 2, 3 and 9 plus** Well 24 – Arginine
INCUBATION TIME	18 - 24 hours	18 - 24 hours	48 hours
TEMPERATURE	35 - 37°C	35 - 37°C	35 - 37°C (25°C for ***Ps. fluorescens***)
INITIAL READINGS			
ADDITION OF REAGENTS	Well 8: Indole - Add 2 drops Kovac's reagent. Read after 60 seconds Well 10: VP – Add 1 drop VPI reagent and 1 drop VPII reagent. Read after 15-30mins Well 12: TDA – Add 1 drop of TDA reagent and read after 60 seconds	As for GN A Gelatin: Interpret at 24 hours Well 24: Arginine - Yellow = Negative Green/Blue = Positive	As for GN A Well 7 – record ONPG result. Add 1 drop Nitrate A+1 drop Nitrate B – read after 60 seconds Gelatin – interpret at 48 hours Well 24: Arginine - Yellow = Negative Blue = Positive
FINAL READING (Optional Microgen Software)			

Note: A black circle around the top of a well indicates a well requiring the addition of mineral oil prior to incubation. A broken black circle around a well requires the addition of mineral oil prior to incubation only if the isolate is oxidase negative. A green circle around the top of a well indicates a well requiring addition of reagents after incubation.

INTENDED USE

The Microgen GN-ID system employs 12 (GN A) or 24 (GN A+B) standardised biochemical substrates in microwells to identify the family *Enterobacteriaceae* and other non-fastidious gram negative bacilli (oxidase negative and positive). The kit is intended for professional laboratory use only.

PRINCIPLE OF THE TEST

The Microgen GN-ID system comprises two separate microwell test strips GN A and GN B). Each Microwell test strip contains 12 standardised biochemical substrates which have been selected on the basis of extensive computer analysis (1) of published databases for the identification of the family *Enterobacteriaceae* and commonly encountered non-fastidious oxidase positive and negative gram negative bacilli (2,3,4,5). The dehydrated substrates in each well are reconstituted with a saline suspension of the organism to be identified. If the individual substrates are metabolised by the organism, a colour change occurs during incubation or after addition of specific reagents (see Substrate Reference Table). The permutation of metabolised substrates can be interpreted using the Microgen Identification System Software (MID-60) to identify the test organism.
The GN A microwell test strip is intended for the identification of oxidase negative, nitrate positive glucose fermenters comprising the most commonly occurring genera of the family *Enterobacteriacea*.
The GN A and GN B microwell test strips are used together to produce a 24 substrate system to identify non-fastidious gram negative bacilli (oxidase negative and positive) in addition to all currently recognised species of the family *Enterobacteriacea* (28 genera) - see data tables.
The GN B microwell test strip is designed to be used in conjunction with the GN A strip and not on its own.

CONT

KIT PRESENTATION

GN	A

MID-64 GN-ID A microwell test strip 60 A Test strips

microwell test strips containing 12 biochemical substrates for identification of GN A organisms - see data tables

Holding frame microwell test strip
Result forms
Instructions for Use

GN	B

MID-65 GN-ID B microwell test strip 24 B Test strips

Microwell test strips containing 12 biochemical substrates to be used with GN A microwell test strip for identification of GN B organisms - see data tables

Instructions for Use

Additional Requirements:

a) Microgen Identification System Software (MID-60) - Provides identification based on probability, % probability and likelihood with an analysis of the quality of differentiation. Full definition of these terms is provided with the software Help manual.
b) Oxidase Strips (6)
c) Mineral Oil
d) VP I and VP II Reagents (7)
e) Nitrate A&B Reagents (8)
f) TDA Reagent (9)
g) Kovac's Reagent (10)
h) Colour chart for reading results – A4 size available from your distributor on request.

i) Sterile 0.85% saline
j) Sterile pipettes and bacteriological loops
k) Incubator, not fan-assisted (35-37°C)
l) Motility medium
m) Sterile horse serum (if *Actinobacillus spp.* or *Pasteurella spp.* are suspected
n) Bunsen burner.
(To ensure correct colour response Items b-g should be purchased from Microgen Bioproducts Ltd.)

WARNINGS AND PRECAUTIONS
Safety:

1. The reagents supplied in this kit are for in vitro diagnostic use only
2. Appropriate precautions should be taken when handling or disposing of potential pathogens. After use, dispose of all contaminated materials by autoclaving, incineration or immersion in an appropriate disinfectant e.g. sodium hypochlorite at a final concentration of 3% for 30 minutes. Liquid waste containing acid must be neutralised before treatment.

Procedural:

1. The Microgen GN-ID system should be used according to the kit instructions.
2. The microwell test strips must **not** be incubated in a CO_2 incubator
3. Due to their more demanding nutritional requirements, *Actinobacillus spp.* and *Pasteurella spp.* will require the addition of some form of enrichment to the inoculum. The addition of 1 drop of sterile inactivated horse serum per mL of sterile saline when preparing the inoculum is recommended.
4. If *Pseudomonas fluorescens* is suspected, the microwell test strips A & B should be incubated at 25°C.
5. Incorrect incubation, inadequate filling of wells, or inadequate inoculum density may give false results.

STORAGE AND SHELF LIFE

GN A and GN B microwell test strips are stable in unopened foil pouches at 2-8°C until the expiry date on the label. Opened and partially used pouches of microwell test strips can be stored for up to 14 days at 2-8°C provided that the pouch is resealed and contains the desiccant sachets.

SPECIMENS

A pure 18-24 hour culture of the bacterial isolate to be identified must always be used. An oxidase test must be carried out on the isolate prior to microwell test strip inoculation

PROCEDURE - INOCULATION AND INCUBATIONS

1. Carry out an oxidase test on the isolate. Oxidase positive organisms can only be identified by inoculating both GN A and GN B microwell test strips.
2. Emulsify a single colony from an 18-24 hour culture in 3mL sterile 0.85% saline for the GN A microwell test strip . If both GN A and GN B microwell test strips are to be inoculated, the colony should be emulsified in 3-5mL sterile 0.85% saline. Mix thoroughly.
3. Carefully peel back the adhesive tape sealing the microwell test strip (s). **Do NOT discard the sealing strip(s) as they will be required later.**
4. Using a sterile pasteur pipette, add 3-4 drops (approximately 100µL) of the bacterial suspension to each well of the microwell test strip(s).
5. As a purity check, transfer 1 drop of the bacterial suspension on to a purity plate using a non-selective differential medium. Incubate the plate aerobically at 35-37°C for 18-24 hours.
6. After inoculation, overlay wells 1,2,3 and 9 (GN A microwell test strip counting from the tabbed end) and wells 20 and 24 (GN B microwell test strip - well 13 is at the tabbed end) with 3-4 drops of mineral oil**. (NB Do NOT overlay well 20 if isolate is oxidase positive).**
7. These wells are highlighted with a black circle (broken black circle in the case of well 20) around the well to assist in decision making in respect of oil overlays.

8. Seal the top of the microwell test strip (s) with the adhesive tape removed earlier and incubate at 35-37°C**. Ensure that the punctures in the adhesive tape are over wells 7, 11 and 12 in the GN A strip and over well 14 in the GN B strip.**
9. The GN A and GN B microwell test strips are read after 18-24 hours incubation for *Enterobacteriaceae*, and after 48 hours for oxidase positive isolates.

PROCEDURE - READING AND ADDITION OF REAGENTS

GN A Strip

1. Remove the adhesive tape and record all positive reactions with the aid of the colour chart (included in this booklet). Record the results on the forms provided.
2. Add the appropriate reagents to the following microwells:
   a) Add 2 drops of Kovac's reagent to well 8. Read and record the results after 60 seconds. Formation of a red colour indicates a positive result.
   b) Add 1 drop of VP I reagent and 1 drop of VP II reagent to well 10 and read after 15-30 minutes. Formation of a deep pink/red colour indicates a positive result.
   c) Add 1 drop of TDA reagent to well 12 and read after 60 seconds. Formation of a cherry red colour indicates a positive result.
3. For oxidase positive organisms, perform the nitrate reduction test on well 7 after reading and recording the ONPG result. Add 1 drop of Nitrate A reagent and 1 drop of Nitrate B reagent to the well and read after 60 seconds. The development of a red colour indicates that nitrate has been reduced to nitrite. If well 7 remains yellow or colourless after addition of nitrate reagents, add a small amount of zinc powder. This will indicate whether nitrate has been completely reduced to nitrogen gas.
   i.e. After addition of Nitrate A + B:
   Red = Positive
   Colourless/Yellow = Negative

   After addition of zinc powder:
   Colourless/Yellow = Positive
   Red = Negative
4. Record these additional results on the forms provided.

