

U890 - UREA	
Carbonyldiamide; Carbamide Plant Tissue Culture Tested	
• Powder • CAS Number: 57-13-6 • Formula: $\text{CH}_4\text{N}_2\text{O}$ • Molecular Weight: 60.06 • Soluble in Water • Store at Room Temperature • Merck 13, 9935	
AVAILABLE PACKAGE SIZES	
500g	1Kg 5Kg
V878 - L-VALINE	
(S)-2-amino-3-methylbutanoic Acid Plant Tissue Culture Tested	
• Powder • CAS Number: 72-18-4 • Formula: $\text{C}_5\text{H}_{11}\text{NO}_2$ • Molecular Weight: 117.17 • Soluble in Water • Store at Room Temperature • Merck 13, 9975	
AVAILABLE PACKAGE SIZES	
25g	100g
V886 - VINEGAR, WHITE DISTILLED	
5% Acetic Acid	
• Liquid • CAS Number: 64-19-7 • Formula: $\text{C}_2\text{H}_4\text{O}_2$ • Molecular Weight: 60.06 • Miscible with Water • Store at Room Temperature 	
AVAILABLE PACKAGE SIZES	
15mL	
X874 - X-GAL	
See Molecular Biology Section for Complete Listing	
X877 - X-GLUC, MONOCYCLOHEXYL AMMONIUM SALT	
See Molecular Biology Section for Complete Listing	
X871 - X-GLUC, SODIUM SALT	
See Molecular Biology Section for Complete Listing	
X8451 - X-GLUC SOLUTION (20MG/ML)	
See Molecular Biology Section for Complete Listing	

Y892 - YEAST EXTRACT	
Microbiological Grade Plant Tissue Culture Tested	
• Powder • CAS Number: 8013-01-2 • Soluble in Water • Store at 2 to 6 °C	
AVAILABLE PACKAGE SIZES	
500g	1Kg 2.5Kg
MAKING STOCK SOLUTIONS OF PLANT GROWTH REGULATORS	
See "Figure 16. Stock Solution Dilution Chart" on page 242 in the Technical Section.	
Z125 - ZEATIN, TRANS ISOMER	
(2E)-2-methyl-4-(1H-purin-6-ylamino)-2-buten-1-ol Plant Tissue Culture Tested	
• Powder • CAS Number: 1637-39-4 • Formula: $\text{C}_{10}\text{H}_{13}\text{N}_5\text{O}$ • Molecular Weight: 219.25 • Soluble in KOH • Store at -20 to 0 °C • Merck 13, 10170	
AVAILABLE PACKAGE SIZES	
10mg	50mg 100mg 250mg 500mg 1g
Z875 - ZEATIN RIBOSIDE SOLUTION (1 MG/ML), TRANS ISOMER	
9-(β-D-Ribofuranosyl)-trans-zeatin, N6-(trans-4-Hydroxy-3-methyl-2-buten-1-yl)adenosine Aqueous Solution Sterile Filtered Plant Tissue Culture Tested	
• Liquid • CAS Number: 6025-53-2 • Formula: $\text{C}_{15}\text{H}_{21}\text{N}_5\text{O}_5$ • Molecular Weight: 351.4 • Miscible with Water • Store at -20 to 0 °C 	
AVAILABLE PACKAGE SIZES	
10mL	

Z899 - ZEATIN RIBOSIDE, TRANS ISOMER

9-(β-D-Ribofuranosyl)-trans-zeatin, N6-(trans-4-Hydroxy-3-methyl-2-buten-1-yl)adenosine

Plant Tissue Culture Tested

- Powder
- CAS Number: 6025-53-2
- Formula: $C_{15}H_{21}N_5O_5$
- Molecular Weight: 351.4
- Soluble in KOH
- Store at -20 to 0 °C

AVAILABLE PACKAGE SIZES

10mg	50mg	100mg	250mg	1g
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Z860 - ZEATIN SOLUTION (1 MG/ML), TRANS ISOMER

(2E)-2-methyl-4-(1H-purin-6-ylamino)-2-buten-1-ol

Sterile Filtered

Plant Tissue Culture Tested

- Liquid
- CAS Number: 1637-39-4
- Formula: $C_{10}H_{13}N_5O$
- Molecular Weight: 219.25
- Miscible with Water
- Store at -20 to 0 °C
- Merck 13, 10170



AVAILABLE PACKAGE SIZES

10mL

Z897 - ZINC NITRATE HEXAHYDRATE

Plant Tissue Culture Tested

- Powder
- CAS Number: 10196-18-6
- Formula: $Zn(NO_3)_2 \cdot 6H_2O$
- Molecular Weight: 297.48
- Soluble in Water
- Store at Room Temperature
- Merck 13, 10197



AVAILABLE PACKAGE SIZES

100g	500g	1Kg
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Z101 - ZINC SULFATE HEPTAHYDRATE

Plant Tissue Culture Tested

- Powder
- CAS Number: 7446-20-0
- Formula: $ZnSO_4 \cdot 7H_2O$
- Molecular Weight: 287.54
- Soluble in Water
- Store at Room Temperature
- Merck 13, 10213



AVAILABLE PACKAGE SIZES

100g	500g
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FIND MICROBIOLOGY MEDIA ON PAGES 151 TO 159

- *LB Agars and Broths*
- *Tryptic Soy Broth*
- *YEP Media*
- *Hanahan's Broth*
- *Peptone Waters*



PLANT TISSUE CULTURE MEDIA



PLANT TISSUE CULTURE MEDIA

PhytoTechnology Laboratories® offers a large selection of ready-to-use plant tissue culture media. The media outlined in this section are for plant tissue micropropagation. Media for other applications, please refer to the following sections:

- Microbiology, page 151
- Phytopathology, page 161
- Seed Testing, page 165
- Phycology, page 173

The formulation for each non-proprietary media is detailed in the product listings on the following pages. To compare media formulations, please consult the formulation tables in the technical section (pages 270 to 293) or visit www.phytotechlab.com.

For instructions on media preparation and usage please consult "Powdered Media" on page 232 or visit www.phytotechlab.com.

For assistance locating products within this catalogue, please consult the indices at the back of this catalogue. Be sure to check back at www.phytotechlab.com for new products!

Custom Media Formulations

In addition to the many popular formulations offered, *PhytoTechnology Laboratories*® also offers custom manufacturing services for proprietary research formulations. Custom formulations provide all of the benefits of pre-made media but can be tailored to specific research needs. Eliminate variability from batch to batch by taking advantage of custom media manufacturing. All custom media meets ISO 9001:2008 and cGMP standards of quality.

See "Custom Services" on page 12 for more information about Custom Media.



Featured in this section

- Agronomic Media
- Crop Specific Media
- Deficient Media
- MS Media
- Orchid Media
- Stock Solutions
- Woody Plant Media
- Vitamins

Murashige & Skoog Formulations

Many of the media formulations offered by *PhytoTechnology Laboratories*® are derivatives of the formulation popularized by Toshio Murashige and Folke Skoog in 1962. On the following page is provided a breakdown of the MS formulations offered by *PhytoTechnology Laboratories*® by media types.

