

APPENDIX G

BIOL 240 LAB – KEYS FOR IDENTIFYING UNKNOWN BACTERIA (EXPTS. 12 & 17)

Experiment 12: Key to Isolated Aerobic Endosporeformers

Species	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Starch		
	10°C	30°C	50°C	pH5	pH 6.8 (Isolation pH)	NB + lysozyme	Min. Glu.	Hydrolysis	Catalase	Oxidase
<i>B. subtilis</i>	-	+	-	-	+	variable (+)	+	+	+	variable (+)
<i>B. stearothermophilus</i>	-	-	+	-	+	-	-	+	variable (+)	variable (+)
<i>B. mycoides</i>	-	+	-	ND	+	+	-	+	+	-
<i>B. megaterium</i>	variable (+)	+	-	ND	+	-	+	+	+	variable (+)
<i>B. acidocaldarius</i>	-	-	+	+	-	ND	+	+	ND	ND
<i>B. coagulans</i>	-	+	+	+	+	-	-	+	+	ND
<i>B. licheniformis</i>	-	+	+	ND	+	variable (+)	+	+	+	variable (+)
<i>B. schlegelii</i>	-	-	+	-	+	+	+	-	+	+

+ = growth
 -- = no growth
 ND = no data available
 variable = usually 11-89% of isolates are positive

Experiment 17: Key to Gram Negative Unknown Bacterium (part I):

SPECIES:	Gram	Motile	Oxidase	Gelatin	Starch	Urease	"I"	"M"	"VI"	"C"	H2S (TS)	P.R. &	Durham	P.R.	P.R.	P.R.	P.R.	P.R.
							Indole (SIM)	MR	VP	Citrate	Product	Glucose	Gas	Lactose	Mannitol	Sucrose	Xylose	L-Arab
<i>Kluyvera ascorbata</i>	-	+	-	-	-	-	+	+	-	+	-	+	+	+	+	+	+	+
<i>Enterobacter aerogenes</i>	-	+	-	-	-	-	-	-	+	+	-	+	+	+	+	+	+	+
<i>Yersinia intermedia</i>	-	+	-	-	-	+	-	-	+	+	-	+	-	-	+	+	+	+
<i>Escherichia coli</i>	-	+/-	-	-	-	-	+	+	-	-	-	+	+	+	+	variable	+	+
<i>Klebsiella pneumoniae</i>	-	-	-	-	+/-	-	-	+	-	+	-	+	+	+	+	+	+	+
<i>Proteus vulgaris</i>	-	+	-	slight	+/-	+	+	+	-	-	+	+	+	-	-	+	+	-
<i>Salmonella typhimurium</i>	-	+	-	slight	-	-	-	+	-	+	+	+	+	-	+	-	+	+
<i>Pseudomonas aeruginosa</i>	-	+	+	+/-	+/-	-	-	-	-	+	-	-	-	-	-	-	+/-	-
<i>Pseudomonas fluorescens</i>	-	+	+	+	+/-	-	-	-	-	+/-	-	-	-	-	-	-	+/-	+
<i>Providencia stuartii</i>	-	+	-	-	-	-	+	+	-	+/-	-	+	-	-	+/-	+/-	-	-
<i>Shigella flexnarii</i>	-	-	-	-	-	-	-	+	-/+	-	-	+	-/+	-/+	+/-	-	--	+
<i>Proteus mirabilis</i>	-	+	-	+/-	-	+	-	+	-	+	+	+	+	-	-	-	+	-
<i>Erwinia carotovora</i>	-	+	-	slight	-	-	-	+	+	-	-	+	-	+	+	+	+	+
<i>Acetobacter aceti</i>	-	+	-	-	-	ND	-	ND	ND	ND	ND	+	-	-	-	-	+	ND
<i>Azotobacter chroococum</i>	-	+	+	-	+	ND	ND	ND	ND	+	ND	+	+	+	ND	+	ND	ND
<i>Citrobacter freundii</i>	-	+	-	-	-	-	-	+	-	+	+	+	+	+	+	+	+	+
<i>Hafnia</i>	-	+	+	-	-	-	-	+	+	-	-	-	-	-	-	-	+	-
<i>Edwardsiella tarda</i>	-	+	-/+	-	-	-	+	+	-	-	+	+	+	-	-	-	+/-	+/-
<i>Yersinia enterocolitica</i>	-	+	-	-	+	-	-	+	+	-	-	+	-	+	+	+	-	+
<i>Vibrio cholerae</i>	-	-	+	+	+	ND	Variable	Variable	Variable	Variable	ND	+	-	-	+	+	-	-

Sugar Fermentation (PR):	+ = Acid (yellow)
	-- = growth, no Acid
	ND = No Data

Experiment 17: Key to Gram Negative Unknown Bacterium (part II):

	<u>TSI SLANT</u>			Nitrate Reductase	Phenyl-alanine Deaminase	Decarb. Base	Decarb. Lysine	Decarb. ARG	Decarb. Orn	Growth KCN	ON PG
	face	butt	Gas								
<i>Kluyvera ascorbata</i>	ND	ND	ND	+	-	+	-	-	+	+	+
<i>Enterobacter aerogenes</i>	A	A	-	+	-	+	-	+	+	+	+
<i>Yersinia intermedia</i>	ND	ND	ND	+	-	+	-	+	-	-	+
<i>Escherichia coli</i>	A	A	+	+	-	+	+	+	+	-	+
<i>Klebsiella pneumoniae</i>	A	A	+	+	-	+	+	-	+/-	+/-	+/-
<i>Proteus vulgaris</i>	A	A	+/-	+	+	-	-	-	+	+	-
<i>Salmonella typhimurium</i>	A	A	+	+/-	-	+	+	+	+	+	+/-
<i>Pseudomonas aeruginosa</i>	K	K	+/-	+ (N ₂ gas)	-	NOT VALID				very slow	ND
<i>Pseudomonas fluorescens</i>	K	K	+/-	-	-	NOT VALID				very slow	ND
<i>Providencia stuartii</i>	A	K	+/-	+	+	-	-	-	-	+	-
<i>Shigella flexnarii</i>	ND	ND	--	+	-	+	-	-	-	-	-/+
<i>Proteus mirabilis</i>	K	K	+/-	+	+	+	-	-	+	+	-
<i>Erwinia carotovara</i>	A	K	-	+	-	+	-	-	-	very slow	ND
<i>Acetobacter aceti</i>	ND	ND	ND	-	ND	ND	ND	ND	ND	ND	ND
<i>Azotobacter chroococum</i>	ND	ND	ND	-	ND	ND	ND	ND	ND	ND	ND
<i>Citrobacter freundii</i>	A	A	G	+	-	+	-	+	-	-	-
<i>Hafnia</i>	ND	ND	ND	+	+	NOT VALID				+	+/-
<i>Edwardsiella tarda</i>	K	A	+	+	-	+	+	-	+	+slow	-
<i>Yersinia enterocolitica</i>	A	A	-	+	-	+	-	-	+	-	+
<i>Vibrio cholerae</i>	ND	ND	ND	+	ND	+	-	+	+	ND	+

<u>TSI SLANT</u>
A = Acid (yellow)
K = Akaline (pink)
ND = No data