GN B Strip

1. Remove the adhesive tape and record all positive reactions with the aid of the colour chart. Record the results on the forms provided.
2. Read specific well as follows:
   a) the gelatin well (13) must be read after 18-24 hours for *Enterobacteriaceae* and after 48 hours for oxidase positive isolates. A positive gelatin liquefaction result is indicated by black particles visible throughout the well.
   b) The arginine well is interpreted differently after 24 hours and 48 hours incubations:
      24 hours *(Enterobacteriaceae)*
      Yellow = Negative
      Green/Blue = Positive

      48 hours (Oxidase positive organisms)
      Yellow/Green = Negative
      Blue = Positive

IDENTIFICATION

On the Microgen GN-ID A+B Report Form, the substrates have been organised into triplets (sets of 3 reactions) with each substrate assigned a numerical value (1, 2 or 4). The sum of the positive reactions for each triplet forms a single digit of the Octal Code that is used to determine the identity of the isolate. The Octal Code is entered into the Microgen Identification System Software (MID-60), which generates a report of the five most likely organisms in the selected database.

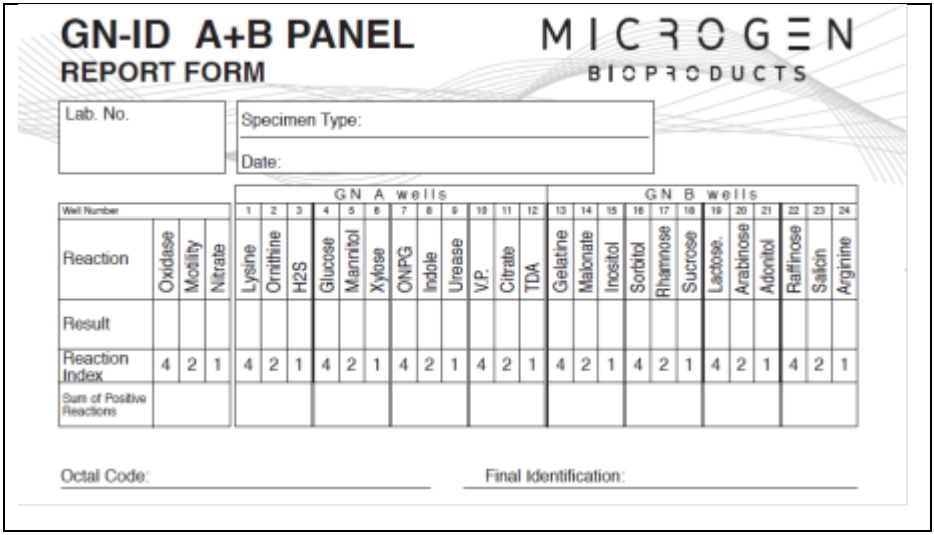
The software provides an identification based on probability, % probability and likelihood with an analysis of the quality of differentiation. Full definition of these terms and an explanation of their usefulness in interpretation is provided with the software Help manual.

Note: For oxidase positive organisms (miscellaneous gram negative bacilli):

- Record weak reactions as negative

- The results for oxidase, nitrate reduction and motility must be included to form a 9 digit Octal Code

Example of Report Form



GN-ID A+B PANEL
REPORT FORM

MICROGEN BIOPRODUCTS

Lab. No.

Specimen Type:

Date:

				GN A wells												GN B wells											
Well Number				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Reaction	Oxidase	Motility	Nitrate	Lysine	Ornithine	H2S	Glucose	Mannitol	Xylose	ONPG	Indole	Urease	V.P.	Citrate	TDA	Gelatine	Malonate	Inositol	Sorbitol	Rhamnose	Sucrose	Lactose.	Arabinose	Adonitol	Raffinose	Salicin	Arginine
Result																											
Reaction Index	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1
Sum of Positive Reactions																											

Octal Code:

Final Identification:

Important:
The Microgen GN-ID A microwell test strip will generate a 4 digit Octal Code.
The Microgen GN-ID A+B microwell test strips will generate an 8 digit Octal Code.
The Microgen GN-ID A+B microwell test strips will generate a 9 digit Octal Code for oxidase positive isolates

LIMITATIONS OF USE

1. Results should be interpreted in the context of all available laboratory information.
2. The Microgen ID system is intended for identification of those organisms included in the database. It should not be used to identify any other bacteria.
3. Test only pure, single colonies since mixed colonies may give erroneous results.
4. Reactions obtained using Microgen GN-ID may differ from published data obtained using alternative substrate formulations or reagents.
5. Some bacterial strains may have atypical biochemical reactions and may be difficult to identify.
6. Computer generated identification results should be interpreted by suitably trained personnel.
7. When determining the final identification of an isolate, the source of the isolate, gram staining, colonial morphology, additional tests and tests against the suggested identification should be considered.
8. Motility and nitrate tests must be performed on oxidase positive, gram negative bacilli. A 9 digit Octal Code is required to interpret the results using the Microgen Identification System Software.
9. The GN-ID A microwell test strip may not be able to differentiate accurately between *Klebsiella* spp, *Enterobacter* spp and *Serratia* spp. Species within these three genera may be differentiated by using GN-ID A+B. Alternatively, additional tests such as motility and DNAse tests can be used.
10. The confirmation of *Salmonella* spp and the full identification requires the performance of serotyping. Whenever the Microgen Identification Software suggests an identification of Salmonella, the following additional comment will be displayed: 'Salmonella cannot be fully identified using biochemistry alone. Perform Polyvalent 'O' and 'H' slide agglutination to confirm and serotype.

11. The full identification of *Shigella* spp requires the performance of serotyping. Whenever the Microgen Identification Software suggests an identification of Shigella, the following additional comment will be displayed: 'Shigella species cannot be identified using biochemistry alone, perform serology to confirm the species type.'
12. If the Glucose reaction is negative for any isolate being identified using the oxidase negative databases, the Microgen Identification Software will display a comment stating: 'Isolate is GLUCOSE NEGATIVE – it is recommended that you check it is not OXIDASE POSITIVE'

QUALITY CONTROL

The performance of the Microgen GN-ID system should be monitored using appropriate control strains. The following cultures are recommended for independent laboratory assessment:
Klebsiella pneumoniae NCTC 9528
Acinetobacter baumannii ATCC 19606
Proteus mirabilis ATCC 14153
Escherichia coli ATCC 25922
Salmonella typhimurium ATCC 14028

	GNA														GNB											
	LYS	ORN	H2S	GLU	MAN	XYL	ONP	IND	URE	VP	CIT	TDA	NIT	GEL	MAL	INO	SOR	RHA	SUC	LAC	ARA	ADO	RAF	SAL	ARG
K.pneumoniae NCTC 9528	+	-	-	+	+	+	+	-	+	+	+	-	+	-	+	+	+	+	+	+	+	+	+	+	-
A.baumannii ATCC 19606	-	-	-	+	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	+	-	-	-	-
P.mirabilis NCIMB 13283	-	+	+	+	-	+	-	-	+	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-
E.coli ATCC 25922	+	+	-	+	+	+	+	+	-	-	-	-	+	-	-	-	+	+	-	+	+	-	-	-	-
S.typhimurium ATCC 14028	+	+	+	+	+	V	-	-	-	-	+	-	+	-	-	V	+	+	-	-	+	-	-	-	+

DATABASE

The Microgen GN-ID systems are based on standard biochemical testing methods. The data provided for interpretation of reaction profiles is based on established literature sources (2,3,4).

PERFORMANCE CHARACTERISTICS

Microgen GN-ID A (MID-64) has been evaluated in comparison with two well-established commercially available products for identification of cultured bacterial isolates. 197 fully characterised strains of *Enterobacteriaceae* were tested with all three products.