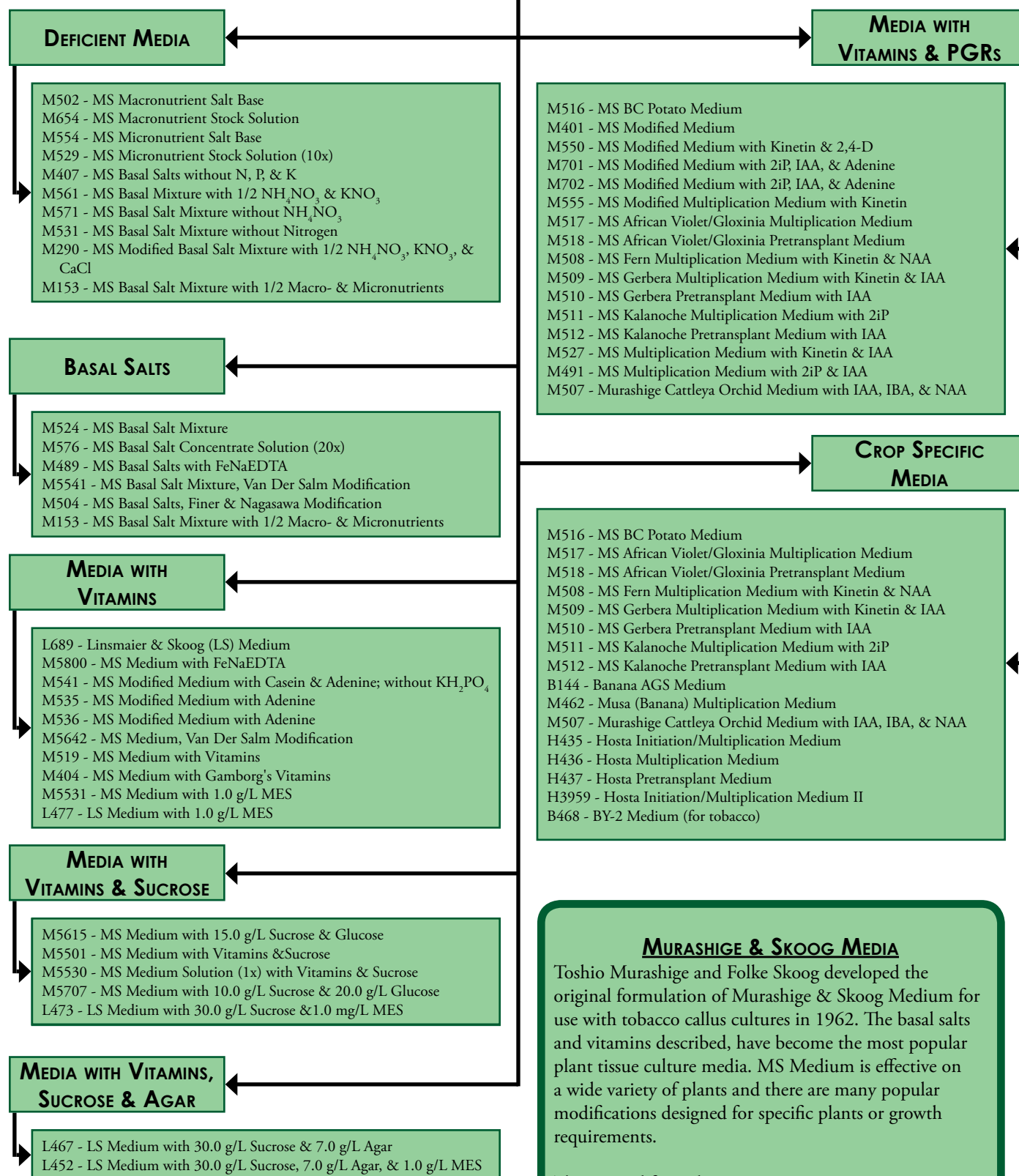
Our Product Definitions

Basal Salts – contain macronutrients and micronutrients. Does not include vitamins, plant growth regulators, or carbohydrates.

Basal Media – contains macronutrients and micronutrients, as well as some organic components. Generally lacks either vitamins, plant growth regulators, or carbohydrates, and is therefore not considered a "complete medium".

Media – typically considered complete and requires only gelling agents, if desired.

MURASHIGE & SKOOG MEDIA FAMILY



MURASHIGE & SKOOG MEDIA

Toshio Murashige and Folke Skoog developed the original formulation of Murashige & Skoog Medium for use with tobacco callus cultures in 1962. The basal salts and vitamins described, have become the most popular plant tissue culture media. MS Medium is effective on a wide variety of plants and there are many popular modifications designed for specific plants or growth requirements.

The original formulations are:

- M524 - MS Basal Salt Mixture
- M519 - MS Medium with Vitamins

A267 - ANDERSON BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Anderson (1978, 1980).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.89 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	400
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	74.5
Ferrous Sulfate•7H ₂ O	55.7
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.3
Potassium Nitrate	480
Sodium Phosphate, Monobasic•H ₂ O	330.6
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	3.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

B129 - BACTERIA SCREENING MEDIUM 523

See Phytopathology Section for Complete Listing

B144 - BANANA AGS BASAL MEDIUM

Contains the macro- and micronutrients, vitamins, and plant growth regulators required to culture bananas.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.71 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	295
Zinc Sulfate•7H ₂ O	8.6
6-(γ,γ-Dimethylallylamino)purine	10
Indole-3-acetic Acid	1.0
myo-Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

BG-11 BLUE GREEN MEDIA

See Phycology Section for Complete Listings

FIND BIOCHEMICALS ON PAGES 15 TO 56

- Gelling Agents
- Plant Growth Regulators
- Media Components
- Stains and Dyes
- Carbohydrates



B514 - BLAYDES BASAL MEDIUM

Contains the macro- and micronutrients, sucrose, and thiamine as described by Blaydes (1966).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 31.86 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1000
Boric Acid	1.6
Calcium Nitrate	241.1
Na ₂ EDTA•2H ₂ O	74.5
Ferrous Sulfate•7H ₂ O	55.7
Magnesium Sulfate, Anhydrous	17.1
Manganese Sulfate•H ₂ O	4.4
Potassium Chloride	100
Potassium Iodide	0.8
Potassium Nitrate	65
Potassium Phosphate, Monobasic, Anhydrous	300
Zinc Sulfate•7H ₂ O	1.5
Glycine	2.0
Sucrose	30,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	3.5 ± 0.75
AVAILABLE PACKAGE SIZES	
1L	10L 50L

TISSUE CULTURE KITS



*Phyto*Technology Laboratories® offers a selection of plant tissue culture kits for educational use. For more information please see pages 179 to 185.

- Kits for:
- African Violet,
 - Carrot,
 - Carnivorous Plants,
 - Fern,
 - Hosta,
 - Lily,
 - Orchids, and
 - Potato.

B138 - BM-1 TERRESTRIAL ORCHID MEDIUM WITHOUT AGAR

Contains the macro- and micronutrients, vitamins, and supplements required to culture orchids. Especially suited for terrestrial orchids, *Paphiopedilum*, and *Phragmipedium*. Seed germination may be enhanced by the addition of 50 mL/L Coconut Water (Product Number C195).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 21.22 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Boric Acid	10
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.25
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	100
Manganese Sulfate•H ₂ O	25
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	300
Zinc Sulfate•7H ₂ O	10
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	500
Folic Acid	0.5
L-Glutamine	100
Glycine	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	0.5
Approximate pH at Room Temperature	5.5 ± 0.75
AVAILABLE PACKAGE SIZES	
1L	10L 50L

TERRESTRIAL ORCHID MEDIA SELECTION GUIDE

See "Figure 22. Terrestrial Orchid Media Selection Guide" on page 250 in the Technical Section.

B141 - BM-1 TERRESTRIAL ORCHID MEDIUM WITH AGAR

Contains the macro- and micronutrients, vitamins, and supplements required to culture orchids. Especially suited for terrestrial orchids, Paphiopedilum, and Phragmipedium. Seed germination may be enhanced by the addition of 50 mL/L Coconut Water (Product Number C195).

