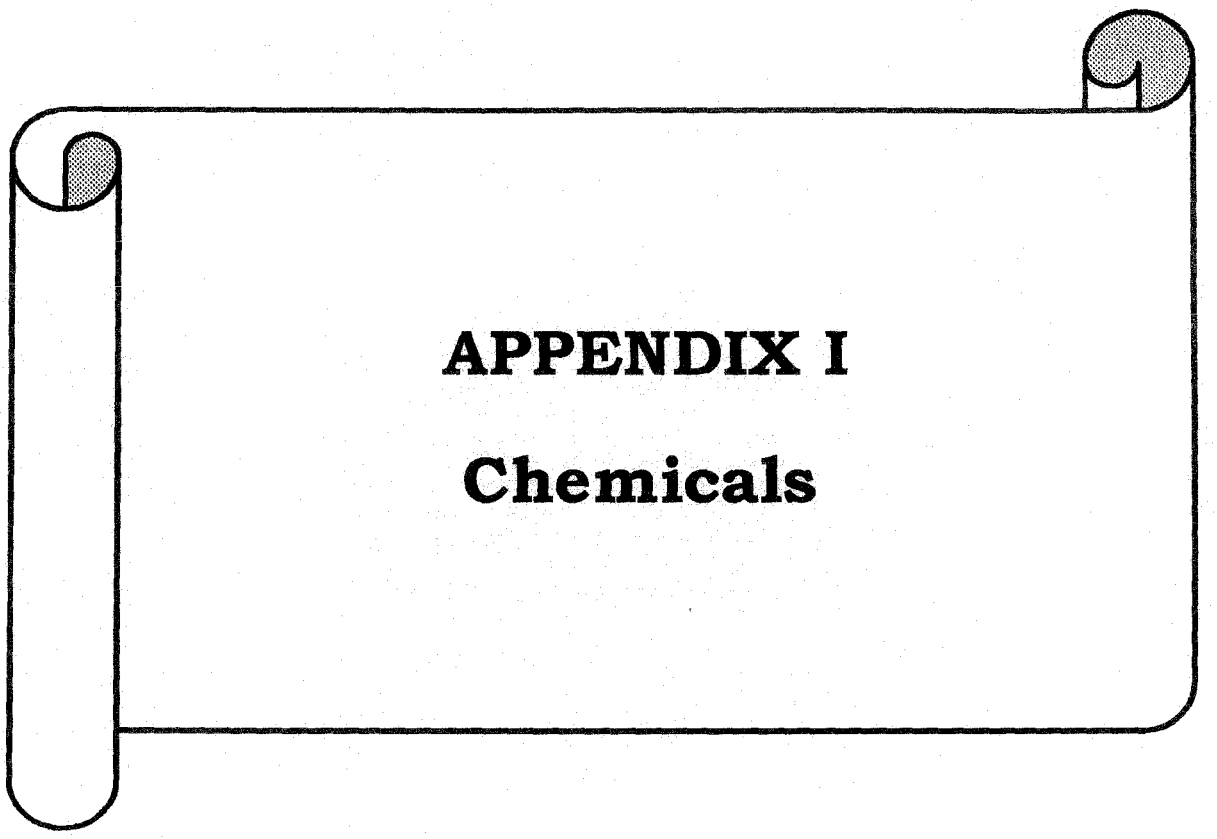


APPENDIX I

Chemicals

CHEMICALS	COMPANY
Acetic acid (glacial)	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Adonitol	HiMedia Laboratories Pvt Ltd, Mumbai, India
Agarose	Lonza, Rockland, ME, USA
Amberlite XAD-2	Supelco Analytical, PA, USA
Ammonium sulphate	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Ampicillin	HiMedia Laboratories Pvt Ltd, Mumbai, India
Amyl alcohol	Sisco Research Laboratories Pvt Ltd, Mumbai, India
D-Arabinose	HiMedia Laboratories Pvt Ltd, Mumbai, India
L-Asparagine	Sisco Research Laboratories Pvt Ltd, Mumbai, India
n-butanol	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Calcium chloride	HiMedia Laboratories Pvt Ltd, Mumbai, India
Carboxy methyl cellulose sodium salt	HiMedia Laboratories Pvt Ltd, Mumbai, India
casamino acid (Casein acid hydrolysate)	HiMedia Laboratories Pvt Ltd, Mumbai, India
chloroform	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Chrome Azurol S	HiMedia Laboratories Pvt Ltd, Mumbai, India
Crystal Violet	Micro Master Laboratories Pvt. Ltd., India
decarboxylase agar base media	HiMedia Laboratories Pvt Ltd, Mumbai, India
p-Dimethyl aminobenzaldehyde	HiMedia Laboratories Pvt Ltd, Mumbai, India
DNA ladder (500 bp)	Bangalore Genei (India) Pvt Ltd, Bangalore, India
DNA ladder (100 bp)	Bangalore Genei (India) Pvt Ltd, Bangalore, India
dNTP mix (2.5 mM each)	Bangalore Genei (India) Pvt Ltd, Bangalore, India
Ethidium Bromide	Bangalore Genei (India) Pvt Ltd, Bangalore, India
Ferric chloride (anhydrous)	HiMedia Laboratories Pvt Ltd, Mumbai, India

Ferric chloride hexahydrate	HiMedia Laboratories Pvt Ltd, Mumbai, India
fluorescent brightener 28	Sigma-Aldrich Co., MO, USA
gel loading buffer (6X)	Bangalore Genei (India) Pvt Ltd, Bangalore, India
Gram's Iodine solution	Micro Master Laboratories Pvt. Ltd., India
Glucose	HiMedia Laboratories Pvt Ltd, Mumbai, India
Glutaraldehyde (25%)	HiMedia Laboratories Pvt Ltd, Mumbai, India
Glycine	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Glycol Chitosan (chitin)	Sigma Aldrich Co. MO, USA
Cetyl trimethyl ammonium benzaldehyde (CTAB/HDTMA)	Calbiochem, E. Merck (India) Ltd., India
Hydrogen peroxide (30%)	E. Merck (India) Ltd., India
Indole acetic acid	E. Merck (India) Ltd., India
Inositol	HiMedia Laboratories Pvt Ltd, Mumbai, India
IPTG	Promega Corporation, Madison, USA
Iso amyl alcohol	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Lactose	Sisco Research Laboratories Pvt Ltd, Mumbai, India
L-Lysine hydrochloride	HiMedia Laboratories Pvt Ltd, Mumbai, India
Maltose	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Magnesium chloride (25 mM)	Bangalore Genei (India) Pvt Ltd, Bangalore, India
Mannitol	HiMedia Laboratories Pvt Ltd, Mumbai, India
Methyl alcohol (Methanol)	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Methyl red	Micro Master Laboratories Pvt. Ltd., India
Methylene Blue	E. Merck (India) Ltd., India
α-Naphthol	Sisco Research Laboratories Pvt Ltd, Mumbai, India
α-Naphthylamine	SD Chemicals, India
ONPG	Sisco Research Laboratories Pvt Ltd, Mumbai, India