Organism	Total number	Microgen GN A	Comm. Test 1	Comm. Test 2
E. coli	43	43	43	43
Shigella spp	4	4	4	4
S. sonnei	3	3	3	3
K. Pneumoniae	13	13	13	13
K. oxytoca	11	11	11	11
E. cloacae	8	7*	8	0**
E. aerogenes	3	3	3	1^{+}
S. marcescens	2	2	2	2
C. freundii	9	9	9	8^{++}
C. diversus	2	2	2	2
H. alvei	1	1	1	1
P. mirabilis	11	11	11	11
P. vulgaris	2	2	2	2
P. stuartii	2	2	2	2
Salmonella spp	83	83	83	83
Total correctly identified	197	196	197	186

1 strain was identified as E. cloacae *with Microgen GN A but as* E. gergoviae *by commercial test 1. However,* E. gergoviae *is not included in the Microgen GN A database; (it is included in the extended Microgen GN A+B database). As this isolate was identified to the correct genus, it was considered that Microgen GN A was equivalent to commercial test 1.*
***6 strains identified by commercial test 2 as* C. diversus*, 1 strain as* S. liquefaciens*, 1 strain as* K. ozanae*.*
[+]*2 strains identified by commercial test 2 as* S. liquefaciens
[++]*1 strain identified by commercial test 2 as* K. ozeane

Microgen GN-ID A+B (MID-64 & 65) has been evaluated in comparison with two well-established commercially available products. 190 fully characterised strains of *Enterobacteriaceae* were tested with all three products.

Organism	Total number	Microgen GN A+B	Comm. Test 1	Comm. Test 2
E. coli	43	43	43	43
Shigella spp	3	3	3	3
S. sonnei	4	4	4	4
K. pneumoniae	12	12	12	12
K. oxytoca	2	2	2	2
K. terrigena	1	1	0*	1
E. cloacae	9	9	9	8**
E. aerogenes	3	3	3	1***
S. marcescens	4	4	4	4
C. freundii	2	2	2	2
C. youngae	4	4	0[+]	4
C. brakki	2	2	2	2
C. amalonaticus	1	1	1	1
H. alvei	2	2	2	1[++]
P. mirabilis	11	11	11	11
P. vulgaris	2	2	2	2
P. stuartii	2	2	2	2
Salmonella spp	83	83	83	83
Total correctly identified	190	190	185	186

* *1 isolate of* K. terrigena *mis-identified as* K. pneumoniae *by Commercial Test 1*
** *1 isolate of* E. cloacae *mis-identified as* K. pneumoniae *by Commercial Test 2*
*** *2 isolates of* E. aerogenes *mis-identified as* S. fonticola *by Commercial Test 2*
[+] *All 4 isolates of* C. youngae *not identified by Commercial Test 1*
[++] *1 isolate of* H. alvei *mis-identified as* Y. ruckeri *by Commercial Test 2*

REPRODUCIBILITY

Intra-batch: A panel of seven bacterial cultures was tested using three batches of GN A and 1 batch of GN B. Each batch of product was used on 3 occasions using a different operator on each occasion. Test results obtained by the three operators correlated very closely giving an overall intra-assay reproducibility of >99%.

Inter-batch: Three batches of GN A and two batches of GN B were tested using a panel of seven bacterial cultures. This gave an overall inter-batch reproducibility of >99%.

REFERENCES

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10. Gadebusch H.H and Gabriel S. (1956) Modified stable Kovacs reagent for the detection of indol Am. J. Clin. Pathol. **26:** 1373

TECHNICAL SUPPORT

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SUBSTRATE REFERENCE TABLE

Well	Reaction	Description	Positive	Negative
1	Lysine	Lysine decarboxylase - Bromothymol blue changes to green/blue indicating the production of the amine cadaverine.	Green / Blue	Yellow
2	Ornithine	Ornithine decarboxylase - Bromothymol blue changes to blue indicating the production of the amine putrescine.	Blue	Yellow / Green
3	H_2S	H_2S production - Thiosulphate is reduced to H_2S that reacts with ferric salts producing a black precipitate.	Brown/ Black	Straw
4	Glucose	Fermentation - Bromothymol blue changes from blue to yellow as a result of acid produced from the carbohydrate fermentation.	Yellow	Blue / Green
5	Mannitol			
6	Xylose			
7	ONPG	Hydrolysis - ONPG hydrolysis by B-galactosidase results in the production of yellow ortho-nitrophenol.	Yellow	Colourless
7a	NITRATE (for oxidase Positive organisms)	Reduction of Nitrate to Nitrite is indicated by the formation of a red colour on addition of Nitrate A and B Reagents	Red	Colourless /yellow
7b	NITRATE (for oxidase positive organisms)	If nitrate has been completely reduced to Nitrogen, 7a will remain colourless/yellow – addition of zinc powder will confirm complete reduction	Colourless/ yellow	Red
8	Indole	Indole is produced from tryptophan and gives a pink/red complex when Kovac's reagent is added.	Pink / Red	Colourless
9	Urease	Hydrolysis of urea results in the formation of ammonia leading to an increase in pH which turns phenol red from yellow to pink / red.	V. Deep Pink	Straw to pale salmon pink colour
10	VP	Acetoin production from glucose is detected by the formation of a pink / red complex after the addition of alpha naphthol and creatine in the presence of KOH.	DeepPink / Red	Colourless to Pale Pink
11	Citrate	Utilisation of citrate (only carbon source) leading to a pH increase giving a colour change in bromothymol blue from green to blue.	Blue	Yellow/ Green
12	TDA	Indolepyruvic acid is produced from tryptophan by tryptophan deaminase giving a cherry red colour when ferric ions are added. Indole positive isolates may give a brown colour – this is a negative result.	Cherry red	Straw colour
13	Gelatin	Proteolytic enzymes liquefy gelatin resulting in black particles being dispersed throughout the well.	Black	Colourless
14	Malonate	Inhibition of the conversion of succinic acid to fumaric acid occurs when sodium malonate is the only source of carbon. An isolate incapable of using this substrate results in the accumulation of succinic acid and the organism does not grow. A positive reaction is the result of the use of sodium malonate at the same time that ammonium sulphate is used as the nitrogen source giving sodium hydroxide which increases the alkalinity giving a blue colour.	Blue	Yellow
15	Inositol	Fermentation - Bromothymol blue changes from blue to yellow as a result of acid produced from the carbohydrate fermentation.	Yellow	Blue
16	Sorbitol			
17	Rhamnose			
18	Sucrose			
19	Lactose			
20	Arabinose			
21	Adonitol			
22	Raffinose			
23	Salicin			
24	Arginine	Arginine is converted to ornithine, ammonia and CO_2 by arginine dihydrolase resulting in an increase in pH and a change in colour of the bromothymol blue from green to blue. At 48 hours green reactions are negative.	Green/ Blue Blue	Yellow Yellow / Green

Species identified using GN A microwell test strip

Acinetobacter baumannii
Acinetobacter lwoffii
Acinetobacter haemolyticus
Citrobacter freundii
Citrobacter diversus/ koseri
Edwardsiella tarda
Enterobacter aerogenes
Enterobacter cloacae
Pantoea agglomerans
Enterobacter gergoviae
Enterobacter sakazakii
Escherichia coli
***Escherichia coli* – inactive**
Shigella Serogroups A,B and C
***Shigella sonnei* (Group D)**
Hafnia alvei
Klebsiella pneumoniae
Klebsiella oxytoca
Klebsiella ozaenae
Klebsiella rhinoscleromatis
Morganella morganii
Proteus mirabilis
Proteus vulgaris
Providencia rettgeri
Providencia stuartii
Providencia alcalifaciens
Salmonella species
Salmonella typhi
Salmonella cholerae-suis
Salmonella paratyphi A
Salmonella gallinarum
Salmonella pullorum
Salmonella arizonae
Serratia marcescens
Serratia liquefaciens
Serratia rubidaea
Yersinia enterocolitica

Species identified using the GN A + GN B microwell test strips

In addition to the species listed above, the following species may be identified using the combined GN A + B microwell test strips