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Boiling Water
- Use at 26.22 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Boric Acid	10
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.25
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	100
Manganese Sulfate•H ₂ O	25
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	300
Zinc Sulfate•7H ₂ O	10
Agar	5000
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	500
Folic Acid	0.5
L-Glutamine	100
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	0.5
Approximate pH at Room Temperature	5.5 ± 0.75
AVAILABLE PACKAGE SIZES	
1L	10L 50L

TISSUE CULTURE & ORCHIDS

See "Tissue Culture & Orchids" on page 250 to 251 in the Technical Section.

B470 - BM-2 TERRESTRIAL ORCHID MEDIUM WITHOUT AGAR

Contains 0.2 mg/L 6-Benzylaminopurine (BA, Product Number B800).

Contains the macro- and micronutrients, vitamins, and supplements required to culture orchids.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 21.22 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Boric Acid	10
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.25
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	100
Manganese Sulfate•H ₂ O	25
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	300
Zinc Sulfate•7H ₂ O	10
6-Benzylaminopurine	0.2
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	500
Folic Acid	0.5
L-Glutamine	100
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	0.5
Approximate pH at Room Temperature	5.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

B142 - BM-2 TERRESTRIAL ORCHID MEDIUM WITH AGAR

Contains 0.2 mg/L 6-Benzylaminopurine (BA, Product Number B800).
Contains the macro- and micronutrients, vitamins, and supplements required to culture orchids.
Especially suited for terrestrial orchids, *Paphiopedilum* and *Phragmipedium*.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Boiling Water
- Use at 27.22 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Boric Acid	10
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.25
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	100
Manganese Sulfate•H ₂ O	25
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	300
Zinc Sulfate•7H ₂ O	10
Agar	6000
6-Benzylaminopurine	0.2
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	500
Folic Acid	0.5
L-Glutamine	100
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	0.5
Approximate pH at Room Temperature	5.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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B1650 - BOLD'S BASAL MEDIA (BBM)

See Phycology Section for Complete Listings

B1396 - BROADLEAF TREE BASAL MEDIUM

Contains the micro- and macro-nutrients and vitamins described by Chalupa (1984).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.21 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	82.5
Ammonium Sulfate	120
Boric Acid	1.55
Calcium Chloride, Anhydrous	16.6
Calcium Nitrate	222
Cobalt Chloride, Hexahydrate	0.005
Cupric Sulfate•5H ₂ O	0.063
Na ₂ EDTA•2H ₂ O	9.325
Ferrous Sulfate•7H ₂ O	6.95
Magnesium Sulfate, Anhydrous	90
Manganese Sulfate•H ₂ O	4.225
Molybdc Acid, Disodium Salt•2H ₂ O	0.063
Potassium Iodide	0.038
Potassium Nitrate	95
Potassium Phosphate, Monobasic, Anhydrous	85
Potassium Sulfate, Anhydrous	430
Zinc Nitrate•6H ₂ O	2.15
myo-Inositol	50
Nicotinic Acid	0.25
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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C206 - CAPE SUNDEW/VENUS FLYTRAP MULTIPLICATION BASAL MEDIUM

Contains the macro- and micronutrients, vitamins, and plant growth regulators required to culture Cape Sundew and Venus Flytrap.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.12 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	400
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	74.5
Ferrous Sulfate•7H ₂ O	55.7
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Nitrate	480
Sodium Phosphate, Monobasic•H ₂ O	380
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
6-(γ,γ-Dimethylallylamino)purine	1.0
myo-Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	3.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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C216 - CAPE SUNDEW/VENUS FLYTRAP PRETRANSPLANT BASAL MEDIUM

Contains the macro- and micronutrients, vitamins, and plant growth regulators required to culture Cape Sundew and Venus Flytrap.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.20 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166.5
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Ferric Sodium EDTA	18.35
Magnesium Sulfate, Anhydrous	90.5
Manganese Sulfate•H ₂ O	8.45
Molybdic Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	4.3
myo-Inositol	50
Thiamine•HCl	0.2
Approximate pH at Room Temperature	5.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND MOLECULAR BIOLOGY PRODUCTS ON PAGES 131 TO 150

- Antibiotics
- Buffers
- DNA Extraction Kits
- Sterile Solutions
- IPTG, X-Gal & X-Gluc



C1935 - CARNIVOROUS PLANT (NEPENTHES) BASAL SALT MIXTURE

This medium is commonly supplemented with MS Vitamins (e.g., M533, M553) and 25 g/L sucrose (Product Number S391).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 0.65 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	160.1
Boric Acid	9.275
Calcium Chloride, Anhydrous	33.94
Cobalt Chloride•6H ₂ O	0.024
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	36.72
Magnesium Sulfate, Anhydrous	36.11
Manganese Sulfate•H ₂ O	16.90
Molybdc Acid, Disodium Salt•2H ₂ O	0.242
Potassium Iodide	0.830
Potassium Nitrate	202.2
Sodium Phosphate, Monobasic	138.01
Zinc Sulfate•7H ₂ O	11.502
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
----	-----	-----

C212 - CARROT CALLUS INITIATION BASAL MEDIUM

Contains the macro- and micronutrients, vitamins, and plant growth regulators required to initiate carrot callus from root tissue.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.21 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	134
Boric Acid	3.0
Calcium Chloride, Anhydrous	113.24
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	122.09
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.75
Potassium Nitrate	2500
Sodium Phosphate, Monobasic•H ₂ O	150
Zinc Sulfate•7H ₂ O	2.0
2,4-Dichlorophenoxyacetic Acid	1.0
<i>myo</i> -Inositol	100
Nicotinic Acid	1.0
Pyridoxine•HCl	1.0
Thiamine•HCl	10
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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C222 - CARROT SHOOT DEVELOPMENT BASAL MEDIUM

Contains the macro- and micronutrients, vitamins, and plant growth regulators required to initiate shoots from carrot callus.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.21 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Sulfate	134
Boric Acid	3.0
Calcium Chloride, Anhydrous	113.24
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	122.09
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.75
Potassium Nitrate	2500
Sodium Phosphate, Monobasic•H ₂ O	150
Zinc Sulfate•7H ₂ O	2.0
myo-Inositol	100
Kinetin	0.2
Nicotinic Acid	1.0
Pyridoxine•HCl	1.0
Thiamine•HCl	10
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

C287 - CHEE & POOL C2D VITIS BASAL MEDIUM

Contains the macro- and micronutrients and vitamins as described by Chee & Pool (1987).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.49 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Nitrate	492.3
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.6
Manganese Sulfate•H ₂ O	0.845
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
myo-Inositol	10
Nicotinic Acid	1.0
Pyridoxine•HCl	1.0
Thiamine•HCl	1.0
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

C149 - CHU N6 VITAMIN SOLUTION (1000x)

Contains the vitamins as described by Chu *et al.* (1975).

