CHAPTER 10

References

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APPENDIX A

An abridged taxonomic outline of the α-*Proteobacteria* as described in the second edition of Bergey's Manual of Systematic Bacteriology (Garrity *et al.*, 2001). Detail is provided only for the families where rhizobia are relevant. Outline may be obtained from website: http://www.cme.msu.edu/Bergeys/

Phylum BXII. *Proteobacteria*
- Class I: *Alphaproteobacteria*
  - Order I: *Rhodospirillales*
    - *Family I:* *Rhodospirillaceae*
    - *Family II:* *Acetobacteraceae*
  - Order II: *Ricketsiales*
    - *Family I:* *Ricketsiaceae*
    - *Family II:* *Ehrlichiceae*
    - *Family III:* *Holosporaceae*
  - Order III: *Rhodobacterales*
    - *Family I:* *Rhodobacteraceae*
  - Order IV: *Sphingomonadales*
    - *Family I:* *Sphingomonadaceae*
  - Order V: *Caulobacterales*
    - *Family I:* *Caulobacteraceae*
  - Order VI: ***Rhizobiales***
    - *Family I:* ***Rhizobiaceae***
      - *Genus I:* ***Rhizobium***
      - *Genus II:* ***Agrobacterium***
      - *Genus III:* *Carbophilus*
      - *Genus IV:* *Chelatobacter*
      - *Genus V:* *Ensifer*
      - *GenusVI:* ***Sinorhizobium***
    - ***Family II:*** ***Bartonellaceae***
    - ***Familiy III:*** ***Brucellaceae***
    - ***Family IV:*** ***Phyllobacteriaceae***
      - *Genus I:* *Phyllobacterium*
      - *Genus II:* ***Allorhizobium***
      - *Genus III:* *Aminobacter*
      - *Genus IV:* *Aquamicrobium*
      - *Genus V:* *Defluvibacter*
      - *Genus VI:* ***Mesorhizobium***
      - *Genus VII:* *Pseudaminobacter*
    - *Family V:* *Methylocystaceae*
    - *Family VI:* *Beijerinckiaceae*
    - *Family VII:* ***Bradyrhizobiaceae***
      - *Genus I:* ***Bradyrhizobium***
      - *Genus II:* *Afipia*
      - *Genus III:* *Agromonas*
      - *Genus IV:* *Blastobacter*
      - *Genus V:* *Bosea*
      - *Genus VI:* *Nitrobacter*
      - *Genus VII:* *Oligotropha*
      - *Genus VIII:* *Rhodopseudomonas*
    - *Family VIII:* ***Hyphomicrobiaceae***
      - *Genus I:* *Hyphomicrobium*
      - *Genus II:* *Ancalomicrobium*
      - *Genus III:* *Ancylobacter*
      - *Genus IV:* *Angulomicrobium*
      - *Genus V:* *Aquabacter*
      - *Genus VI:* ***Azorhizobium***
      - Including 14 other genera
    - *Family IX:* *Methylobacteriaceae*
      - *Genus I:* *Methylobacterium*
      - Including 2 other genera
    - *Family X:* *Rhodobiaceae*
      - *Genus I:* *Rhodobium*

APPENDIX B

Graphical representation of the 95 different carbon sources as supplied in the Gram negative Biolog plate.

A1 water	A2 α-cyclodextrin	A3 dextrin	A4 glycogen	A5 tween 40	A6 tween 80	A7 N-acetyl-D-galactosamine	A8 N-acetyl-D-glucosamine	A9 adonitol	A10 L-arabinose	A11 D-arabitol	A12 cellobiose
B1 i-erythritol	B2 D-fructose	B3 L-fucose	B4 D-galactose	B5 gentiobiose	B6 α-D-glucose	B7 m-inositol	B8 α-D-lactose	B9 lactulose	B10 maltose	B11 D-mannitol	B12 D-mannose
C1 D-melibiose	C2 β-methyl D-glucoside	C3 D-psicose	C4 D-raffinose	C5 L-rhamnose	C6 D-sorbitol	C7 sucrose	C8 D-trehalose	C9 turanose	C10 xylitol	C11 methyl pyruvate	C12 mono-methyl succinate
D1 acetic acid	D2 cis-aconitic acid	D3 citric acid	D4 formic acid	D5 D-galactonic acid lactone	D6 D-galacturonic acid	D7 D-gluconic acid	D8 D-glucosaminic acid	D9 D-glucuronic acid	D10 α-hydroxybutyric acid	D11 β-hydroxybutyric acid	D12 γ-hydroxybutyric acid
E1 p-hydroxy phenylacetic acid	E2 itaconic acid	E3 α-keto butyric acid	E4 α-keto glutaric acid	E5 α-keto valeric acid	E6 D,L-lactic acid	E7 malonic acid	E8 propionic acid	E9 quinic acid	E10 D-saccharic acid	E11 sebacic acid	E12 succinic acid
F1 bromo succinic acid	F2 succinamic acid	F3 glucuronamide	F4 alaninamide	F5 D-alanine	F6 L-alanine	F7 L-alanyl-glycine	F8 L-asparagine	F9 L-aspartic acid	F10 L-glutamic acid	F11 glycyl-L-aspartic acid	F12 glycyl-L-glutamic acid
G1 L-histidine	G2 hydroxy L-proline	G3 L-leucine	G4 L-ornithine	G5 L-phenylalanine	G6 L-proline	G7 L-pyroglutamic acid	G8 D-serine	G9 L-serine	G10 L-threonine	G11 D,L-carnitine	G12 γ-amino butyric acid
H1 urocanic acid	H2 inosine	H3 uridine	H4 thymidine	H5 phenyl ethylamine	H6 putrescine	H7 2-amino ethanol	H8 2,3-butanediol	H9 glycerol	H10 D,L-α-glycerol phosphate	H11 glucose-1-phosphate	H12 glucose-6-phosphate

APPENDIX C

Medium 72:

K_2HPO_4	1.2 g
KH_2PO_4	0.62 g
$CaCl_2.2H_2O$	34 mg
$MgSO4.7H_2O$	0.2 g
NaCl	0.1 g
$FeCl_3.6H_2O$	1 mg
$(NH4)_2SO_4$	0.5 g
Trace element solution	1 ml
Agar	15 g
Distilled water up to	1 L
PH	7.0

Trace element solution

$CuSO_4.5H_2O$	5 mg
$MnSO_4.H_2O$	7 mg
$Na_2MoO_4.2H_2O$	10 mg
H_3BO_3	10 mg
$ZnSO_4.7H_2O$	70 mg
$CoCl_2.6H_2O$	5 mg

After sterilisation cool down and aseptically add 10 ml filter-sterilised methanol per liter medium