Oxidase Negative Non Fastidious Gram Negative Bacilli

Acinetobacter baumannii
Acinetobacter lwoffii
Acinetobacter haemolyticus
Averyella dalhousiensis
Budvicia aquatica
Buttiauxella agrestis
Buttiauxella brennerae
Buttiauxella ferragutiae
Buttiauxella gaviniae
Buttiauxella izardi
Buttiauxalla noackiae
Butiauxella wamboldiae
Cedecea davisae
Cedecea lapagei
Cedecea neteri
Cedecea sp 3
Cedecea sp 5
Citrobacter freundii
Citrobacter diversus/koseri
Citrobacter amalonaticus
Citrobacter farmeri
Citrobacter youngae
Citrobacter braakii
Citrobacter werkmanii
Citrobacter sedlakii
Citrobacter rodentium
Citrobacter gillenii
Citrobacter Group 137
Edwardsiella tarda
Edwardsiella tarda biogp 1
Edwardsiella hoshinae
Edwardsiella ictaluri
Enterobacter aerogenes
Enterobacter cloacae
Enterobacter agglomerans
Enterobacter gergoviae
Enterobacter sakazakii
Enterobacter taylorae (cancerogenus)
Enterobacter amnigenus biogp 1
Enterobacter amnigenus biogp 2
Enterobacter asburiae
Enterobacter hormaechei
Enterobacter cancerogenus
Enterobacter dissolvens
Enterobacter nimipressuralis
Enterobacter pyrinus
Escherichia coli
Escherichia coli - inactive
Escherichia fergusonii
Escherichia hermannii
Escherichia vulneris
Escherichia blattae
Shigella Serogroups A,B,C
Shigella sonnei (Group D)
Ewingella americana
Hafnia alvei
Hafnia alvei biogp 1
Klebsiella pneumoniae
Klebsiella oxytoca
Klebsiella ornithinolytica
Klebsiella ozaenae
Klebsiella rhinoscleromatis
Klebsiella terrigena
Kluyvera ascorbata
Kluyvera cryocrescens
Kluyvera georgiana
Kluyvera intermedia
Leclercia adecarboxylata
Leminorella grimontii
Leminorella richardii
Moellerella wisconsensis
Morganella morganii
Morganella morganii ss morganii
Morganella morganii biogp 1
Morganella morganii ss Sibonii 1
Obesumbacterium proteus biogp 2
Pragia fontium
Pantoea dispersa
Pantoea agglomerans
Photorhabdus luminescens (25C)
Photorhabdus asymbiotica
Proteus mirabilis
Proteus vulgaris
Proteus penneri
Proteus myxofaciens
Providencia rettgeri
Providencia stuartii
Providencia alcalifaciens
Providencia rustigianii
Providencia heimbachae
Rahnella aquatilis
Salmonella enterica Group I
Salmonella serotype Typhi
Salmonella Cholerae-suis
Salmonella Paratyphi A
Salmonella gallinarum
Salmonella pullorum
Salmonella Group II
Salmonella Group IIIa
Salmonella Group IIIb
Salmonella Group IV
Salmonella bongori (Group V)
Salmonella Group VI
Serratia marcescens
Serratia marcescens biogp 1
Serratia liquefaciens
Serratia rubidaea
Serratia odorifera biogp 1
Serratia odorifera biogp 2
Serratia plymuthica
Serratia ficaria
Serratia entomophila
Serratia fonticola
Tatumella ptyseos
Trabulsiella guamensis
Xenorhabdus nematophilis (25°C)

Xanthomonas (Stenotrophomonas) maltophilia
Yersinia enterocolitica
Yersinia frederiksenii
Yersinia intermedia
Yersinia kristensenii
Yersinia rohdei
Yersinia aldovae
Yersinia bercovieri
Yersinia mollaretii
Yersinia pestis
Yersinia pseudotuberculosis
Yersinia ruckeri
Yokenella regensburgei
Enteric Gp59
Enteric Gp60
Enteric Gp63
Enteric Gp64
Enteric Gp68
Enteric Gp69

Oxidase Positive Non Fastidious Gram Negative Bacilli

Pseudomonas aeruginosa
Pseudomonas fluorescens **25°C**
Pseudomonas fluorescens **37°C**
Burkholderia cepacia
Pseudomonas putida
Pseudomonas stutzeri
Pseudomonas diminuta
Burkholderia pseudomallei
Shewanella putrefaciens
Alcaligenes faecalis **type 11**
Alcaligenes faecalis
Alcaligenes xylosoxidans ss xylos
Actinobacillus spp.
Flavobacterium meningosepticum
Flavobacterium odoratum
Flavobacterium breve
Flavobacterium oindologenes
Vibrio fluvialis
Vibrio furnissii
Vibrio mimicus
Vibrio vulnificus
Vibrio hollisae
Vibrio cholerae
Vibrio parahaemolyticus
Vibrio alginolyticus
Vibrio cincinnatiensis
Vibrio damsela
Vibrio carchariae
Moraxella spp.
Plesiomonas shigelloides
Aeromonas hydrophila
Aeromonas veronii bio sobria
Aeromonas veronii bio veronii
Aeromonas caviae
Weeksella virosa
Weeksella zoohelcum
Pasteurella multocida
Pasteurella haemolytica

COMMONLY ENCOUNTERED GRAM NEGATIVE DATA TABLE

	LYS	ORN	H2S	GLU	MAN	XYL	ONP	IND	UR	VP	CIT	TDA
Acinetobacter baumannii	60	8	0.1	99.9	0.1	97	0.1	0.1	9	0.1	99.9	0.1
Acinetobacter lwoffii	40	0.1	0.1	6	0.1	0.1	0.1	0.1	3	0.1	0.1	0.1
Acinetobacter haemolyticus	40	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3	0.1	9	0.1
Citrobacter freundii	0.1	0.1	78	99.9	99.9	89	89	33	44	0.1	78	0.1
Citrobacter diversus / koseri	0.1	99	0.1	99.9	99	99.9	99	99	75	0.1	99	0.1
Edwardsiella tarda	99.9	99.9	99.9	99.9	0.1	0.1	0.1	99	0.1	0.1	1	0.1
Enterobacter aerogenes	98	98	0.1	99.9	99.9	99.9	99.9	0.1	2	98	95	0.1
Enterobacter cloacae	0.1	96	0.1	99.9	99.9	99	99	0.1	65	99.9	99.9	0.1
Pantoea agglomerans	0.1	0.1	0.1	99.9	99.9	93	90	20	20	70	50	20
Enterobacter gergoviae	90	99.9	0.1	99.9	99	99	97	0.1	93	99.9	99	0.1
Enterobacter sakazakii	0.1	91	0.1	99.9	99.9	99.9	99.9	11	1	99.9	99	50
Escherichia coli	85	85	1	99.9	98	95	95	99.9	1	0.1	1	0.1
Escherichia coli - inactive	40	20	1	99.9	93	70	45	80	1	0.1	1	0.1
Shigella Serogroups A,B&C	0.1	1	0.1	99.9	93	2	2	50	0.1	0.1	0.1	0.1
Shigella sonnei (Group D)	0.1	98	0.1	99.9	99	2	90	0.1	0.1	0.1	0.1	0.1
Hafnia alvei	99.9	98	0.1	99.9	99	98	90	0.1	4	85	10	0.1
Klebsiella pneumoniae	98	0.1	0.1	99.9	99	99	99	0.1	95	98	98	0.1
Klebsiella oxytoca	99	0.1	0.1	99.9	99	99.9	99.9	99	90	95	95	1
Klebsiella ozaenae	40	3	0.1	99.9	99.9	95	80	0.1	10	0.1	30	0.1
Klebsiella rhinoscleromatis	0.1	0.1	0.1	99.9	99.9	99.9	0.1	0.1	0.1	0.1	0.1	0.1
Morganella morganii	24	97	0.1	99.9	0.1	0.1	0.1	99	98	0.1	0.1	95
Proteus mirabilis	0.1	99	98	99.9	0.1	98	0.1	2	98	50	65	98
Proteus vulgaris	0.1	0.1	95	99.9	0.1	95	1	98	95	0.1	15	99
Providencia rettgeri	0.1	0.1	0.1	99.9	99.9	10	5	99	98	0.1	95	98
Providencia stuartii	0.1	0.1	0.1	99.9	10	7	10	98	30	0.1	93	95
Providencia alcalifaciens	0.1	1	0.1	99.9	2	1	1	99	0.1	0.1	98	98
Salmonella species	98	97	95	99.9	99.9	97	2	1	1	0.1	95	0.1
Salmonella Typhi	98	0.1	97	99.9	99.9	82	0.1	0.1	0.1	0.1	0.1	0.1
Salmonella Choleraesuis	95	99.9	50	99.9	98	98	0.1	0.1	0.1	0.1	25	0.1
Salmonella Paratyphi A	0.1	95	10	99.9	99.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Salmonella Gallinarum	90	1	99.9	99.9	99.9	70	0.1	0.1	0.1	0.1	0.1	0.1
Salmonella Pullorum	99.9	95	90	99.9	99.9	90	0.1	0.1	0.1	0.1	0.1	0.1
Salmonella Arizonae	99	99	99	99.9	99.9	99.9	92	2	0.1	0.1	98	0.1
Serratia marcescens	99	99	0.1	99.9	99	7	95	1	15	98	98	0.1
Serratia liquefaciens	95	95	0.1	99.9	99.9	99.9	93	1	3	93	90	0.1
Serratia rubidaea	55	0.1	0.1	99.9	99.9	99	99.9	0.1	2	99.9	95	0.1
Yersinia enterocolitica	0.1	95	0.1	99.9	98	70	95	50	90	2	0.1	0.1