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 1.0 mL per liter of medium
- Plant Tissue Culture Tested



Components (mg/L)	
Glycine	2000
Nicotinic Acid	500
Pyridoxine•HCl	500
Thiamine•HCl	1000
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
100mL	

C167 - CHU N6 BASAL MEDIUM WITH VITAMINS

Contains the macro- and micronutrients and vitamins as described by Chu *et al.* (1975).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.99 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Sulfate	463
Boric Acid	1.6
Calcium Chloride, Anhydrous	125.33
Na ₂ EDTA·2H ₂ O	37.25
Ferrous Sulfate·7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.37
Manganese Sulfate·H ₂ O	3.3
Potassium Iodide	0.8
Potassium Nitrate	2830
Potassium Phosphate, Monobasic, Anhydrous	400
Zinc Sulfate·7H ₂ O	1.5
Glycine	2.0
Nicotinic Acid	0.5
Pyridoxine·HCl	0.5
Thiamine·HCl	1.0
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 10LFB 50L 100L

C416 - CHU N6 BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Chu *et al.* (1975).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.98 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Sulfate	463
Boric Acid	1.6
Calcium Chloride, Anhydrous	125.33
Na ₂ EDTA·2H ₂ O	37.25
Ferrous Sulfate·7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.37
Manganese Sulfate·H ₂ O	3.3
Potassium Iodide	0.8
Potassium Nitrate	2830
Potassium Phosphate, Monobasic, Anhydrous	400
Zinc Sulfate·7H ₂ O	1.5
Approximate pH at Room Temperature	4.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 10LFB 50L 100L

C442 - CORN MEAL AGAR

See Phytopathology Section for Complete Listing

CZAPEK-DOX BROTH & AGAR

See Phytopathology Section for Complete Listings

D146 - DCR BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Gupta & Durzan (1985).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.64 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	400
Boric Acid	6.2
Calcium Chloride, Anhydrous	64.14
Calcium Nitrate	386.31
Cobalt Chloride·6H ₂ O	0.025
Cupric Sulfate·5H ₂ O	0.25
Na ₂ EDTA·2H ₂ O	37.3
Ferrous Sulfate·7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate·H ₂ O	22.3
Molybdic Acid, Disodium Salt·2H ₂ O	0.25
Nickel Chloride·6H ₂ O	0.025
Potassium Iodide	0.83
Potassium Nitrate	340
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate·7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

PRODUCT CATALOGUE & LABORATORY GUIDE

D2206 - DE GREEF & JACOBS MEDIUM

Contains the macro- and micronutrients and vitamins as described by De Greef & Jacobs (1979).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.91 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	400
Boric Acid	10.62
Calcium Chloride, Anhydrous	226.5
Cobalt Chloride	0.0025
Cupric Sulfate	0.0025
Ferrous Sulfate	27.8
Magnesium Sulfate, anhydrous	244.33
Manganese Sulfate, monohydrate	1.68
Disodium EDTA, dihydrate	37.26
Potassium Chloride	600
Potassium Iodide	1.58
Potassium Nitrate	2000
Sodium Phosphate, monobasic	250
Sodium Molybdate	0.0025
Zinc Sulfate	1.06
myo-Inositol	100
Nicotinic Acid	1
Pyridoxine HCl	1
Thiamine HCl	10
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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D191 - DKW BASAL MEDIUM

Contains 10 g/L Sucrose; without vitamins.
Contains the macro- and micronutrients as described by Driver & Kuniyuki (1984) and McGranahan *et al.* (1987).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 15.22 grams per liter
- Plant Tissue Culture Tested

Note: The high calcium level in this medium may inhibit many gellan gums from completely melting during autoclaving. For this reason the use of Gellan Gum or Agargellan with this medium is not recommended as a clear, firm gel may not be obtained.

Components (mg/L)

Ammonium Nitrate	1416
Boric Acid	4.8
Calcium Chloride, Anhydrous	112.5
Calcium Nitrate	1367
Cupric Sulfate•5H ₂ O	0.25
Na ₂ EDTA•2H ₂ O	45.4
Ferrous Sulfate•7H ₂ O	33.8
Magnesium Sulfate, Anhydrous	361.49
Manganese Sulfate•H ₂ O	33.5
Molybdic Acid, Disodium Salt•2H ₂ O	0.39
Nickel Sulfate•6H ₂ O	0.005
Potassium Phosphate, Monobasic, Anhydrous	265
Potassium Sulfate, Anhydrous	1559
Zinc Nitrate•6H ₂ O	17
Sucrose	10,000
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND SEED TESTING PRODUCTS ON PAGES 165 TO 172

- *PhytoSelect Basal Medium*
- *mD5A Medium*
- *Stains & Dyes*
- *King's B Medium*
- *Selection Agents*



D189 - DKW BASAL MEDIUM

Contains 30 g/L Sucrose; without vitamins.
Contains the macro- and micronutrients as described by Driver & Kuniyuki (1984) and McGranahan *et al.* (1987).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 35.22 grams per liter
- Plant Tissue Culture Tested

Note: The high calcium level in this medium may inhibit many gellan gums from completely melting during autoclaving. For this reason the use of Gellan Gum or Agargellan with this medium is not recommended as a clear, firm gel may not be obtained.

Components (mg/L)	
Ammonium Nitrate	1416
Boric Acid	4.8
Calcium Chloride, Anhydrous	112.5
Calcium Nitrate	1367
Cupric Sulfate•5H ₂ O	0.25
Na ₂ EDTA•2H ₂ O	45.5
Ferrous Sulfate•7H ₂ O	33.8
Magnesium Sulfate, Anhydrous	361.49
Manganese Sulfate•H ₂ O	33.5
Molybdic Acid, Disodium Salt•2H ₂ O	0.39
Nickel Sulfate•6H ₂ O	0.005
Potassium Phosphate, Monobasic, Anhydrous	265
Potassium Sulfate, Anhydrous	1559
Zinc Nitrate•6H ₂ O	17
Sucrose	30,000
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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D190 - DKW BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Driver & Kuniyuki (1984) and McGranahan *et al.* (1987).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.22 grams per liter
- Plant Tissue Culture Tested

Note: The high calcium level in this medium may inhibit many gellan gums from completely melting during autoclaving. For this reason the use of Gellan Gum or Agargellan with this medium is not recommended as a clear, firm gel may not be obtained.

Components (mg/L)	
Ammonium Nitrate	1416
Boric Acid	4.8
Calcium Chloride, Anhydrous	112.5
Calcium Nitrate	1367
Cupric Sulfate•5H ₂ O	0.25
Na ₂ EDTA•2H ₂ O	45.4
Ferrous Sulfate•7H ₂ O	33.8
Magnesium Sulfate, Anhydrous	361.49
Manganese Sulfate•H ₂ O	33.5
Molybdic Acid, Disodium Salt•2H ₂ O	0.39
Nickel Sulfate•6H ₂ O	0.005
Potassium Phosphate, Monobasic, Anhydrous	265
Potassium Sulfate, Anhydrous	1559
Zinc Nitrate•6H ₂ O	17
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND PHYCOLOGY PRODUCTS ON PAGES 173 TO 178

- Bold's Basal Medium
- Blue-Green Medium
- Tris Acetate Phosphate
- Seawater
- Sueoka's High Salt Medium



D2470 - DKW BASAL MEDIUM WITH VITAMINS

Contains the macro- and micronutrients as described by Driver & Kuniyuki (1984) and McGranahan *et al.* (1987).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.32 grams per liter
- Plant Tissue Culture Tested

Note: The high calcium level in this medium may inhibit many gellan gums from completely melting during autoclaving. For this reason the use of Gellan Gum or Agargellan with this medium is not recommended as a clear, firm gel may not be obtained.