L-Ornithine monohydrochloride	HiMedia Laboratories Pvt Ltd, Mumbai, India
pGEM-T Easy Vector System II	Promega Corporation, Madison, USA
Peptone	HiMedia Laboratories Pvt Ltd, Mumbai, India
Pectin	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Perchloric Acid (35%)	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Phenol	Bangalore Genei (India) Pvt Ltd, Bangalore, India
Phenol red	Sisco Research Laboratories Pvt Ltd, Mumbai, India
L-Phenylalanine	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Picric acid	HiMedia Laboratories Pvt Ltd, Mumbai, India
Primers	Sigma Aldrich Co., USA
Proteinase K	Bangalore Genei (India) Pvt Ltd, Bangalore, India
D-Raffinose	HiMedia Laboratories Pvt Ltd, Mumbai, India
L-Rhamnose	HiMedia Laboratories Pvt Ltd, Mumbai, India
Safranin Stain	E. Merck (India) Ltd., India
Sephadex LH-20	Sigma Aldrich Co., USA
D-Sorbitol	HiMedia Laboratories Pvt Ltd, Mumbai, India
Sucrose	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Sodium citrate	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Sodium dodecyl sulphate	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Sodium molybdate dihydrate	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Starch (soluble)	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Sulphanilic acid	E. Merck (India) Ltd., India
10X Taq DNA polymerase buffer F (without $MgCl_2$)	Bangalore Genei (India) Pvt Ltd, Bangalore, India
Taq polymerase (3Unit/µl)	Bangalore Genei (India) Pvt Ltd, Bangalore, India

Tetramethyl-p-phenylenediamine dihydrochloride	HiMedia Laboratories Pvt Ltd, Mumbai, India
Thiamine HCl	Sisco Research Laboratories Pvt Ltd, Mumbai, India
Trehalose	HiMedia Laboratories Pvt Ltd, Mumbai, India
Triphenyl tetrazolium chloride (Tetrazoliun salt)	HiMedia Laboratories Pvt Ltd, Mumbai, India
Tryptone	HiMedia Laboratories Pvt Ltd, Mumbai, India
Urea	HiMedia Laboratories Pvt Ltd, Mumbai, India
X-gal	Promega Corporation, Madison, USA
D-Xylose	HiMedia Laboratories Pvt Ltd, Mumbai, India
Yeast extract	HiMedia Laboratories Pvt Ltd, Mumbai, India

APPENDIX II

Buffers and Reagents

1. Acetate buffer

Stock solution A:

Acetic acid	0.1 M
Distilled water	1000 ml

Stock solution B:

Sodium acetate (tri hydrate)	13.6 g
Distilled water	1000 ml

847 ml Stock solution A and stock solution B 153 ml were mixed to obtain a buffer of pH 4.

2. Phosphate Buffer

Stock solution A:

NaH_2PO_4	23.4 g
Distilled water	1000 ml

Stock solution B:

Na_2HPO_4	21.29 g
Distilled water	1000 ml

28 ml of stock solution A was added to 72 ml of stock solution B to obtain a final solution of pH 7.2.

To obtain a solution of pH 7.0, stock solution A was added to 61 ml of stock solution B.

3. TE buffer

Tris-HCl	10 mM
EDTA	1 mM
Final pH	8.0

4. 1X TAE buffer

50X TAE composition:

Tris base	242 g
Glacial acetic acid	57.1 ml

EDTA (0.5 M)	100 ml
Distilled water (final volume make up to)	1000 ml
Final pH	8.0

To make 1X TAE buffer, 1 ml 50X stock buffer was diluted in 49 ml distilled water to make final volume 50 ml.

5. 0.1% Congo Red Solution

Congo Red	0.1 g
Distilled water	100 ml

6. 1% CTAB in 1M NaCl

CTAB	1.0 g
NaCl	5.8 g
Distilled water	100 ml

5.8 g of NaCl was added to 100 ml distilled water in a conical flask and dissolved completely. The solution was autoclaved at 15 psi for 15 min. After sterilization the solution was allowed to cool down and then 1 g CTAB was added to it and mixed gently.

7. Kovac's reagent

p- dimethylaminobenzaldehyde	5.0 g
Amyl alcohol	75 ml
Concentrated HCl	25 ml

The *p*-dimethylaminobenzaldehyde was dissolved in alcohol by gentle mixing and then conc. HCl was added to it with care. The solution was stored at 4°C in dark.

8. Malachite green Stain

Malachite green	5.0 g
Distilled water	100 ml

9. Methylene Blue Stain

Methylene blue (90%)	0.3 g
Distilled water	100 ml

10. Methyl red indicator

Methyl red	0.1 g
Ethyl alcohol (95%)	300 ml
Distilled water	200 ml

Methyl red was dissolved in alcohol, distilled water was added to it and the mixture was filtered, stored.

11. Nitrate reagent A

Sulphanilic acid	8.0 g
Acetic acid 5N	1000 ml

12. Nitrate reagent B

α-Naphthylamine	5.0 g
Acetic acid 5N	1000 ml

13. Nitrite-Molybdate Reagent

$NaNO_2$	10.0 g
$Na_2MoO_4.2H_2O$	10.0 g
Distilled water	50 ml

14. Oxidase Reagent (tetramethyl-*p*-phenylenediamine dihydrochloride)

Tetramethyl *p*-phenylene diamine dihydrochloride	1.0 g
Distilled water	100 ml

15. Salkowski's reagent

$FeCl_3$ (0.5 M)	1.0 ml
Perchloric Acid (35%)	50 ml

16. 10% SDS solution

SDS	10 g
Distilled wate	100 ml

To prepare 10% SDS solution, 100 ml distilled water was measured and dispensed in a 250 ml conical flask. It was sterilized by autoclaving at 15 psi for 15 min and allowed to cool down. After the sterilized water was cold

enough (about 40°C) 10 g of SDS was weighed and added to it. It was mixed gently to avoid froth formation.

17. Sodium chloride solution (5M)

NaCl	29.2 g
Distilled water	100 ml

100 ml distilled water was taken in a conical flask and 29.2 g NaCl was added to it. It was mixed thoroughly and sterilized at 15 psi for 15 min.