EXTENDED OXIDASE NEGATIVE DATA TABLE

	LYS	ORN	H2S	GLU	MAN	XYL	ONP	IND	URE	VP	CIT	TDA	GEL	MAL	INO	SOR	RHA	SUC	LAC	ARA	ADO	RAF	SAL	ARG
Acinetobacter baumannii	60	8	0/1	99.9	0/1	97	0/1	0/1	9	0/1	99.9	0/1	0/1	98	0/1	0/1	0/1	0/1	0/1	67	0/1	0/1	0/1	0/1
Acinetobacter lwoffi	40	0/1	0/1	6	0/1	0/1	0/1	0/1	3	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	6
Acinetobacter haemolyticus	40	0/1	0/1	0/1	0/1	0/1	0/1	0/1	2	0/1	9	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	6
Aeromonas deltocaseneola	99.9	85	0/1	99.9	99.9	99.9	99.9	0/1	70	0/1	95	0/1	0/1	95	0/1	99.9	99.9	0/1	30	99.9	0/1	0/1	99.9	0/1
Budvicia aquatica	0/1	0/1	80	90.9	60	99	99	0/1	33	0/1	0/1	0/1	0/1	0/1	0/1	0/1	99.9	0/1	87	80	0/1	0/1	0/1	0/1
Buttiauxella agrestis	0/1	99.9	0/1	99.9	99.9	99.9	99.9	0/1	0/1	0/1	99.9	0/1	0/1	90	0/1	0/1	0/1	99.9	0/1	99.9	99.9	0/1	99.9	99.9
Buttiauxella brennerae	0/1	33	0/1	90.9	90.9	99.9	99.9	0/1	0/1	0/1	0/1	0/1	0/1	99.9	0/1	0/1	33	0/1	67	99.9	67	90.9	90.9	0/1
Buttiauxella ferragutiae	99.9	90	0/1	99.9	99.9	99.9	99.9	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	99.9	99.9	0/1	0/1	99.9	0/1	0/1	99.9	0/1
Buttiauxella gaviniae	0/1	0/1	0/1	99.9	99.9	99.9	99.9	0/1	0/1	0/1	20	0/1	0/1	99.9	0/1	0/1	99.9	0/1	60	99.9	99.9	0/1	99.9	20
Buttiauxella izardii	0/1	90.9	0/1	90.9	90.9	99.9	99.9	0/1	0/1	0/1	0/1	0/1	0/1	99.9	0/1	0/1	99.9	0/1	90.9	90.9	0/1	33	90.9	0/1
Buttiauxella noackiae	0/1	0/1	0/1	95.5	95.5	99.9	99.9	20	0/1	0/1	20	99.9	0/1	99.9	0/1	0/1	99.9	0/1	0/1	99.9	0/1	0/1	95.5	67
Buttiauxella warmboldiae	0/1	0/1	0/1	90.9	90.9	99.9	99.9	0/1	0/1	0/1	33	99.9	0/1	99.9	67	0/1	99.9	0/1	0/1	99.9	0/1	0/1	90.9	0/1
Cedecea davisae	0/1	95	0/1	95.5	95.5	99.9	90	0/1	0/1	50	95	0/1	0/1	91	0/1	0/1	0/1	99.9	19	0/1	0/1	10	99	50
Cedecea lapagei	0/1	0/1	0/1	90.9	90.9	0/1	99	0/1	0/1	90	99	0/1	0/1	99	0/1	0/1	0/1	0/1	60	0/1	0/1	0/1	90.9	80
Cedecea neteri	0/1	0/1	0/1	90.9	90.9	99.9	99.9	0/1	0/1	50	99.9	0/1	0/1	99.9	0/1	99.9	0/1	99.9	35	0/1	0/1	0/1	90.9	90.9
Cedecea sp 3	0/1	0/1	0/1	95.5	95.5	99.9	99.9	0/1	0/1	50	99.9	0/1	0/1	0/1	0/1	0/1	0/1	50	0/1	0/1	0/1	95.5	95.5	95.5
Cedecea sp 5	0/1	50	0/1	90.9	90.9	99.9	99.9	0/1	0/1	50	99.9	0/1	0/1	0/1	0/1	99.9	0/1	99.9	0/1	0/1	0/1	90.9	90.9	50
Citrobacter freundii	0/1	0/1	70	95.5	95.5	99	99	30	44	0/1	70	0/1	0/1	11	0/1	99.9	99.9	85	70	99.9	0/1	44	0/1	67
Citrobacter diversus/ koseri	0/1	99	0/1	90.9	99	99.9	99	99	75	0/1	99	0/1	0/1	90	0/1	90	90	40	80	99	99	0/1	15	80
Citrobacter amalonaticus	0/1	95	5	90.9	90.9	99	97	99.9	85	0/1	95	0/1	0/1	1	0/1	90	99.9	9	35	99	0/1	5	30	85
Citrobacter farmeri	0/1	95.9	0/1	95.5	95.5	99.9	99.9	99.9	59	0/1	10	0/1	0/1	0/1	0/1	90	99.9	99.9	15	99.9	0/1	95.9	9	65
Citrobacter murliae	0/1	5	85	90.9	90.9	99.9	90	15	80	0/1	75	0/1	0/1	5	5	99.9	99.9	20	25	99.9	0/1	10	10	60
Citrobacter braakii	0/1	90	80	95.5	95.5	99.9	80	30	67	0/1	80	0/1	0/1	0/1	0/1	99.9	99.9	7	80	99.9	0/1	7	0/1	67
Citrobacter werkmanii	0/1	0/1	90.9	90.9	90.9	99.9	99.9	0/1	99.9	0/1	99.9	0/1	0/1	99.9	0/1	99.9	99.9	0/1	17	99.9	0/1	0/1	0/1	90.9
Citrobacter sedlakii	0/1	90.9	0/1	90.9	90.9	99.9	99.9	80	99.9	0/1	90	0/1	0/1	99.9	0/1	99.9	99.9	0/1	90	99.9	0/1	0/1	17	90.9
Citrobacter rodentium	0/1	95.9	0/1	95.5	95.5	99.9	99.9	0/1	99.9	0/1	0/1	0/1	0/1	99.9	0/1	99.9	99.9	0/1	99.9	99.9	0/1	0/1	0/1	0/1
Citrobacter pilfinii	0/1	0/1	67	90.9	90.9	99.9	67	0/1	0/1	0/1	33	0/1	0/1	99.9	0/1	99.9	99.9	33	67	99.9	0/1	0/1	0/1	33
Citrobacter Group 9 87	0/1	90.9	0/1	90.9	90.9	99.9	99.9	99.9	70	0/1	0/1	0/1	0/1	0/1	0/1	99.9	99.9	99.9	90	99.9	0/1	90.9	90.9	20
Edwardsiella ictaluri	99.9	99.9	99.9	99.9	0/1	0/1	0/1	99	0/1	0/1	1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1	0/1	0/1	0/1	0/1
Edwardsiella ictaluri biogp 1	90.9	90.9	0/1	90.9	90.9	0/1	0/1	99.9	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	99.9	0/1	90.9	0/1	0/1	0/1	0/1