Components (mg/L)

Ammonium Nitrate	1416
Boric Acid	4.8
Calcium Chloride, Anhydrous	112.5
Calcium Nitrate	1367
Cupric Sulfate•5H ₂ O	0.25
Na ₂ EDTA•2H ₂ O	45.4
Ferrous Sulfate•7H ₂ O	33.8
Magnesium Sulfate, Anhydrous	361.49
Manganese Sulfate•H ₂ O	33.5
Molybdc Acid, Disodium Salt•2H ₂ O	0.39
Nickel Sulfate•6H ₂ O	0.005
Potassium Phosphate, Monobasic, Anhydrous	265
Potassium Sulfate, Anhydrous	1559
Zinc Nitrate•6H ₂ O	17
<i>myo</i> -Inositol	100
Glycine	2
Nicotinic Acid	1
Thiamine•HCl	2
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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E575 - ECONOMOU & READ BASAL MEDIUM

Contains the macro- and micronutrients and vitamins as described by Economou & Read (1984).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.84 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	400
Ammonium Sulfate	132
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Iron Chelate, Sequestrene 330	56
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Nitrate	202
Potassium Phosphate, Monobasic, Anhydrous	408
Zinc Sulfate•7H ₂ O	8.6
<i>myo</i> -Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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E330 - ERIKSSON VITAMIN SOLUTION (1000x)

Contains the vitamins as described by Eriksson (1965).

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 1.0 mL per liter of medium
- Plant Tissue Culture Tested



Components (mg/L)

Glycine	2000
Nicotinic Acid	500
Pyridoxine•HCl	500
Thiamine•HCl	500
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

100mL

E333 - EXS IIIa™ BASAL MEDIUM WITH ADENINE

Contains Adenine Hemisulfate (Product Number A545) and vitamins. Does not contain carbohydrates or gelling agents. EXS IIIa™ is a proprietary plant cell culture medium that was originally developed for the culture of foliage plants such as *Syngonium*, *Ficus* and *Spathiphyllum*.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.95 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	4.0 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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E337 - EXS III™ BASAL MEDIUM WITHOUT ADENINE

Contains vitamins. Without Adenine Hemisulfate. Does not contain carbohydrates or gelling agents. EXS III™ is a proprietary plant cell culture medium that was originally developed for the culture of foliage plants such as *Syngonium*, *Ficus* and *Spathiphyllum*.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.87 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	4.75 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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f/2 GUILLARD'S MARINE ENRICHED SEAWATERS

See Phycology Section for Complete Listings

F522 - FAST TERRESTRIAL ORCHID MEDIUM

Contains the macro- and micronutrients, vitamins, sucrose and fructose supplements required to culture terrestrial orchids. Contains Agar.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 27.84 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Aluminum Chloride	0.03
Ammonium Nitrate	167
Boric Acid	1
Calcium Nitrate	40.1
Cupric Sulfate•5H ₂ O	0.03
FeNaEDTA	17
Ferric Chloride•H ₂ O	1
Magnesium Sulfate, Anhydrous	19.8
Manganese Sulfate•H ₂ O	0.8
Nickle Chloride•6H ₂ O	0.03
Potassium Chloride	167
Potassium Iodide	0.01
Potassium Phosphate, Dibasic	83
Zinc Sulfate•7H ₂ O	1
Agar	7000
D-Biotin	0.01
Fructose	5000
Nicotinic Acid	0.1
Peptone from Meat	1670
Sucrose	11,670
Yeast Extract	2000
Approximate pH at Room Temperature	6.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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SELECTING TERRESTRIAL ORCHID MEDIA BY GENUS

See "Figure 24. Terrestrial Orchid Media Selection Guide by Genus" on page 251 in the Technical Section.

CUSTOM MEDIA & SERVICES



PhytoTechnology Laboratories® offers custom manufacturing and testing services. For more information please see page 12.

- Custom Dry Powder Media
- Custom Liquid Media
- Custom Packaging
- Testing Services

G398 - GAMBORG B-5 BASAL MEDIUM

Contains the macro- and micronutrients and vitamins as described by Gamborg *et al.* (1968).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.21 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	134
Boric Acid	3.0
Calcium Chloride, Anhydrous	113.24
Cobalt Chloride·6H ₂ O	0.025
Cupric Sulfate·5H ₂ O	0.025
Na ₂ EDTA·2H ₂ O	37.26
Ferrous Sulfate·7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	122.09
Manganese Sulfate·H ₂ O	10
Molybdc Acid, Disodium Salt·2H ₂ O	0.25
Potassium Iodide	0.75
Potassium Nitrate	2500
Sodium Phosphate, Monobasic·H ₂ O	150
Zinc Sulfate·7H ₂ O	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	1.0
Pyridoxine·HCl	1.0
Thiamine·HCl	10
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	10LFB	50L	100L
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G768 - GAMBORG BASAL SALT MIXTURE (B-5 SALTS)

Contains the macro- and micronutrients as described by Gamborg *et al.* (1968).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.10 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	134
Boric Acid	3.0
Calcium Chloride, Anhydrous	113.24
Cobalt Chloride·6H ₂ O	0.025
Cupric Sulfate·5H ₂ O	0.025
Na ₂ EDTA·2H ₂ O	37.26
Ferrous Sulfate·7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	122.09
Manganese Sulfate·H ₂ O	10
Molybdc Acid, Disodium Salt·2H ₂ O	0.25
Potassium Iodide	0.75
Potassium Nitrate	2500
Sodium Phosphate, Monobasic·H ₂ O	150
Zinc Sulfate·7H ₂ O	2.0
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	10LFB	50L
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G249 - GAMBORG VITAMIN POWDER (1000x)

Contains the vitamins as described by Gamborg *et al.* (1968). *myo*-Inositol may precipitate out of the prepared stock solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Soluble in Water
- Use 11.20 grams to make 100 mL of 1000x stock
- Use at 1.0 mL per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

<i>myo</i> -Inositol	100,000
Nicotinic Acid (Free Acid)	1000
Pyridoxine·HCl	1000
Thiamine·HCl	10,000
Approximate pH at Room Temperature	3.25 ± 0.5

AVAILABLE PACKAGE SIZES

100 mL

G219 - GAMBORG VITAMIN SOLUTION (1000x)

Contains the vitamins as described by Gamborg *et al.* (1968). *myo*-Inositol may precipitate out of the prepared stock solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 1.0 mL per liter of medium
- Plant Tissue Culture Tested



Components (mg/L)

<i>myo</i> -Inositol	100,000
Nicotinic Acid	1000
Pyridoxine•HCl	1000
Thiamine•HCl	10,000
Approximate pH at Room Temperature	3.5 ± 0.75

AVAILABLE PACKAGE SIZES

100mL	500mL
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VITAMINS MIXTURES FOR USE IN PLANT TISSUE CULTURE

See "Vitamin Formulations Table" on page 287 in the Technical Section.

FIND CULTURE VESSELS IN THE EQUIPMENT SECTION



For our full line of culture vessels, consult the equipment section on pages 187 to 218.

- Sterile Culture Vessels
- Reusable Culture Vessels
- Petri Dishes
- Culture Tubes

G371 - GRESSHOFF & DOY BASAL MEDIUM

Contains the macro- and micronutrients and vitamins as described by Gresshoff & Doy (1974).