18. VP reagent I

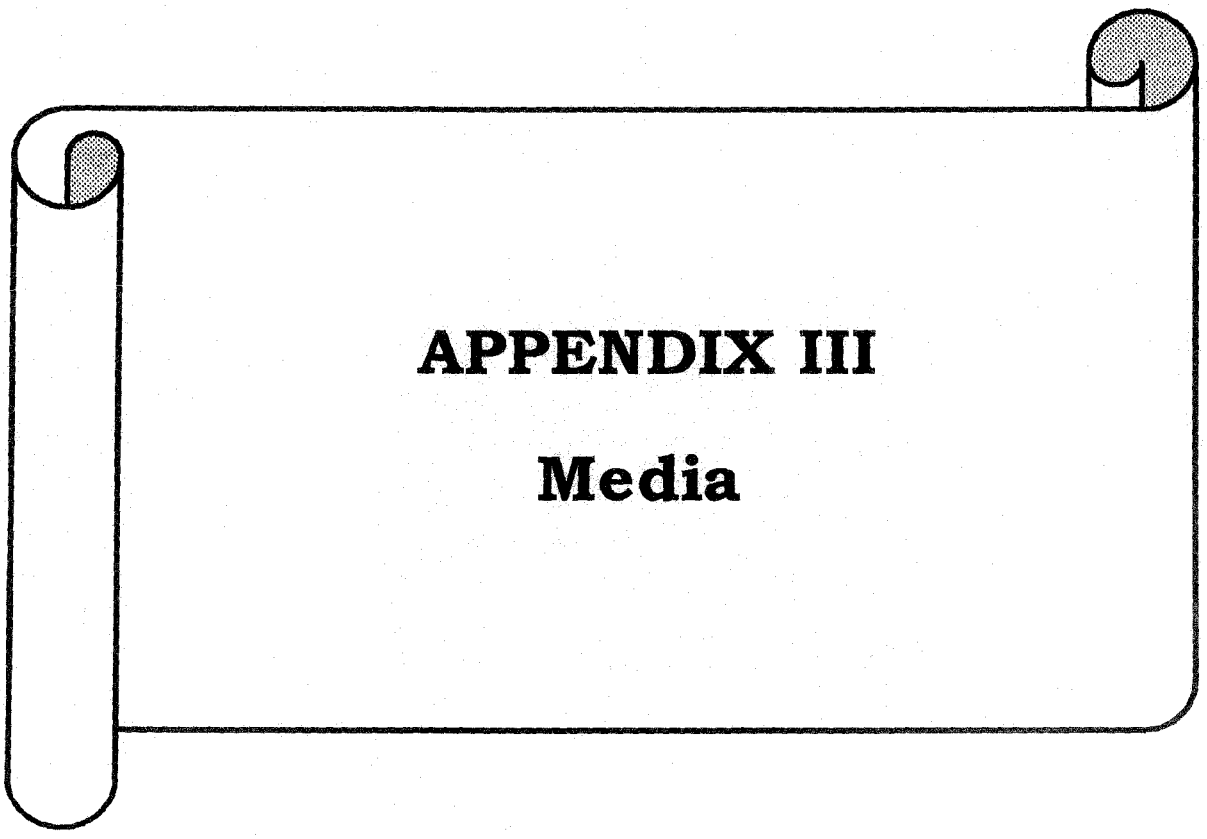
α-naphthol	5.0 g
Ethyl alcohol	95 ml

19. VP reagent II

KOH	40 g
Distilled water	100 ml

20. Winogradsky solution

K_2HPO_4	3.8 g
KH_2PO_4	1.2 g
$MgSO_4.\ 7H_2O$	5.1 g
NaCl	2.5 g
$FeSO_4$	0.05 g
$MnSO_4$	0.05 g
DDW	1000 ml



APPENDIX III

Media

1. Chrome Azurol S (CAS) agar (Schwyn & Neilands, 1987)

CAS agar plates were prepared by mixing all ingredients as described in chapter 3 (section 3.2.2)

Solution 1(Fe-CAS indicator solution):

1mM $FeCl_3.6H_2O$ (in 10mM HCl)	10 ml
CAS solution (1.21mg/ml)	50 ml
HDTMA solution (1.82mg/ml)	40 ml

Solution 2 (Buffer solution):

PIPES buffer	30.24 g
Distilled water	750 ml
Final pH (at 25°C)	6.8

Solution 3:

Glucose	2 g
Mannitol	2 g
Distilled water	70 ml

Solution 4:

10% (w: v) casamino acid (filter sterilized)	30 ml

2. Decarboxylase test medium base (HiMedia, India)

For preparing the decarboxylase medium, decarboxylase test medium base (Falkow base) (HiMedia, India) was used. It was supplemented with L-Ornthine and L-Lysine separately. The composition of the medium is as follows:

Composition:

Peptone	5.0 g
Yeast extract	3.0 g
Dextrose	1.0 g
Bromo cresol purple	0.02 g
Distilled water	1000 ml

9 g of test medium (HiMedia Laboratories, India) was dispensed in 1000 ml distilled water following manufacturer's instruction. Medium was heated to dissolve the components completely. It was divided into 3 equal parts. One part was prepared without adding any amino acid, to the remaining 2 parts L-Ornithine and L-Lysine hydrochloride were added to obtain a final concentration of 0.5%. The medium was dispensed in 3-4 ml quantities in test tubes and sterilized by autoclaving at 15 psi for 15 min.

3. DNase agar (Himedia, India)

Composition:

Tryptose	20.0 g
Deoxyribonucleic acid (DNA)	2.0 g
NaCl	5.0 g
Toluidine blue	0.1 g
Agar	15.0 g
Distilled Water	1000 ml
Final pH (at 25°C)	7.3

The DNase agar (Hi-media Laboratories, India) was weighed 42.1 g and dissolved in 1000 ml distilled water in a conical flask following manufacturer's instruction. It was next heated to melt and sterilized by autoclaving at 15 psi for 15 min. After autoclaving medium was dispensed in sterile petri plates (15 ml each) and allowed to solidify.

4. Fiss Glucose Minimal Media (Vellore, 2001)

Composition:

KH_2PO_4	5.03 g
L-Asparagine	5.03 g
Glucose	5.0 g
$MgSO_4.7H_2O$	40.0 mg
$MnSO_4$	100.0 µg

$ZnCl_2$	500.0 µg
Deionized distilled water	1000 ml

All components were dissolved in distilled water and the resulting medium (150 ml) was dispensed in 250 ml conical flasks. It was autoclaved for 15 min at 15 psi.

5. Gelatin Agar Media (Aneja, 2003)

Composition:	
Tryptone	1.0 g
Yeast extract	5.0 g
Glucose	1.0 g
Gelatin	4.0 g
Potassium monohydrogen phosphate	5.0 g
Distilled water	1000 ml
Final pH (at 25°C)	6.8

All ingredients were weighed and dissolved in distilled water. The medium was heated to melt all ingredients and pH was adjusted to 6.8. The final solution was dispensed in test tubes (5 ml each) and sterilized by autoclaving at 15 psi for 15 min.

6. Hugh and Leifson's O-F media (Barrow and Feltham 1993)

Composition:	
Peptone	2.0 g
NaCl	5.0 g
K_2HPO_4	0.3 g
Bromothymol Blue (0.2%)	15 ml
Agar	3.0 g
Glucose	10.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.1

All the solids except glucose were dissolved by heating in the water and pH was adjusted to 7.1, filtered, and the indicator was added to it. Then the mixture was sterilized at 121°C for 15 min. Glucose was dissolved in water, sterilized separately and added aseptically to the medium to make a final concentration of 1% and was dispensed in sterile test tubes (5 ml each).

7. Luria-Bertani (LB) broth

Composition:	
Yeast extract	5.0 g
Casein peptone	10 .0 g
Sodium chloride	10.0 g

All media components were dissolved in distilled water and dispensed in test tubes (5 ml each). Test tubes were autoclaved at 15 psi for 15 min.

8. M9 agar basal medium (Miller, 1974)

Composition:	
Na_2HPO_4	6.0 g
K_2HPO_4	4.5 g
NH_4Cl	1.0 g
NaCl	0.50 g
$CaCl_2$	15.0 mg
$MgSO_4.7H_2O$	245.0 mg
Thiamine HCl	10.0 mg
Agar	20 g
Distilled water	1000 ml

M9 agar basal medium was prepared by dissolving all ingredients in distilled water and then it was heated to melt them completely. The basal medium was supplemented with cellulose, pectin or chitin (glycol chitosan) separately to test for different lytic activities. The

supplemented medium was sterilized by autoclaving at 15 psi for 15 min.

9. MR-VP broth (Aneja, 2003)

Composition:	
Peptone	7.0 g
K_2HPO_4	5.0 g
Dextrose	5.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.0

MR-VP broth was prepared by dissolving the components in distilled water and its pH was adjusted to 7.0. The medium was dispensed in test tubes (5 ml each) and sterilized.