Edwardsiella tarda	95.9	95	0/1	95.5	95.5	0/1	0/1	50	0/1	0/1	0/1	0/1	0/1	99.9	0/1	0/1	0/1	99.9	0/1	1.0	0/1	0/1	50	0/1
Edwardsiella ictaluri	99.9	85	0/1	99.9	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
Enterobacter aerogenes	68	68	0/1	90.9	90.9	99.9	99.9	0/1	2	68	95	0/1	0/1	95	95	99.9	90	99.9	95	99.9	68	95	99.9	0/1
Enterobacter cloacae	0/1	95	0/1	95.5	95.5	99	99	0/1	55	99.9	99.9	0/1	0/1	75	15	95	90	97	93	99.9	25	97	75	97
Pantoea agglomerans	0/1	0/1	0/1	90.9	90.9	99	90	20	20	70	50	20	2	65	15	30	65	75	40	95	7	30	65	0/1
Enterobacter pergoviae	90	95.9	0/1	95.5	99	99	97	0/1	90	99.9	99	0/1	0/1	95	0/1	0/1	95	90	55	99	0/1	97	99	0/1
Enterobacter sakazakii	0/1	91	0/1	99.9	99.9	99.9	99.9	11	1	99.9	99	50	0/1	10	75	0/1	99.9	99.9	99	99.9	0/1	99	99	99
Enterobacter taylorae (cancerogenus)	0/1	99	0/1	90.9	90.9	99.9	99.9	0/1	1	99.9	99.9	0/1	0/1	99.9	0/1	1	99.9	0/1	10	99.9	0/1	0/1	62	64
Enterobacter amnigenus biogp 1	0/1	55	0/1	95.5	95.5	99.9	91	0/1	0/1	99.9	70	0/1	0/1	91	0/1	9	99.9	99.9	70	99.9	0/1	95.5	91	9
Enterobacter amnigenus biogp 2	0/1	99.9	0/1	99.9	90.9	99.9	99.9	0/1	0/1	99.9	99.9	0/1	0/1	99.9	0/1	99.9	99.9	0/1	35	99.9	0/1	0/1	99.9	35
Enterobacter asburiae	0/1	95	0/1	95.5	95.5	97	99.9	0/1	99	2	99.9	0/1	0/1	3	0/1	99.9	5	99.9	75	99.9	0/1	70	95.9	21
Enterobacter hormaechei	0/1	91	0/1	99.9	90.9	99	99	0/1	87	99.9	96	4	0/1	99.9	0/1	0/1	99.9	99.9	9	99.9	0/1	0/1	44	78
Enterobacter cancerogenus	0/1	99.9	0/1	90.9	90.9	99.9	99.9	0/1	0/1	99.9	99.9	0/1	0/1	99.9	0/1	0/1	99.9	0/1	0/1	99.9	0/1	0/1	99.9	99.9
Enterobacter dissolvens	0/1	95.9	0/1	95.5	95.5	99.9	99.9	0/1	99.9	99.9	99.9	0/1	0/1	99.9	0/1	99.9	99.9	99.9	0/1	99.9	0/1	95.9	95.9	95.9
Enterobacter nimipressuralis	0/1	99.9	0/1	99.9	99.9	99.9	99.9	0/1	0/1	99.9	0/1	0/1	0/1	99.9	0/1	99.9	99.9	0/1	0/1	99.9	0/1	0/1	99.9	0/1
Enterobacter pyrinus	99.9	99.9	0/1	99.9	99	0/1	99.9	0/1	86	86	0/1	0/1	0/1	0/1	99.9	0/1	99.9	99.9	14	99.9	0/1	0/1	95.9	0/1
Escherichia coli	85	85	1	99.9	99	95	96	99.9	1	0/1	1	0/1	0/1	0/1	1	94	90	90	95	99	5	90	40	17
Escherichia coli - inactive	40	20	1	90.9	99	73	45	80	1	0/1	1	0/1	0/1	0/1	1	75	65	15	25	85	3	15	10	3
Escherichia fergusonii	95	95.9	0/1	95.5	90	95	93	90	0/1	0/1	17	0/1	0/1	95	0/1	0/1	90	0/1	0/1	90	90	0/1	0/5	5
Escherichia hermannii	6	99.9	0/1	99.9	99.9	99.9	99	99	0/1	0/1	1	0/1	0/1	0/1	0/1	0/1	97	45	45	99.9	0/1	40	40	0/1
Escherichia vulneris	85	0/1	0/1	90.9	90.9	99.9	99.9	0/1	0/1	0/1	0/1	0/1	0/1	85	0/1	1	90	9	15	99.9	0/1	99	90	90
Escherichia blattae	99.9	99.9	0/1	99.9	0/1	99.9	0/1	0/1	0/1	0/1	0/1	0/1	0/1	99.9	0/1	0/1	99.9	0/1	0/1	99.9	0/1	0/1	0/1	0/1
Shigella Serogroup A, B,C	0/1	1	0/1	90.9	99	2	2	50	0/1	0/1	0/1	0/1	0/1	0/1	0/1	30	5	0/1	0/1	60	0/1	50	0/1	5
Shigella sonnei (Group D)	0/1	90	0/1	95.5	99	2	90	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	2	75	1	2	95	0/1	3	0/1	2
Ewingella americana	0/1	0/1	0/1	99.9	99.9	1.0	99	0/1	0/1	99	99	0/1	0/1	0/1	0/1	0/1	0/1	2.0	0/1	70	0/1	0/1	0/1	80	0/1
Hafnia alvei	90.9	99	0/1	90.9	99	99	90	0/1	4	86	10	0/1	0/1	90	0/1	0/1	0/1	67	10	5	95	0/1	2	1.3	6
Hafnia alvei biogp 1	99.9	45	0/1	99.9	55	0/1	30	0/1	0/1	70	0/1	0/1	0/1	45	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	55	0/1
Klebsiella pneumoniae	99	0/1	0/1	90.9	99	99	99	0/1	96	99	99	0/1	0/1	90	95	96	90	90	98	99	90	99	99	0/1
Klebsiella oxytoca	99	0/1	0/1	99.9	99	99.9	99	99	95	95	1	0/1	90	90	95	99.9	99.9	99.9	2	95	0/1	99.9	95.9	0/1
Klebsiella ornithinolytica	99.9	99.9	0/1	99.9	99.9	99.9	99.9	99.9	99.9	70	99.9	0/1	0/1	99.9	95	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	0/1
Klebsiella oxytoca	40	3	0/1	90.9	90.9	95	80	0/1	10	0/1	30	0/1	0/1	3	55	65	55	20	30	98	67	90	67	6
Klebsiella rhinoscleromatis	0/1	0/1	0/1	99.9	99.9	99.9	0/1	0/1	0/1	0/1	0/1	0/1	0/1	95	95	99.9	90	75	0/1	99.9	99.9	90	90	0/1