- Store at 2 to 6 °C
- Soluble in Hot Water
- Use at 2.71 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1000
Boric Acid	0.3
Calcium Nitrate	241.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.25
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	17.1
Manganese Sulfate•H ₂ O	1.0
Molybdc Acid, Disodium Salt•2H ₂ O	0.025
Potassium Chloride	65
Potassium Iodide	0.8
Potassium Nitrate	1000
Potassium Phosphate, Monobasic, Anhydrous	300
Zinc Sulfate•7H ₂ O	0.3
D-Biotin	0.2
Glycine	4.0
<i>myo</i> -Inositol	10
Nicotinic Acid	0.1
Pyridoxine•HCl	0.1
Thiamine•HCl	1.0
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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H289 - HANAHAN'S BROTH

See Microbiology Section for Complete Listing

O612 - H1 OAT MEDIUM

Contains the macro- and macronutrients and supplements required for the symbiotic culture of orchids. Contains Agar and Sucrose.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 12.52 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Calcium Nitrate	96.6
Magnesium Sulfate	23.9
Potassium Chloride	100
Potassium Phosphate, Monobasic	200
Agar	7000
Sucrose	2000
Rolled Oats	3000
Yeast Extract	100
Approximate pH at Room Temperature	6.0 ± 1.0

AVAILABLE PACKAGE SIZES

1L 10L

O622 - H2 OAT MEDIUM

Contains the macro- and micronutrients and supplements required for the symbiotic culture of orchids. Contains Agar and Glucose.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 12.52 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Calcium Nitrate	96.6
Magnesium Sulfate	23.9
Potassium Chloride	100
Potassium Phosphate, Monobasic	200
Agar	7000
Glucose	2000
Rolled Oats	3000
Yeast Extract	100
Approximate pH at Room Temperature	6.0 ± 1.0

AVAILABLE PACKAGE SIZES

1L 10L

H393 - HELLER BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Heller (1953).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.64 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Aluminum Chloride•6H ₂ O	0.0543
Boric Acid	1.0
Calcium Chloride, Anhydrous	56.7
Cupric Sulfate•5H ₂ O	0.03
Ferric Chloride•6H ₂ O	1.0
Magnesium Sulfate, Anhydrous	122.1
Manganese Sulfate•H ₂ O	0.0758
Molybdenum Trioxide	0.03
Potassium Chloride	750
Potassium Iodide	0.01
Sodium Nitrate	600
Sodium Phosphate, Monobasic•H ₂ O	108.75
Zinc Sulfate•7H ₂ O	1.0
Approximate pH at Room Temperature	5.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L 10L 50L

H353 - HOAGLAND MODIFIED BASAL SALT MIXTURE

Contains Ferrous Sulfate

Contains the macro- and micronutrients as described by Hoagland & Arnon (1950).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.63 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Phosphate, Monobasic	115.03
Boric Acid	2.86
Calcium Nitrate	656.4
Cupric Sulfate•5H ₂ O	0.08
Na ₂ EDTA•2H ₂ O	3.35
Ferrous Sulfate•7H ₂ O	2.50
Magnesium Sulfate, Anhydrous	240.76
Manganese Chloride•4H ₂ O	1.81
Molybdenum Trioxide	0.016
Potassium Nitrate	606.6
Zinc Sulfate•7H ₂ O	0.22
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L 10L 50L 100L

FOR HELP PREPARING TISSUE CULTURE MEDIA

See "Figure 7. Basic Steps to Preparing 1 Liter of Medium" on page 233 in the Technical Section.

H3959 - HOSTA INITIATION/MULTIPLICATION MEDIUM II

A modification of the macro- and micronutrients of Murashige and Skoog Basal Medium (M524) with vitamins, PGRs, Sucrose and Agar.

- Store at 2 to 6 °C
- Partially soluble in Water
- Use at 43.4 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

6-Benzylaminopurine	2
Adenine Hemisulfate	160
Agar	8000
Ammonium Nitrate	1650
α -Naphthaleneacetic Acid	0.02
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Casein Hydrolysate	500
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferrous Sulfate•7H ₂ O	27.8
Glycine	2
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
<i>myo</i> -Inositol	100
Na ₂ EDTA•2H ₂ O	37.26
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	300
Sodium Phosphate, Monobasic•H ₂ O	170
Sucrose	30,000
Thiamine•HCl	0.4
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.5 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L
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H435 - HOSTA INITIATION/ MULTIPLICATION MEDIUM

Stage I/II Medium

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains sucrose and agar.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Boiling/Hot Water
- Use at 43.40 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	300
Sodium Phosphate, Monobasic•H ₂ O	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	160
Agar	8000
6-Benzylaminopurine	2.0
Casein, Enzymatic Hydrolysate	500
Glycine	2.0
<i>myo</i> -Inositol	100
α -Naphthaleneacetic Acid	0.5
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.5 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L
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H436 - HOSTA MULTIPLICATION MEDIUM

Stage II Medium

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains Sucrose and Agar.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Boiling/Hot Water
- Use at 43.39 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	300
Sodium Phosphate, Monobasic•H ₂ O	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	160
Agar	8000
6-Benzylaminopurine	0.1
Casein, Enzymatic Hydrolysate	500
Glycine	2.0
<i>myo</i> -Inositol	100
α-Naphthaleneacetic Acid	0.5
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.5 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L
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H437 - HOSTA ROOTING MEDIUM

Stage III Medium

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains Sucrose and Agar.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Boiling/Hot Water
- Use at 43.23 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	300
Sodium Phosphate, Monobasic•H ₂ O	170
Zinc Sulfate•7H ₂ O	8.6
Agar	8000
6-Benzylaminopurine	0.1
Casein, Enzymatic Hydrolysate	500
<i>myo</i> -Inositol	100
α-Naphthaleneacetic Acid	0.5
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.0 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L
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1365 - ICHIHASHI NEW *PHALAENOPSIS* (NP) MEDIUM

Contains the components as described by Ichihashi (1992); modified to contain 82.0 mg/L Ammonium Nitrate (Product Number A300).

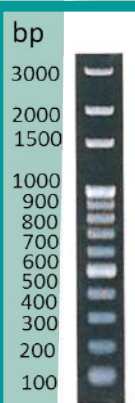
- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Boiling/Hot Water
- Use at 25.35 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	82
Ammonium Sulfate	303.9
Boric Acid	3.1
Calcium Nitrate	637.6
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Nitrate•6H ₂ O	256.4
Manganese Sulfate•H ₂ O	11.2
Molybdic Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	424
Potassium Phosphate, Monobasic, Anhydrous	462.7
Zinc Sulfate•7H ₂ O	4.3
Gellan Gum, CultureGel™ – Biotech	3000
Glycine	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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MOLECULAR BIOLOGY KITS



*Phyto*Technology Laboratories® offers a variety of kits for molecular biology. Please see the molecular biology section on pages 131 to 150 for more information.

- RNA Extraction Kits
- Genomic DNA Extraction Kits
- Plasmid DNA Extraction Kits
- DNA Ladder Kits

K427 - KAO & MICHAYLUK MODIFIED BASAL MEDIUM

Contains the macro- and micronutrients, vitamins, and organic supplements as described by Kao & Michayluk (1975).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.90 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	600
Boric Acid	3.0
Calcium Chloride, Anhydrous	453
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	146.55
Manganese Sulfate•H ₂ O	10
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Chloride	300
Potassium Iodide	0.75
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	2.0
<i>p</i> -Aminobenzoic Acid	0.02
L-Ascorbic Acid	2.0
D-Biotin	0.01
Calcium Pantothenate	1.0
Cholecalciferol; Vitamin D ₃	0.01
Choline Chloride	1.0
Citric Acid, Anhydrous	40
Cyanocobalamin; Vitamin B ₁₂	0.02
Folic Acid	0.4
Fumaric Acid, Free Acid	40
Malic Acid	40
<i>myo</i> -Inositol	100
Niacinamide	1.0
Pyridoxine•HCl	1.0
Pyruvic Acid, Potassium Salt	20
Retinol; Vitamin A	0.01
Riboflavin	0.2
Thiamine•HCl	1.0
Approximate pH at Room Temperature	3.5 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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K413 - KAO & MICHAYLUK BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Kao & Michayluk (1975).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.65 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	600
Boric Acid	3.0
Calcium Chloride, Anhydrous	453
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	146.55
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Chloride	300
Potassium Iodide	0.75
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	2.0
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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K421 - KAO & MICHAYLUK VITAMIN SOLUTION (100x)

Contains the vitamins as described by Kao & Michayluk (1975).