10. Nitrate Broth (Barrow and Feltham 1993)

Composition:	
KNO_3	1.0 g
Nutrient Broth	1000 ml

KNO_3 was dissolved in the nutrient broth and mixed properly. The medium was distributed into test tubes (5 ml each) and sterilized at121°c for 15 min.

11. Nutrient Broth (NB) (Aneja, 2003)

Composition:	
Peptone	5.0 g
NaCl	5.0 g
Beef extract	3.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.2

Nutrient broth was prepared by dissolving all ingredients in distilled water and pH was adjusted. The medium was dispensed into test tubes (5 ml each). Test tubes were sterilized by autoclaving at 15 psi for 15 min.

12. Nutrient Agar (NA) (Aneja, 2003)

Composition:	
Peptone	5.0 g
NaCl	5.0 g
Beef extract	3.0 g
Agar	15.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.2

All media components were dissolved in distilled water and heated to melt the agar. It was dispensed in test tubes (5 ml for slants) and autoclaved. To prepare NA plates, the medium was autoclaved and then dispensed in sterile petri plates.

13. ONPG broth (Barrow and Feltham 1993)

Composition:	
ONPG	6.0 g
0.01M Na_2HPO_4	1000 ml

ONPG (O-nitro-phenyl-D-galactopyranoside) was dissolved in the phosphate solution (pH-7.5) at room temperature and sterilized by filtration.

ONPG solution	250 ml
Peptone water	750 ml

ONPG solution was aseptically added to the sterile peptone water, mixed and distributed in 2.5 ml volumes in sterile test tubes.

14. Peptone Water Broth (Barrow and Feltham 1993)

Composition:	
Peptone	10.0 g
NaCl	5.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.2

The solids were dissolved by heating in water and pH of the solution was adjusted to pH 7.2. The medium was distributed in test tubes (5 ml each) and sterilized at 121°C for 15 min.

15. Phenylalanine agar (Barrow and Feltham 1993)

Composition:	
DL-Phenylalanine	2.0 g
Yeast extract	3.0 g
Na_2HPO_4	1.0 g
NaCl	5.0 g
Agar	20.0 g
Distilled water	1000 ml

All media ingredients were dissolved in distilled water and heated to melt. It was then dispensed in test tubes (5 ml each) and sterilized by autoclaving at 15 psi for 15 min.

16. Pikovskaya's Agar Medium (Pikovskaya, 1948)

Composition:	
Yeast extract	0.5 g
Dextrose	10.0 g
$Ca_3(PO_4)_2$	5.0 g

$(NH_4)_2SO_4$	0.5 g
KCl	0.2 g
$MgCl_2$	0.1 g
$MnSO_4$	0.0001 g
$FeSO_4$	0.0001 g
Agar	15 g
Distilled water	1000 ml

Media components were dissolved in distilled water and then heated to melt. The medium was autoclaved and after that dispensed in sterile perti plates and allowed to solidify.

17. Potato Dextrose Broth (PDB) (Aneja, 2003)

Composition:	
Potato	20.0 g
Dextrose	2.0 g
Distilled water	100 ml

The skin of potatoes were peeled off and cut into 1 cm cubes. The pieces were boiled in 100 ml distilled water till they turned soft. It was then filtered through cheesecloth and the filtrate was collected. Dextrose was added to it and dissolved. The medium was dispensed according to the experimental requirements and autoclaved at 15 lb psi for 15 min.

18. Potato Dextrose Agar (PDA) (Aneja, 2003)

Composition:	
Potato	20.0 g
Dextrose	2.0 g
Agar	2.0 g
Distilled water	100 ml

The PDB was prepared as above and agar was added which was then heated to melt before dispensing in tubes (5 ml for slants). It was

sterilized at 15 psi pressure for 15 min. The medium was dispensed in sterile petri plates and allowed to solidify or in case of slants, the tubes were kept at slanting position till solidified.

19. *Pseudomonas* Agar (For Fluorescein) (HiMedia):

Composition:	
Pancreatic digest of casein	10.0 g
Peptic digest of animal tissue	10.0 g
Anhydrous dibasic potassium phosphate	1.5 g
$MgSO_4.7H_2O$	1.5 g
Agar	15.0 g
Distilled water	1000 ml

37.3 g of the dehydrated medium (Hi-media Laboratories, India) was dissolved in 1000 ml of distilled water containing 10 ml glycerine following manufacturer's instruction. The medium was then heated and sterilized at 121°C for 15 min and dispensed into sterile petri plates.

20. Semi Solid Motility Medium (Tittsler and Sandholzer, 1936)

Composition:	
Beef extract	3.0 g
Peptone	5.0 g
Agar	5.0 g
Distilled water	1000 ml
Final pH (at 25°C)	6.8

The ingredients were mixed and heated to melt. The medium was distributed in test tubes (10 ml each) and autoclaved at 121°C for 15 min. The tubes were then kept upright to solidify for stab inoculation.

21. Simmon's Citrate agar

Composition:	
$(NH_4)_2HPO_4$	1.0 g
K_2HPO_4	1.0 g
NaCl	5.0 g
Sodium citrate	2.0 g
$MgSO_4$, $7H_2O$	0.2 g
Bromothymol blue	0.08 g
Agar	15.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.0

Medium was prepared by adding all ingredients in distilled water and was heated to melt the agar. The melted medium was dispensed in test tubes (5 ml each) and autoclaved at 15 lb psi for 15 min. The tubes were allowed to stand at an inclined position until solidification.

22. Skim Milk Agar (Aneja, 2003)

Composition:	
Skim milk powder	100.0 g
Peptone	5.0 g
Agar	15.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.2

The ingredients were dissolved in distilled water and its pH was adjusted to 7.2. The medium was autoclaved at 15 psi for 15 min. After that, it was dispensed in sterile petri plates and allowed to solidify.

23. Soil extract agar (Barrow and Feltham, 1993)

Composition:	
Peptone	5.0 g
Beef (Meat) extract	3.0 g
Agar	20.0 g
Soil extract	1000 ml

The ingredients were added to soil extract and sterilized at 15 psi for 15 min. The medium was dispensed in sterile petri plates and allowed to stand for solidification.

24. Starch Agar (Aneja, 2003)

Composition:	
Starch (soluble)	20.0 g
Peptone	5.0 g
Beef extract	3.0 g
Agar	15.0 g
Distilled water	1000 ml
Final pH (at 25°C)	7.0

The ingredients except agar were dissolved in distilled water and pH was adjusted. Then agar was added to it and melted by heating. It was next autoclaved at 15 psi for 15 min. The medium was distributed in sterile petri plates and allowed to solidify.

25. Tryptone Broth (Aneja, 2003)

Composition:	
Tryptone	10.0 g
NaCl	5.0 g

$CaCl_2$ (1M)	1.0 g
Distilled water	1000 ml

Tryptone broth was prepared by dissolving all the components in distilled water and distributing them into test tubes (5 ml each). Test tubes were sterilized by autoclaving.