Klebsiella terrigena	99.9	20	0.1	99.9	99.9	99.9	99.9	0.1	0.1	99.9	40	0.1	0.1	99.9	90	99.9	99.9	99.9	99.9	99.9	99.9	99.9	0.1
Kluyvera ascorbata	57	99.9	0.1	99.9	99.9	99	99.9	92	0.1	0.1	96	0.1	0.1	96	0.1	40	99.9	90	90	99.9	0.1	90	99.9	0.1
Kluyvera cryocrescens	20	99.9	0.1	90.9	95	91	99.9	90	0.1	0.1	80	0.1	0.1	86	0.1	45	99.9	81	95	99.9	0.1	99.9	99.9	0.1
Kluyvera georgiana	99.9	99.9	0.1	99.9	99.9	99.9	99.9	99.9	0.1	0.1	99.9	0.1	0.1	92	0.1	0.1	83	99.9	83	99.9	0.1	99.9	99.9	0.1
Kluyvera intermedia	0.1	89	0.1	99.9	99.9	99.9	99.9	0.1	0.1	99.9	95	0.1	0.1	99.9	0.1	99.9	99.9	95	99.9	99.9	0.1	99.9	99.9	0.1
Leclercia adecarboxylata	0.1	0.1	0.1	99.9	99.9	99.9	99.9	99.9	40	0.1	0.1	0.1	0.1	90	0.1	0.1	99.9	80	93	99.9	93	86	99.9	0.1
Leminorella grimontii	0.1	0.1	99.9	99.9	0.1	80	0.1	0.1	0.1	0.1	99.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	99.9	0.1	0.1	0.1
Leminorella richardii	0.1	0.1	99.9	99.9	0.1	99.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	99.9	0.1	0.1	0.1
Moellerella wisconsensis	0.1	0.1	0.1	99.9	0.1	0.1	90	0.1	0.1	0.1	80	0.1	0.1	0.1	0.1	0.1	0.1	99.9	99.9	0.1	99.9	99.9	0.1	0.1
Morganella morganii	24	57	0.1	90.0	0.1	0.1	0.1	99	30	0.1	0.1	95	0.1	4	0.1	0.1	0.1	1	0.1	0.1	0.1	0.1	0.1	0.1
Morganella morganii ss morganii	1	85	20	99.9	0.1	0.1	1.0	99	95	0.1	0.1	95	0.1	1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1	0.1	0.1
Morganella morganii biogp 1	99.9	80	1.5	99.9	0.1	0.1	20	99.9	99.9	0.1	0.1	99.9	0.1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Morganella morganii ss Sibirski 1	20	64	7	90.0	0.1	0.1	0.1	50	99.9	0.1	0.1	90	0.1	0.1	0.1	0.1	0.1	7	0.1	0.1	0.1	0.1	0.1	0.1
Obesumbacterium proteus biogp 2	99.9	99.9	0.1	99.9	0.1	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pragia fontium	0.1	0.1	99	99.9	0.1	0.1	0.1	0.1	0.1	0.1	99	22	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	70	0.1
Rahnella aquatilis	0.1	0.1	0.1	99.9	99.9	94	99.9	0.1	0.1	99.9	94	95	0.1	99.9	0.1	94	94	99.9	99.9	99.9	0.1	94	99.9	0.1
Rahnella genomosp 3	0.1	0.1	0.1	99.9	99.9	99.9	99.9	0.1	0.1	99.9	99.9	0.1	0.1	99.9	0.1	99.9	99.9	99.9	99.9	99.9	0.1	99.9	99.9	0.1
Salmonella enterica (Group I)	98	97	95	99.9	99.9	97	2	1	1	0.1	95	0.1	0.1	0.1	35	95	95	1	1	99	0.1	2	0.1	70
Salmonella serotype Typhi	98	0.1	97	99.9	99.9	82	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	95	0.1	1	2	0.1	0.1	0.1	0.1	3
Salmonella serotype Choleraesuis	95	99.9	50	99.9	90	90	0.1	0.1	0.1	0.1	25	0.1	0.1	0.1	0.1	90	99.9	0.1	0.1	0.1	0.1	1	0.1	55
Salmonella serotype Paratyphi A	0.1	95	1.0	90.9	99.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	95	99.9	0.1	0.1	99.9	0.1	0.1	0.1	1.5
Salmonella serotype Gallinarum	90	1	99.9	99.9	99.9	73	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1.0	0.1	0.1	80	0.1	10	0.1	10
Salmonella serotype Pullorum	99.9	95	90	99.9	99.9	90	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0	99.9	0.1	0.1	99.9	0.1	1	0.1	10
Salmonella Group II	99.9	99.9	99.9	99.9	99.9	99.9	1.5	2	0.1	0.1	99.9	0.1	2	95	5	99.9	99.9	1	1	99.9	0.1	0.1	5	50
Salmonella Group IIIa	99	99	99	90.0	90.9	99.0	99.0	1	0.1	0.1	99	0.1	0.1	95	0.1	95	90	1	1.5	99	0.1	1	0.1	70
Salmonella Group IIIb	99	99	99	99.9	99.9	99.9	92	2	0.1	0.1	98	0.1	0.1	95	0.1	95	95	5	85	99	0.1	1	0.1	70
Salmonella Group IV	99.9	99.9	99.9	99.9	99	99.9	0.1	0.1	2	0.1	98	0.1	0.1	0.1	0.1	99.9	90	0.1	0.1	99.9	5	0.1	60	70
Salmonella serogp (Group V)	90.9	99.9	90.0	90.0	90.0	99.0	94	0.1	0.1	0.1	94	0.1	0.1	0.1	0.1	99.0	80	0.1	0.1	94	0.1	0.1	0.1	94
Salmonella Group VI	99.9	99.9	99.9	99.9	99.9	99.9	44	0.1	0.1	0.1	99	0.1	0.1	0.1	0.1	0.1	99.9	0.1	22	99.9	0.1	0.1	0.1	67
Serratia ficaria	99	99	0.1	99.9	99	7	90	1	1.5	90	99	0.1	90	0	7.5	90	0.1	99	2	0.1	40	2	95	0.1
Serratia fonticola	95	85	0.1	90.9	90	0.1	2	99.9	95	0.1	90	94	20	1	1	90	99.9	99.9	99	99	99	99	99	0.1
Serratia liquefaciens	0.1	0.1	0.1	99.9	99.9	99	1	3	90	90	0.1	90	2	90	90	1.5	90	10	90	5	85	97	0.1	
Serratia marcescens	0.1	0.1	0.1	99.9	99.9	99.9	90	1	3	90	90	0.1	90	2	90	90	1.5	90	10	90	5	85	97	0.1
Serratia odorifera biogp 1	99.9	99.9	0.1	90.9	99.9	99.9	99.9	60	5	50	99.9	0.1	95	0.1	99.9	99.9	95	99.9	20	99.9	50	95.9	90	0.1
Serratia odorifera biogp 2	94	0.1	0.1	99.9	97	99.9	99.9	50	0.1	99.9	97	0.1	94	0.1	99.9	99.9	94	0.1	97	99.9	55	7	45	0.1
Serratia plymuthica	0.1	0.1	0.1	99.9	99.9	94	70	0.1	0.1	50	75	0.1	50	0.1	50	65	0.1	99.9	80	99.9	0.1	94	94	0.1
Serratia ficaria	0.1	0.1	0.1	99.9	99.9	99.9	0.1	0.1	75	99.9	0.1	99.9	0.1	50	99.9	35	99.9	15	99.9	0.1	70	99.9	0.1	
Serratia entomophila	0.1	0.1	0.1	99.9	99.9	40	99.9	0.1	0.1	99.9	99.9	0.1	99.9	0.1	0.1	0.1	0.1	99.9	0.1	0.1	0.1	0.1	99.9	0.1
Serratia fonticola	99.9	97	0.1	99.9	99.9	85	99.9	0.1	1.3	9	91	0.1	90	90	99.9	76	21	97	99.9	99.9	99.9	99.9	0.1	
Tatumella ptyseos	0.1	0.1	0.1	99.9	0.1	5	0.1	0.1	0.1	5	2	90	0.1	0.1	0.1	0.1	0.1	90	0.1	0.1	0.1	11	55	0.1
Trabulsiella guamensis	99.9	99.9	90.0	90.0	90.0	99.0	99.0	40	0.1	0.1	90	0.1	0.1	0.1	0.1	99.0	99.9	0.1	0.1	99.9	0.1	0.1	1.3	50
Xenorhabdus nematophila (DSMZ)	0.1	0.1	0.1	80	0.1	0.1	0.1	40	0.1	0.1	0.1	0.1	90	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Xanthomonas (Stenotrophomonas) maltophi	54	0.1	0.1	0	0.1	0.1	35	0.1	0.1	0.1	90	0.1	99	91	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1
Yersinia aldovae	0.1	95	0.1	90.9	99	73	95	50	30	2	0.1	0.1	0.1	0.1	30	95	1	95	5	99	0.1	5	20	0.1
Yersinia frederiksenii	0.1	95	0.1	99.9	99.9	99.9	99.9	70	0.1	15	0.1	0.1	0.1	20	99.9	90	99.9	40	99.9	0.1	30	82	0.1	
Yersinia intermedia	0.1	99.9	0.1	99.9	99.9	99.9	90	99.9	30	5	5	0.1	0.1	5	15	99.9	99.9	99.9	35	99.9	0.1	45	99.9	0.1
Yersinia kristensenii	0.1	92	0.1	90.9	99.9	85	73	30	77	0.1	0.1	0.1	0.1	0.1	15	99.9	0.1	0.1	8	77	0.1	0.1	15	0.1
Yersinia mollaretii	0.1	25	0.1	99.9	99.9	38	50	0.1	82	0.1	0.1	0.1	0.1	0.1	0.1	99.9	0.1	99.9	0.1	99.9	0.1	82	0.1	0.1
Yersinia pestis	0.1	40	0.1	99.9	80	40	0.1	0.1	80	0.1	0.1	0.1	0.1	0.1	0.1	80	0.1	20	0.1	60	0.1	0.1	0.1	0.1
Yersinia pseudotuberculosis	0.1	80	0.1	90.9	99.9	99.9	80	0.1	50	0.1	0.1	0.1	0.1	0.1	0.1	99.9	0.1	99.9	20	99.9	0.1	0.1	20	0.1
Yersinia ruckeri	0.1	80	0.1	99.9	99.9	60	20	0.1	20	0.1	0.1	0.1	0.1	0.1	0.1	99.9	0.1	99.9	40	99.9	0.1	0.1	20	0.1
Yersinia wesbi	0.1	0.1	0.1	99.9	97	90	50	0.1	5	0.1	0.1	0.1	0.1	0.1	0.1	50	1	0.1	0.1	99.9	0.1	0.1	70	0.1
Yersinia pseudotuberculosis	0.1	0.1	0.1	99.9	99.9	99.9	73	0.1	95	0.1	0.1	0.1	0.1	0.1	0.1	0.1	20	0.1	0.1	50	0.1	15	25	0.1
"Yersinia" ruckeri	50	99.9	0.1	90.0	90.0	0.1	50	0.1	0.1	10	0.1	0.1	30	0.1	0.1	50	0.1	0.1	0.1	5	0.1	5	0.1	5
Yokenella regensburgei	99.9	99.9	0.1	99.9	99.9	99.9	99.9	0.1	0.1	0.1	92	0.1	0.1	0.1	0.1	0.1	99.9	0.1	0.1	99.9	0.1	25	8	8
Enteric Cp59	0.1	0.1	0.1	99.9	99.9	99.9	99.9	1.0	0.1	0.1	99.9	30	0.1	90	0.1	0.1	99.9	0.1	80	99.9	0.1	0.1	99.9	60
Enteric Cp60	0.1	99.9	0.1	90.0	50	0.1	99.0	0.1	50	0.1	0.1	0.1	0.1	99.0	0.1	0.1	75	0.1	0.1	25	0.1	0.1	0.1	0.1
Enteric Cp63	99.9	99.9	0.1	99.9	99.9	99.9	99.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	99.9	99.9	0.1	0.1	99.9	0.1	0.1	99.9	0.1
Enteric Cp64	0.1	0.1	0.1	99.9	99.9	99.9	99.9	0.1	0.1	0.1	50	0.1	0.1	99.9	0.1	0.1	99.9	0.1	99.9	99.9	99.9	0.1	99.9	50
Enteric Cp66	0.1	0.1	0.1	99.9	99.9	0.1	0.1	0.1	0.1	50	0.1	0.1	0.1	0.1	0.1	0.1	0.1	99.9	0.1	0.1	0.1	0.1	50	0.1
Enteric Cp68	0.1	99.9	0.1	99.9	99.9	99.9	99.9	0.1	0.1	99.9	99.9	0.1	0.1	99.9	0.1	99.9	99.9	25	99.9	99.9	0.1	99.9	99.9	99.9