- Store at -20 to 0 °C
- Sterile Filtered
- Miscible with Water
- Use at 10.0 mL per liter of Medium
- Plant Tissue Culture Tested



Components (mg/L)

p-Aminobenzoic Acid	2.0
L-Ascorbic Acid	200
D-Biotin	1.0
Calcium Pantothenate	100
Choline Chloride	100
Cyanocobalamin; Vitamin B ₁₂	2.0
Folic Acid	40
myo-Inositol	10,000
Niacinamide	100
Pyridoxine•HCl	100
Retinol; Vitamin A	1.0
Riboflavin	20
Thiamine•HCl	100
Approximate pH at Room Temperature	5.25 ± 1.75

AVAILABLE PACKAGE SIZES

100mL	500mL	1L
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K5013 - KING'S B MEDIUM

See Seed Testing Section for Complete Listing

CUSTOM MEDIA & SERVICES



PhytoTechnology Laboratories® offers custom manufacturing and testing services. For more information please see page 12.

- Custom Dry Powder Media
- Custom Liquid Media
- Custom Packaging
- Testing Services

K400 - KNUDSON C ORCHID MEDIUM MOREL MODIFICATION

Contains the components as described by Knudson (1946) as modified by Morel (1965).

For optimal results, this medium may be supplemented with 5-10% (v/v) Cocount Water (Product Number C195) or 30-50 g/L Banana Powder (Product Number B852).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 22.00 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	500
Ammonium Sulfate	500
Calcium Nitrate	347.2
Ferrous Sulfate•7H ₂ O	25
Magnesium Sulfate, Anhydrous	122.13
Manganese Sulfate•H ₂ O	5.68
Potassium Chloride	250
Potassium Phosphate, Monobasic, Anhydrous	250
Sucrose	20,000
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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EPIPHYTIC ORCHID MEDIA SELECTION GUIDE

See "Figure 23. Epiphytic Orchid Media Selection Guide" on page 250 in the Technical Section.

K425 - KNUDSON C MODIFIED PLUS ORCHID MEDIUM

Proprietary Formulation

A complete orchid replate and seed sowing medium. Contains Activated Charcoal, Sucrose, Banana Powder, and a Gelling Agent.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Hot/Boiling Water
- Use at 79.11 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	4.75 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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LB BROTHS & AGARS

See Microbiology Section for Complete Listings

L476 - LEIFERT & WAITES STERILITY TEST MEDIUM

See Phytopathology Section for Complete Listing

L154 - LLOYD & McCOWN WOODY PLANT BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Lloyd & McCown (1981).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.30 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	400
Boric Acid	6.2
Calcium Chloride, Anhydrous	72.5
Calcium Nitrate	386
Cupric Sulfate•5H ₂ O	0.25
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	22.3
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	170
Potassium Sulfate, Anhydrous	990
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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L472 - LINDEMANN ORCHID BASAL MEDIUM

Contains the macro- and micronutrients as described by Lindemann *et al.* (1970); contains Sucrose and Vitamins. A complete orchid replate and seed sowing medium.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Warm to Hot Water
- Use at 22.71 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Aluminum Chloride•6H ₂ O	0.0561
Ammonium Sulfate	1000
Boric Acid	1.014
Calcium Nitrate	347.2
Cupric Sulfate•5H ₂ O	0.019
Ferric Citrate	4.4
Magnesium Sulfate, Anhydrous	58.62
Manganese Sulfate•H ₂ O	0.0515
Nickel Chloride•6H ₂ O	0.0312
Potassium Chloride	1050
Potassium Iodide	0.099
Potassium Phosphate, Monobasic, Anhydrous	135
Zinc Sulfate•7H ₂ O	0.565
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	1.0
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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L467 - LINSMAIER & SKOOG MODIFIED BASAL MEDIUM WITH 30 G/L SUCROSE & 7 G/L AGAR

Contains the macro- and micronutrients and vitamins as described by Linsmaier & Skoog (1965). Also contains 30 g/L Sucrose and 7 g/L Agar. This medium may be sold as Murashige & Skoog (MS) Medium with Minimal Organics (MSMO) by some media suppliers.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Hot/Boiling Water
- Use at 41.43 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Agar	7000
myo-Inositol	100
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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L452 - LINSMAIER & SKOOG MODIFIED BASAL MEDIUM WITH 30 G/L SUCROSE & 7 G/L AGAR	
pH Adjusted and Buffered Contains the macro- and micronutrients and vitamins as described by Linsmaier & Skoog (1965). Also contains 30 g/L Sucrose and 7 g/L Agar. This medium may be sold as Murashige & Skoog (MS) Medium with Minimal Organics (MSMO) by some media suppliers.	
• Store at 2 to 6 °C • Soluble in Water (Partially), Fully Soluble in Hot/Boiling Water • Use at 42.53 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Hydroxide	100
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Agar	7000
myo-Inositol	100
MES (Free Acid) •H ₂ O	1000
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

L689 - LINSMAIER & SKOOG BASAL MEDIUM	
Contains the macro- and micronutrients and vitamins as described by Linsmaier & Skoog (1965). This medium may be sold as Murashige & Skoog (MS) Minimal Organics (MSMO) by some media suppliers.	
• Store at 2 to 6 °C • Soluble in Water • Use at 4.43 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
myo-Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 10LFB 50L 100L

L473 - LINSMAIER & SKOOG MODIFIED BASAL MEDIUM WITH 30 G/L SUCROSE

pH Adjusted and Buffered
Contains the macro- and micronutrients and vitamins as described by Linsmaier & Skoog (1965). This medium may be sold as Murashige & Skoog (MS) Medium with Minimal Organics (MSMO) by some media suppliers.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 35.53 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Hydroxide	100
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
<i>myo</i> -Inositol	100
MES (Free Acid)•H ₂ O	1000
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

L477 - LINSMAIER & SKOOG MODIFIED BASAL MEDIUM

pH Adjusted and Buffered
Contains the macro- and micronutrients and vitamins as described by Linsmaier & Skoog (1965).
This medium may be sold as Murashige & Skoog (MS) Medium with Minimal Organics (MSMO) by some media suppliers.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.53 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Hydroxide	100
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
<i>myo</i> -Inositol	100
MES•H ₂ O	1000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

L546 - LITVAY BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Litvay *et al.* (1981).