26. TSI agar (Aneja, 2003)

Composition:

Beef (Meat) extract	3.0 g
Yeast extract	3.0 g
Peptone	20.0 g
Glucose	1.0 g
Lactose	10.0 g
Sucrose	10.0 g
$FeSO_4.7H_2O$	0.2 g
NaCl	5.0 g
$Na_2S_2O_3.5H_2O$	0.3 g
Agar	20.0 g
Distilled water	1000 ml
Phenol red (0.2% aq. Soln.)	12 ml

The mixture of all ingredients was heated to dissolve the solids in distilled water and the indicator solution (Phenol red) was added, mixed and dispensed into tubes. The media was sterilized at 121°C for 15 min and cooled to form slopes with deep butts, about 3 cm long.

27. Tween 80 Media (Sierra, 1957)

Composition:

Peptone	10.0 g
NaCl	5.0 g
$CaCl_2.2H_2O$	0.1 g

Agar	20.0g
Tween 80	10 ml
Distilled water	1000 ml

The ingredients were dissolved by steaming and pH was adjusted to 7.4. It was sterilized at 121°C for 15 min and cooled to 40-50°C. Tween 80 was filter sterilized and 10 ml of it was added aseptically to flask to give a final concentration of 1% and then dispensed into petriplates.

28. Urea Broth (Barrow and Feltham 1993)

Composition:

Peptone	1.0 g
NaCl	5.0 g
KH_2PO_4	2.0 g
Glucose	1.0 g
Phenol red, 0.2% aq. Soln.	6 ml
Urea, 20% aq. soln.	100 ml
Distilled water	1000 ml
Final pH (at 25°C)	6.8

The solids namely peptone, NaCl and KH_2PO_4 were dissolved by heating and adjusted to pH 6.8, filtered and sterilized at 121°C for 15 min. Glucose and phenol red soln. were added to the molten base, steamed for 1h and cooled to 50°C. Urea was sterilized by filtration and added aseptically to the base cooled at 50°C. The medium was aseptically distributed into sterile test tubes.

APPENDIX IV

Nucleotide Sequences

1. Nucleotide sequences of 16S rRNA genes of the siderophore producing bacterial isolates antagonistic towards phytopathogens

1.1 Isolate BB05 (*Pseudomonas putida*)

Accession No. KC109321

Forward Sequence:

GACAATGGGCGAAAGCCTGATCCAGCCATGCCGCGTGTGTGAAGAAGGTCTTCG
GATTGTAAAGCACTTTAAGTTGGGAGGAAGGGCAGTAAGTTAATACCTTGCTGTTT
TGACGTTACCGACAGAATAAGCACCGGCTAACTCTGTGCCAGCAGCCGCGGTAA
TACAGAGGGTGCAAGCGTTAATCGGAATTACTGGGCGTAAAGCGCGCGTAGGTG
GTTTGTTAAGTTGGATGTGAAAGCTCAACCCCGGGCCTGGGAACTGCATCCAAAA
CTGGCAAGCTAGAGTACGGTAGAGGATGGGCCTATTAGAATTTCCTGTGTAGCG
GTGAAATGCGTAGATATAGGAAGGAACACCAGTGGCGAAGGCGACCACCTGGAC
TCCATGGCTGACACTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACC
CTGGTAGTCCACGCCGTAAACGATGTCAACTAGCCGTTGGAATCCTTGAGATTTT
AGTGGCGCAGCTAACGCATTAAGTTGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAA
TTCGAAGCAA

1.2 Isolate BB07 (*Pseudomonas fluorescens*)

Accession No. JX535385

Forward Sequence:

CTTGCTCCCGGATTCAGCGGCCGACGGGTGAGTAATGCCTAGGAATCTGCCTGG
TAGTGGGGGACAACGTTTCGAAAGGAACGCTAATACCGCATACGTCCTACGGGA
GAAAGCAGGGGACCTTCGGGCCTTGCGCTATCAGATGAGCCTAGGTCGGATTAG
CTAGTTGGTGAGGTAATGGCTCACCAAGGCGACGATCCGTAACTGGTCTGAGAG
GATGATCAGTCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGC
AGTGGGGAATATTGGACAATGGGCGAAAGCCTGATCCAGCCATGCCGCGTGTGT
GAAGAAGGTCTTCGGATTGTAAAGCACTTTAAGTTGGGAGGAAGGGTTGTAGATT
AATACTCTGCAATTTTGACGTTACCGACAGAATAAGCACCGGCTAACTCTGTGCC
AGCAGCCGCGGTAATACAGAGGGTGCAAGCGTTAATCGGAATTACTGGGCGTAA
AGCGCGCGTAGGTGGTTCGTTAAGTTGGATGTGAAATCCCCGGGCTCAACCTGG
GAACTGCATCCAAAACTGGCGAGCTAGAGTATGGTAGAGGGTGGTGGAGTTTCC
TGT

1.3 Isolate JL11 (*Klebsiella oxytoca*)

Accession No. KC109327

Forward Sequence:

CGGAATTGCCGCGGGCCCTAACACATGCAGTCGACGGTAGCACAGAGAGCTTGC
TCTCGGGTGACGAGTGGCGGACGGGTGAGTAATGTCTGGGAAACTGCCTGATGG
AGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAACGTCGCAAGACCAA
AGAGGGGGACCTTCGGGCCTCTTGCCATCAGATGTGCCCAGATGGGATTAGCTA
GTAGGTGGGGTAACGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGAT
GACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGT

GGGGAATATTGCACAATGGGCGCAAGCCTGATGCAGCCATGCCGCGTGTATGAA
GAAGGCCTTCGGGTTGTAAAGTACTTTCAGCGGGGAGGAAGGTGTTGAGGTTAA
TAACCTCAGCAATTGACG

1.4 Isolate MD01 (*Pseudomonas fluorescens*)

Accession No. KC109323

Forward Sequence:

TCTGCCTGGTAGTGGGGGATAACGCTCGGAAACGGACGCTAATACCGCATACGT
CCTACGGGAGAAAGCAGGGGACCTTCGGGCCTTGCCTATCAGATGAGCCTAGGT
CGGATTAGCTATTGGTGAGGTAATGGCTCACCAAGGCGACGATCCGTAACTGGT
CTGAGAGGATGATCAGTCACACTGGAACTGAGACGGATAGTACTCCTACGGGAG
CAGCAGTGGGGAATATTGGACAATGGGCGAAAGCCTGATCCAGCCATGCCGCGT
GTGTGAAGAAGGTCTTCGGATTGTAAAGCACTTTAAGTTGGGAGGAAGGGCATTA
ACCTAATACGTTAGTGTTTTGACGTTACCGACAGAATAAGCACCGGCTAACTCTGT
GCCAGCAGCCGCGGTAATTTCTAGTGCAAGCGTTAATCGGAATTACTGGGCGTAA
AGCGCGCTAGGTGGTTCGTTAAGTTGGATGTGAAAGCCCCGGGCTCAACCTGGG
AACTGCATTCAAAACTGTCGATAGAGTATGGTAGAGGGTGGTGGAATTTCCTGTG
TAGCGGTGAAATGCGTAGATATAGGAAGGAACACCAGTGGCGAAGGCGACCACC
TGGACTGATACTGACACTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAATA
CCCTGGTAGTCCACGCCGTAAACGATGTCAACTAGCCGTTGGGAGCCTTTGAGC
TCTTAGTGGCGCAGCTAACGCATTAAGTTGACCGCCTGGGGGTACGGCCGCAAG
GTTAAAA

1.5 Isolate CB02 (*Serratia marcescens*)

Accession No. KC109325

Forward Sequence:

TGGCGGCAGGCTTAACACATGCAAGTCGAGCGGTAGCACAGGGGAGCTTGCTCC
CTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACTGCCTGATGGA
GGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAACGTCGCAAGACCAAA
GAGGGGGACCTTCGGGCCTCTTGCCATCAGATGTGCCCAGATGGGATCCCTAGC
TGGTCTGAGAGGATGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTA
CGGGAGGCAGCAGTGGGGAATATTGCACAATGGGCGCAAGCCTGATGCAGCCA
TGCCGCGTGTGTGAAGAAGGCCTCTCGGGGTCCGTAAAGCACTTTCAGCGAGAG
AGGAAGCTGGTGAGCTTAATACGCTCATTCAATTGAACGTAACTCGCAGAAGAAG
CACCGGCTAACTCCGGTGCCAGCAGCCGCGGTAATACCGGAGGGGTGCAAGCG
TTAATCGGAATTACTGGGCGTAAAGCGCACGCAGGCGGTTTGTTAAGTCAGATGT
GAAATCCCCGGGGCTCAACCCTGGGAACTGCATTTGAAACTGGCAAGCTAGAGT
CTCGTAGAGGGGGGGTAGAATTCCAGGT

1.6 Isolate AS01 (*Pseudomonas putida*)

Accession No. EU661866

Forward Sequence:

AGATTGAACGCTGGCGGCAGGCCTAACACATGCAAGTCGAGCGGATGACGGGA
GCTTGCTCCTTGATTCAGCGGCGGACGGGTGAGTAATGCCTAGGAATCTGCCTG
GTAGTGGGGGACAACGTTTCGAAAGGAACGCTAATACCGCATACGTCCTACGGG

AGAAAGCAGGGGACCTTCGGGCCTTGCGCTATCAGATGAGCCTAGGTCGGATTA
GCTAGTTGGTGGGGTAATGGCTCACCAAGGCGACGATCCGTAACTGGTCTGAGA
GGATGATCAGTCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAG
CAGTGGGGAATATTGGACAATGGGCGAAAGCCTGATCCAGCCATGCCGCGTGTG
TGAAGAAGGTCTTCGGATTGTAAAGCACTTTAAGTTGGGAGGAAGGGCAGTAAGC
TAATACCTTGCTGTTTTGACGTTACCGACAGAATAAGCACCGGCTAACTCTGTGC
CAGCAGCCGCGGTAATACAGAGGGTGCAAGCGTTAATCGGAATTACTGGGCGTA
AAGCGCGCGTAGGTGGTTCGTTAAGTTGGATGTGAAAGCCCCGGGCTCAACCTG
GGAACTGCATCCAAAACTGGCGAGCTAGAGTACGGTAGAGGGTGGTGGAATTTC
CTGTGTAGCGGTGAAATGCGTAGATATAGGAAGGAACACCAGTGGCGAAGGCGA
CCACCTGGACTGATACTGACACTGAGGTGCGAAAGCGTGGGGAGCAAACAGGAT
TAGATACCCTGGTAGTCCACGCCGTAAACGATGTCAACTAGCCGTTGGAATCCTT
GAGATTTTAGTGGCGCAGCTAACGCATTAAGTTGACCGCCTGGGGAGTACGGCC
GCAAGGTTAAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATG
TGGTTTAATTCGAAGCAACGCGAAGAACCTTACCAGGCCTTGACATGCAGAGAAC
TTTCCAGAGATGGATTGGTGCCTTCGGGAACTCTGACACAGGTGCTGCATGGCT
GTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGTAACGAGCGCAACCC
TTGTCCTTAGTTACCAGCACGTTATGGTGGGCACTCTAAGGAGACTGCCGGTGAC
AAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGGCCTGGG
CTACACACGTGCTACAATGGTCGGTACAGAGGGTTGCCAAGCCGCGAGGTGGAG
CTAATCTCACAAAACCGATCGTAGTCCGGATCGCAGTCTGCAACTCGACTGCGTG
AAGTCGGAATCGCTAGTAATCGCGAATCAGAATGTCGCGGTGAATACGTTCCCG
GGCCTTGTACACACCGCCCGTCACACCATGGGAGTGGGTTGCACCAGAAGTAGC
TAGTCTAACCTTCGGGAGGACGGTTACCACGGTGTGATTCATGACTGGGGTGA

1.7 Isolate AS04 (*Pseudomonas putida*)

Accession No. EU661864

Forward Sequence:

AGAGTTTGATCCTGGCTCAGATTGAACGCTGGCGGCAGGCCTAACACATGCAAG
TCGAGCGGATGACGGGAGCTTGCTCCTTGATTCAGCGGCGGACGGGTGAGTAAT
GCCTAGGAATCTGCCTGGTAGTGGGGGACAACGTTTCGAAAGGAACGCTAATAC
CGCATACGTCCTACGGGAGAAAGCAGGGGACCTTCGGGCCTTGCGCTATCAGAT
GAGCCTAGGTCGGATTAGCTAGTTGGTGGGGTAATGGCTCACCAAGGCGACGAT
CCGTAACTGGTCTGAGAGGATGATCAGTCACACTGGAACTGAGACACGGTCCAG
ACTCCTACGGGAGGCAGCAGTGGGGAATATTGGACAATGGGCGAAAGCCTGATC
CAGCCATGCCGCGTGTGTGAAGAAGGTCTTCGGATTGTAAAGCACTTTAAGTTGG
GAGGAAGGGCAGTAAGTTAATACCTTGCTGTTTTGACGTTACAGACAGAATAAGC
ACCGGCTAACTCTGTGCAAACAGCCGCGGTAATACAGAGGGTGCAAGCGTTAAT
CGGAATTACTGGGCGTAAAGCGCGCGTAGGTGGTTCGTTAAGTTGGATGTGAAA
GCCCCGGGCTCAACGTGGGAACTGCATCCAAAACTGGCGAGCTAGAGTACGGTA
GAGGGTGGTGGAATTTCCTGTGTGGCGGTGAAATGCGTAGATATAGGAAGGAAC
ACCAGTGGCGAAGGCGACCACCTGGACTGATACTGACACTGAGGTGCGAAAGCG
TGGGGAGCAAACAGGATTAGATACGCTGGTAGTCCACGCCGTAAACGATGTCGA
CTAGCCGTTGGAATCCTTGAGATTTTAGTGGCGCAGCTAGCGCATTAAGTTGACC
GCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAATGAATTGACGGGCGCCCGC
ACAAGCGGTGGAGCATGTGGTTTAATTCAAAGCAACGCGAACATCCTTACCAAGG
CCTTGACATGCAGAGAACTTTCCAGAGATGCATTGCAGCCTTCGGGAACTCTGAC
GCAGGTGCTGCATGCCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGATAAGTCC

CGTAACGAGCGCAACTCTTGTCCTTAGTTACCAGCACGTTATGGTGGGCACTCTA
AGGAGACTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCAT
GGCCCTTACGGCCTGGGCTACACACGTGCTACAATGGTCGGTACAGAGGGTTGC
CAAGCCGCGAGGTGGAGCTAATCTCACAAAACCGATCGTAGTCCGGATCGCAGT
CTGCAACTCGACTGCGTGAAGTGGGAATCGCTAGTAATCGCGAATCAGAATGTC
GCGGTGATACGTTCCCGGGCCTTGTACACACCGCCCGTCACACCATGGGAGTGG
GTTGCACCAGAAGTAGCTAGTCTAACCTTCGGGAGGACGGTTACCACGGTGTGA
TTCATGACTGGGGTGAAGTCGTAACAAGGTAAAT