Number denotes the percentage of positive strains

OXIDASE POSITIVE DATA TABLE

ORGANISM	OXI	MOT	NIT	LYS	ORN	H2S	GLU	MAN	XYL	ONP	IND	UR	VP	CIT	TDA	GEL	MAL	INO	SOR	RHA	SUC	LAC	ARA	ADO	RAF	SAL	ARG
Pseudomonas aeruginosa	100	93	85	89	3	0	85	40	81	0	0	56	0	95	0	64	94	0	0	0	0	0	45	0	0	0	100
Pseudomonas fluorescens 25°C	100	94	55	46	0	0	78	12	74	0	0	7	0	100	0	50	78	2	7	0	44	0	48	0	0	0	48
Pseudomonas fluorescens 37°C	100	94	5	26	0	0	0	7	0	0	0	0	0	63	0	0	41	0	0	0	0	0	7	0	0	0	74
Burkholderia cepacia	91	100	5	98	0	0	94	0	25	76	0	30	0	95	5	87	87	12	0	0	48	84	95	3	0	5	0
Pseudomonas putida	100	100	0	75	0	0	24	0	56	0	0	5	0	95	0	5	53	0	0	0	0	0	1	1	0	0	95
Pseudomonas stutzeri	100	100	81	48	0	0	18	18	9	0	0	17	0	72	0	3	33	0	0	0	0	0	0	0	0	0	14
Pseudomonas diminuta	100	100	10	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
Burkholderia pseudomallei	100	100	90	12	0	0	95	95	51	0	0	39	0	86	0	75	80	95	80	6	70	70	80	56	6	9	85
Shewanella putrefaciens	100	100	100	80	80	100	0	0	0	0	0	20	0	80	0	80	0	0	0	0	0	0	0	0	0	0	0
Alcaligenes faecalis type 11	91	91	40	26	0	0	0	0	0	0	0	0	0	58	0	0	40	0	0	0	0	0	0	0	0	0	0
Alcaligenes faecalis	100	80	0	36	9	0	0	0	0	0	0	0	0	100	0	0	1	0	0	0	0	0	0	0	0	0	0
Alcaligenes xylosoxidans ss xylos	100	100	100	95	0	0	0	0	0	0	0	0	0	80	0	3	4	0	0	0	0	0	0	0	0	0	0
Flavobacterium meningosepticum	100	5	2	0	0	0	0	0	0	45	100	0	0	27	0	79	0	0	0	0	0	3	5	0	0	0	0
Flavobacterium odoratum	99	3	0	0	0	0	0	0	0	0	0	100	0	60	0	60	0	0	0	0	0	0	0	0	0	0	0
Flavobacterium breve	100	5	1	0	0	0	0	0	0	0	60	2	0	60	0	60	0	0	0	0	0	0	0	0	0	0	0
Flavobacterium oindologenes	100	4	31	0	0	0	0	0	0	0	100	0	0	70	0	100	0	0	0	0	0	0	0	0	0	0	0
Vibrio fluvialis	100	70	96	0	0	0	100	100	0	42	15	0	0	84	0	79	5	0	0	8	100	0	100	0	0	49	98
Vibrio furnissii	100	90	98	0	0	0	100	100	0	35	11	0	0	90	0	80	12	0	0	45	100	0	95	0	5	0	95
Vibrio mimicus	98	100	100	97	92	0	100	80	0	90	94	0	5	90	0	63	0	0	0	0	1	19	1	0	0	0	0
Vibrio vulnificus	99	99	100	98	93	0	100	43	0	75	95	0	0	75	35	79	0	0	0	0	15	86	0	0	0	95	0
Vibrio hollisae	100	0	100	0	0	0	100	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	94	0	0	0	0
Vibrio cholerae	100	97	99	98	98	0	100	98	0	93	88	0	65	96	0	43	2	0	0	0	100	9	0	0	0	5	0
Vibrio parahaemolyticus	100	99	100	93	59	0	80	93	10	20	65	0	0	31	0	55	0	0	0	0	0	0	34	0	28	0	0
Vibrio alginolyticus	100	100	100	90	70	0	50	20	0	10	20	0	70	10	0	30	10	0	0	0	60	0	10	0	10	0	0
Vibrio cincinnatiensis	100	86	100	57	0	0	100	100	43	86	8	0	0	21	0	0	0	100	0	0	100	0	100	0	0	100	0
Vibrio damsela	95	25	100	50	0	0	100	0	0	0	0	0	95	0	0	6	0	0	0	0	5	0	93	0	0	0	95
Vibrio carchariae	100	0	100	100	0	0	50	50	0	0	100	0	50	0	0	0	0	0	0	0	50	0	0	0	0	0	0
Moraxella spp.	100	0	65	50	50	0	0	0	0	0	0	9	0	50	0	19	2	0	0	0	0	0	0	0	0	0	0
Plesiomonas shigelloides	97	85	99	95	50	0	100	0	0	94	100	0	0	0	0	5	0	99	0	0	0	40	0	0	0	20	95
Aeromonas hydrophila	100	100	98	72	1	5	100	96	1	93	99	5	76	26	0	83	1	0	1	9	93	27	62	3	3	65	90
Aeromonas veronii bio sobria	100	100	100	91	2	0	100	100	0	88	96	0	80	77	0	60	4	1	0	0	88	5	11	2	2	2	98
Aeromonas veronii bio veronii	100	100	100	91	87	0	100	100	0	88	96	0	80	77	0	60	4	1	0	0	88	5	11	2	2	83	10
Aeromonas caviae	100	100	100	40	0	1	100	97	2	96	92	0	22	3	0	50	0	0	1	22	100	15	84	0	1	33	84
Weeksella virosa	99	0	0	0	0	0	0	0	0	0	60	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0
Weeksella zoohelcum	99	0	0	0	0	0	0	0	0	0	20	85	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Pasteurella multocida	100	0	45	1	78	0	100	90	34	10	90	3	0	0	0	0	1	5	84	1	88	9	3	0	1	1	1
Pasteurella haemolytica	95	0	95	0	0	0	100	90	40	70	0	0	0	0	0	0	0	70	70	0	90	20	5	10	70	0	0
Actinobacillus spp.	90	0	91	0	0	10	33	27	11	78	0	100	0	0	0	0	5	0	5	0	27	27	0	0	33	33	0

Number denotes the percentage of positive strains

Colour chart/Farbtafel/Tableau 'de couleurs

Microgen™ GN A ID

WELL/NAPFCHEN /GODET	1	2	3	4	5	6	7	8	9	10	11	12	7
Reaction	Lysine	Ornithine	H_2S	Glucose	Mannitol	Xylose	O.N.P.G.	Indole	Urease	V.P.	Citrate	T.D.A.	Nitrate
Negative													
Positive													

Microgen™ GN B ID

WELL/NAPFCHEN /GODET	13	14	15	16	17	18	19	20	21	22	23	24	24
Reaction	Gelatin	Malonate	Inositol	Sorbitol	Rhamnose	Sucrose	Lactose	Arabinose	Adonitol	Raffinose	Salicin	Arginine 24hrs	Arginine 48hrs
Negative													
Positive													

CAUTION: Keep out of direct sunlight. Due to laminate discolouration and paper ageing, the colours on this chart will change.

These colours are provided as general guide to the range of test colours.

Legend:

- Appropriate reagents to be added prior to reading.
- Overlaid with sterile mineral oil.
- Not overlaid with oil for oxidase positive organism.