1.8 Isolate CR04 (*Enterobacter cloacae*)

Accession No. KC109315

Forward Sequence:

GGAATATTGCACAAGGGGCGCAAGCCTGATGCAGCCATGCCGCGTGTATGGAAG
GCCTTCGGGTTGTAAAGTACTTTCAGCGGGGAGGAAGGTGTTAAGGTTAATAACC
TTGTCAATTGACGTTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGC
CGCGGTAATACGGAGTGCAAGCGTTAAGGATCGGAATTACTGGGCGTAAAGCGC
ACGCAGGCGGTCTGTCAAGTCGGATGTGAAATCCCCGGGCTAACCTGGGAACTG
CATTCGAAACTGGCAGGCTAGAGTCTTGTAGAGGGGCCTGAATTGGTAGAATTCC
AGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCG
GCCCTCCCCTGGACAAAGACTGACGCTCATGCGAAAGCGGGGGAGCAAACAGG
ATTAGTACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGTTGTGCCC

1.9 Isolate CR07 (*Bacillus thuringiensis*)

Accession No. KC109320

Forward Sequence:

AACACGTGGGTAACCTGCCCATAAGACTGGGATAACTCCGGGAAACCGGGGCTA
ATACCGGATAATATTTTGAACCGCATGGTTCGAAATTGAAAGGCGGCTTCGGCTG
TCACTTATGGATGGACCCGCGTCGCATTAGCTAGTTGGTGAGGTAACGGCTCAC
CAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTG
AGACACGGCCCAGCTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGCAATGGAC
GAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGCTTTCGGGTCGTAAAA
CTCTGTGTTAGGGAAGAACAAGTGCTAGTTGAATAAGCTGGCACCTTGACGGTAC
CTAACCAGA

1.10 Isolate CR10 (*Bacillus subtilis*)

Accession No. KC117154

Forward Sequence:

TTGCAAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTTAGCGGCGGACG
GGTGAGTAACACGTGGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACC
GGGGCTAATACCGGATGCTTGTTTGAACCGCATGGTTCAAACATAAAAGGTGGCT
TCGGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGGTGAGGTAAT
GGCTCACCAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACT
GGGACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCC
GCAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGG
ATCGTAAAGCTCTGTTGTTAGGGAAGAACAAGTACCGTTCGAATAGGGCGGTACC

TTGACGGTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTA
ATACGTAGGTGGCAAGCGTTGTCCGGAATTATTGGGCGTAAAGGGCTCGCAGGC
GGTTTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGGGGAGGGTCATTGGA
AACTGGGGAACTTGAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGA
AATGCGTAGAGATGTGGAGGAACACCAGTGGCGAAGGCGACTCTCTGGTCTGTA
ACTGACGCTGAGGAGCGAAAGCGTGGGGAGCGAACAGGATTAG

1.11 Isolate CR12 (*Alcaligenes faecalis*)

Accession No. KC109316

Forward Sequence:

CGCCCTACGGGGGAAAGGGGGGGATTCTTCGGAACCTCTCACTATTGGAGCGG
CCGCGGATTAGCTAGTTGGTGGGGTAAAGGCTCACCAAGGCAACGATCCGTAGC
TGGTTTGAGAGGACGACCAGCCACACTGGGACTGAGACACGGCCCAGACTCCTA
CGGGAGGCAGCAGTGGGGAATTTTGGACAATGGGGGAAACCCTGATCCAGCCAT
CCCGCGTGTATGATGAAGGCCTTCGGGTTGTAAAGTACTTTTGGCAGAGAAGAAC
CTCCAAAGGTATCTCATACGAGATACTGCTGACGGTATCTGCAGAATAAGCACCG
GCTAACTACGTGCCAGCAGCCGCGGTAATAGTAGGGTGCAAGCGTTAATCGGAA
TTACTGGGCGTAAAGCGTGTGTAGGCGGTTCGGAAAGAAAGATAAAGAACTTGAT
TCGATGTGAAATCCCAGGGCTC

1.12 Isolate CR13 (*Alcaligenes faecalis*)

Accession No. KC109317

Forward Sequence:

CGCCCTACGGGGGAAAGGGGGGGATTCTTCGGAACCTCTCACTATTGGAGCGG
CCGCGGATTAGCTAGTTGGTGGGGTAAAGGCTCACCAAGGCAACGATCCGTAGC
TGGTTTGAGAGGACGACCAGCCACACTGGGACTGAGACACGGCCCAGACTCCTA
CGGGAGGCAGCAGTGGGGAATTTTGGACAATGGGGGAAACCCTGATCCAGCCAT
CCCGCGTGTATGATGAAGGCCTTCGGGTTGTAAAGTACTTTTGGCAGAGAAGAAC
CTCCAAAGGTATCTCATACGAGATACTGCTGACGGTATCTGCAGAATAAGCACCG
GCTAACTACGTGCCAGCAGCCGCGGTAATAGTAGGGTGCAAGCGTTAATCGGAA
TTACTGGGCGTAAAGCGTGTGTAGGCGGTTCGGAAAGAAAGATAAAGAACTTGAT
TCGATGTGAAATCCCAGGGCTC

1.13 Isolate CR14 (*Bacillus cereus*)

Accession No. KC117153

Forward Sequence:

AAACATTGCGGCGTGCTATACATGCAAGTCGAGCGAATGGATTAAGAGCTTGCTC
TTATGAAGTTAGCGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCCATAAGA
CTGGGATAACTCCGGGAAACCGGGGCTAATACCGGATAACATTTTGAACCGCAT
GGTTCGAAATTGAAAGGCGGCTTCGGCTGTCACTTATGGATGGACCCGCGTCGC
ATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCAACGATGCGTAGCCGACCT
GAGAGGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGGA
GGCAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACGCCGC
GTGAGTGATGAAGGCTTTCGGGTCGTAAAACTCTGTTGTTAGGGAAGAACAAGTG
CTAGTTGAATAAGCTGGCACCTTGACGGTACCTAACCAGAAAGCCACGGCTAACT

ACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGGAATTATTG
GGCGTAAAGCGCGCGCAGGTGGTTTCTTAAGTCTGATGTGAA

1.14 Isolate MB01 (*Pseudomonas fluorescens*)

Accession No. KC109322

Forward Sequence:

GGTGAGGTAATGGCTCACCAAGGCGACGATCCGTAACTGGTCTGAGAGGATGAT
CAGTCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGG
GGAATATTGGACAATGGGCGAAAGCCTGATCCAGCCATGCCGCGTGTGTGAAGA
AGGTCTTCGGATTGTAAAGCACTTTAAGTTGGGAGGAAGGCAGTTACCTAATACG
TGATTGTTTTGACGTTACCGACAGAATAAGCACCGGCTAACTCTGTGCCAGCAGC
CGCGGTAATACAGAGGGTGCAAGCGTTAATCGGAATTACTGGGCGTAAAGCGCG
CGTGGTGGTTTGTAAGTTGGATGTGAAATCCCCGGGCTCAACCTGGGAACTGCA
TTCAAAACTGACTGACTAGAGTATGGTAGAGGGTGGTGGAATTTCCTGTGTAGCG
GTGAAATGCGTAGATATAGGAAGGAACACCAGTGGCGAAGGCGACCACCTGGAC
TGATACTGACACTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACCCT
GGTAGTCCACGCCGTAAACGATGTCAACTAGCCGTTGGGAGCCTTGAGCTCTTA
GTGGCGCAGCTACGCATTAAGTTGACCGCCTGGGGAGTACGGCCGCAAGGTTAA
AACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATT
CGAAGCAACGCGAAGAACCTTACCAGGCCTTGACATCCAATGAACTTTCTAGAGA
TAGATTGGTGCCTTCGG

1.15 Isolate MB02 (*Bacillus subtilis*)

Accession No. JX960418

Forward Sequence:

GGGTTCNNAACCCTCGCCTGGNAAGGACTAGGGATAACTCCTGTGAAAAACGGG
GGCTAATACCGGATGGTTGTTTGAACCGCANGGTTCAAACATAAAAGGTGGCTTC
GGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGGTGAGGTAACGG
CTCACCAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGG
GACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGCA
ATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGGATC
GTANAGCTCTGTTGTTAGGGAAGAACAAGTACCGTTCGAATAGGGCGGTACCTTG
ACGGTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATA
CGTAGGTGGCAAGCGTTGTCCGGAATTATTGGGCGTAAAGGGCTCGCAGGCGGT
TTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGGGGAGGGTCATTGGAAAC
TGGGGAACTTGAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGAAAT
GCGTATAGATGTGGAGGAACACCAGTGGCGAAGGCGACTCTCTGGTCTGTAACT
GACGCTGAGGAGCGAAAGCGTGGGGAGCGATCANGATTAGATACCCTGGTAGTT
CACGCCGTAAACGATTAGTGCTAAGTTGTTAGGGGGTTTCCGCCCCTTATTGCTG
CAGCTTACGAATTAAGNACTNCGCCCTGTGAAGTATGGT

1.16 Isolate MB05 (*Citrobacter freundii*)

Accession No. KC109318

Forward Sequence:

TGTGAAATCCCCGGGCTCAACCTGGGAACTGCATCCGAAACTGGCAGGCTAGCT
TGTAGGGGGGGTAGAATTCCAGGTTAGCGGTGAAATGCGTAATCTGGAGGCCGG
TGGCGAAGGCGGCCCCCTGGACAAAGACTGACGCTCAGGTGCGAAAGCGTGGC
AAACAGGATTAGATCCTGGTAGTCCACGCCGTAACGATGTCGACTTGGAGGTTGC
CCTTGAGGCGTGGCTTCCGGAGCTACGCGTTAAGTCGACCGCCTGGGGAGTAC
GGCCGCAAGGAAAACTCAAATGAATTGAGGGGGCCCGCACAAGCGGTGGAGCA
TGTGGTTTAATTCGTGCAACGCGAGAACCTTACCTACTCTTGAATCCAGAGAACTT
AGCAGAGATGCTTTGGTGCCTTCGGGAACTCTGAGCAGGTGCTGCATGGCTGTC
GTCAGCTCGTGAAATGTTGGGTTAATCCCGCAACGAGCGCAACCCTTATCCTTTGT
TGCCAGCGATCGGCCGGGACTCAAAGGGACTGCCAGTGATAAACTGAGGAAGGT
GGATGACGTCAAGTCATCAGGCCCTTACAGTAGGGCACACACGTGCTACAATGG
CATATACAAAGAAAGCGACCCGCGAGAGCAAG

1.17 Isolate NG04 (*Pseudomonas stutzeri*)

Accession No. KC109324

Forward Sequence:

GACTCCTACGGGAGGCAGCAGTGGGGAATATTGGACATGGGCGAAAGCCTGATC
CCCATGCCGCGTGTGTGAAGAAGGTCTTCGGATTGTAAAGCACTTTAAGTTGGGA
GGAAGGGCATTAACCTCAATACGTCTAGTGTTTTGACGTTACCGACAGAATAAGC
ACCGGCTAACTTCGTGCCAGCAGCCGCGGTAATACGAAGGGTGCAAGCGTTAAT
CGGAATTACTGGGCGTAAAGCGCGCGTAGGTGGTTTGTAAGTTGAATGTGAAAG
CCCCGGGCTCAACCTGGGAACTGATCCAAAACTGGCAAGCTAGAGTGTTGAATT
CCATGGCAGAGGGTGGTGGAATTTCCTGTGTAGCGGTGAAATGCGTAGATATAG
GAAGGAACACCAGTGGCGAAGGCGACCACCTGGGCTAATACTGACACTGAGGTG
CGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAATA
AACGATGTCGACTAGCCGTTGGGATCCTTGAGATCTTAGTGGCGCAGCTAACGC
ATTA

1.18 Isolate NG05 (*Citrobacter freundii*)

Accession No. KC109319

Forward Sequence:

CAGCCGCGGTAATACGGAGGGTGCAAGCGTTAATCGGAATTACTGGGCGTAAAG
CGCACGAGGCGGTCTGTCAAGTCGGATGTGAAATCCCCGGGCTCAACCTGGGAA
CTGCATCCGAAACTGGCAGGCAGAGTCTTGTAGAGGGGTAGAATTCCAGGTGTA
GCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGGCCCCCT
GGACAAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATA
CCCTGGGCCAATGCCACCACGCCGTAAACGATGTCGACTTGGAGGTTGTGCCCT
TGAGGCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCTGGGGAGTACGGC
CGCAAGGTTAAAACCAAATGAATTGACGGGGGCCCGCACAAGCGTGGAGCATGT
GGTTTAATTCGATGCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAACTT
AGCAGAGATGCTTTGGTGCCTTCGGGAACTCTGAGACAGGTGCTGCATGGCTGT
CGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTA

TCCTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGAGACTGCCAGTGATAACT
GGAGGAAGGATGACGTCAAGTCACATGGCCCTTACGAGTAGGGCTACACACGTG
CTACAATGGCATATACAAAGAGAAGCGACCTCGCGAGAGCAAGCGGACCTCATA
AAGTATGTCGTAGT

1.19 Isolate NG07 (*Bacillus cereus*)

Accession No. KC109326

Forward Sequence:

GCTAATACCGATAACATTTGAACCGCATGTTCGAAATTGAAAGGCGGCTTCGGCT
GTCACTTATGGATGGACCCGCGTCGCATTAGCTAGTTGGTGAGGTAACGGCTCA
CCAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACT
GAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGCAATG
GACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGCTTTCGGGTCGTA
AAACTCTGTTGTTAGGGAAGAACAAGTGCTAGTTGAATAAGCTGGCACCTTGACG
GTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGT
AGTTGGCAAGCGTTATCCGGAATTATTGGGCGTAAAGCGGCGCAGGT

1.20 Isolate KT05 (*Bacillus subtilis*)

Accession No. KC109328

Forward Sequence:

ATGCAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTTAGCGTCGGACGGG
TGAGTAACACGTGGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGG
GGCTAATACCGGATGGTTGTTTGAACCGCATGGTTCAAACATAAAAGGTGGCTTC
GGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGGTGAGGTAACGG
CTCACCAAGGCAACGATGCGTAGCGACCTGAGAGGGTGATCGGCCACACTGGG
ACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGCAA
TGGACAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGGATCGT
AAAGCTCTGTTGTTAGGGAAGAACAAGTACGTTCGAATAGGGCGGTACCTTGACG
GTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGT
AGGTGGCAAG