Originally developed for the culture of both juvenile and mature tissues of Douglas-fir (*Pseudotsuga menziesii*) and Loblolly pine (*Pinus taeda*).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.95 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	31
Calcium Chloride, Anhydrous	16.61
Cobalt Chloride•6H ₂ O	0.125
Cupric Sulfate•5H ₂ O	0.5
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	903.38
Manganese Sulfate•H ₂ O	21
Molybdic Acid, Disodium Salt•2H ₂ O	1.25
Potassium Iodide	4.15
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	340
Zinc Sulfate•7H ₂ O	43
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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L444 - LLOYD & McCOWN WOODY PLANT MICRONUTRIENT MIXTURE

Contains the micronutrients as described by Lloyd & McCown (1981).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 0.53 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Boric Acid	6.2
Calcium Chloride, Anhydrous	72.5
Cupric Sulfate•5H ₂ O	0.25
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	22.3
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND PHYTOPATHOLOGY MEDIA ON PAGES 161 TO 164

- Oat Meal Agar
- Czapek & Dox Agar & Broth
- Bacterial Screening Media
- Potato Dextrose Agar & Broth
- Corn Meal Agar



L449 - LLOYD & McCOWN WOODY PLANT BASAL MEDIUM WITH VITAMINS

Contains the macro- and micronutrients and vitamins as described by Lloyd & McCown (1981).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	400
Boric Acid	6.2
Calcium Chloride, Anhydrous	72.5
Calcium Nitrate	386
Cupric Sulfate•5H ₂ O	0.25
Na ₃ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	22.3
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	170
Potassium Sulfate, Anhydrous	990
Zinc Sulfate•7H ₂ O	8.6
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	1.0
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M551 - MALMGREN MODIFIED TERRESTRIAL ORCHID MEDIUM WITHOUT SUCROSE

Contains the macro- and micronutrients, agar, and organic components as described by Malmgren (1996). Does not contain Sucrose.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Hot/Boiling Water
- Use at 28.84 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Calcium Phosphate, Tribasic	75
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	97.69
Manganese Sulfate•H ₂ O	1.54
Potassium Phosphate, Monobasic, Anhydrous	75
Activated Charcoal	1000
Agar	7000
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	400
Folic Acid	0.5
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	5.0
Pineapple Powder	20,000
Pyridoxine•HCl	5.0
Thiamine•HCl	10
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND MICROBIOLOGY MEDIA ON PAGES 151 TO 159

- *LB Agars and Broths*
- *Tryptic Soy Broth*
- *YEP Media*
- *Hanahan's Broth*
- *Peptone Waters*



M534 - MALMGREN MODIFIED TERRESTRIAL ORCHID MEDIUM WITHOUT SUCROSE & AGAR

Contains the macro- and micronutrients, and organic components as described by Malmgren (1996). Does not contain Sucrose or Agar.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 21.84 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Calcium Phosphate, Tribasic	75
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	97.69
Manganese Sulfate•H ₂ O	1.54
Potassium Phosphate, Monobasic, Anhydrous	75
Activated Charcoal	1000
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	400
Folic Acid	0.5
Glycine	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	5.0
Pineapple Powder	20,000
Pyridoxine•HCl	5.0
Thiamine•HCl	10
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M482 - MALMGREN MODIFIED TERRESTRIAL ORCHID MEDIUM WITHOUT SUCROSE, AGAR, & PINEAPPLE POWDER

Contains the macro- and micronutrients, and organic components as described by Malmgren (1996). Does not contain Sucrose, Agar, or Pineapple Powder.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Hot/Boiling Water
- Use at 1.84 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Calcium Phosphate, Tribasic	75
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	97.69
Manganese Sulfate•H ₂ O	1.54
Potassium Phosphate, Monobasic, Anhydrous	75
Activated Charcoal	1000
D-Biotin	0.05
Casein, Enzymatic Hydrolysate	400
Folic Acid	0.5
Glycine	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	5.0
Thiamine•HCl	10
Approximate pH at Room Temperature	5.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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MALT EXTRACT BROTH & AGAR

See Microbiology Section for Complete Listings

M5516 - mD5A MEDIUM

See Seed Testing Section for Complete Listing

M419 - MG BASAL SALT MIXTURE

Modified Murashige & Skoog/Gamborg Basal Salt Mixture
Contains the macronutrients as described by Murashige & Skoog (1962) and the micronutrients as described by Gamborg *et al.* (1968).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.88 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	33.5
Boric Acid	2.3
Calcium Chloride, Anhydrous	111.36
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	18.64
Ferrous Sulfate•7H ₂ O	13.9
Magnesium Sulfate, Anhydrous	75.7
Manganese Sulfate•H ₂ O	6.7
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.4
Potassium Nitrate	1100
Potassium Phosphate, Monobasic, Anhydrous	42.5
Sodium Nitrate	437.8
Sodium Phosphate, Monobasic•H ₂ O	32.6
Zinc Sulfate•7H ₂ O	2.7
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M579 - MITRA MAINTENANCE/REPLATE MEDIUM

Contains the macro- and micronutrients, vitamins, and supplements as described by Mitra *et al.* (1976) for the culture of orchids. Contains Activated Charcoal, Agar, and Sucrose.

- Store at 2 to 6 °C
- Soluble in Water (Partially), Fully Soluble in Hot/Boiling Water
- Use at 29.82 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	100
Boric Acid	0.6
Calcium Nitrate	100
Cobalt Nitrate•6H ₂ O	0.05
Cupric Sulfate•5H ₂ O	0.05
Na ₂ EDTA•2H ₂ O	22.3
Ferrous Sulfate•7H ₂ O	16.7
Manganese Chloride•4H ₂ O	0.4
Magnesium Sulfate, Anhydrous	250
Molybdc Acid, Disodium Salt•2H ₂ O	0.05
Potassium Iodide	0.03
Potassium Nitrate	180
Sodium Phosphate•H ₂ O	150
Zinc Sulfate•7H ₂ O	0.05
Activated Charcoal	2000
Agar	7000
D-Biotin	0.05
Folic Acid	0.3
Nicotinic Acid	1.25
Pyridoxine•HCl	0.3
Riboflavin	0.05
Sucrose	20,000
Thiamine•HCl	0.3
Approximate pH at Room Temperature	5.75 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L
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TERRESTRIAL ORCHID MEDIA SELECTION GUIDE

See "Figure 22. Terrestrial Orchid Media Selection Guide" on page 250 in the Technical Section.

M587 - MOREL & MARTIN VITAMIN SOLUTION (100x)

Contains the vitamins as described by Morel & Martin (1955). *myo*-Inositol may precipitate out of the solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 10 mL per liter of medium
- Plant Tissue Culture Tested



Components (mg/L)

D-Biotin	0.1
D-Calcium pantothenate	100
<i>myo</i> -Inositol	10,000
Nicotinic Acid	100
Pyridoxine•HCl	100
Approximate pH at Room Temperature	4.3 ± 0.75

AVAILABLE PACKAGE SIZES

100mL

M580 - MODIFIED MELIN-NORKRANS MEDIUM

See Microbiology Section for Complete Listing

M5800 - MURASHIGE & SKOOG BASAL MEDIUM WITH EDTA FERRIC-SODIUM SALT

Contains the macro- and micronutrients and vitamins as described by Murashige and Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.41 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
FeNaEDTA	36.7
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine (Free Base)	2
<i>myo</i> -Inositol	100
Nicotinic Acid (Free Acid)	0.5
Pyridoxine HCl	0.5
Thiamine HCl	0.1
Approximate pH at Room Temperature	5.0 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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FIND CULTURE VESSELS IN THE EQUIPMENT SECTION



For our full line of culture vessels, consult the equipment section on pages 187 to 218.

- Sterile Culture Vessels
- Reusable Culture Vessels
- Petri Dishes
- Culture Tubes

M519 - MURASHIGE & SKOOG BASAL MEDIUM WITH VITAMINS

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.43 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt• 2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	5L	10L	10LFB	50L	100L
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FOR FIND MEDIA FOR THE VARIOUS STAGES OF TISSUE CULTURE PLANT GROWTH

See "Figure 5. Examples of Media Designed for a Specific Stage of Growth" on page 231 in the Technical Section.

M5501 - MURASHIGE & SKOOG BASAL MEDIUM WITH VITAMINS AND SUCROSE

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 34.43 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt• 2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2
<i>myo</i> -Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	30,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M5530 - MURASHIGE & SKOOG BASAL MEDIUM WITH VITAMINS AND SUCROSE SOLUTION (1x)

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Sterile Filtered
- 1x Solution
- Plant Tissue Culture Tested



Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt• 2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	30,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

500mL 1L

M5615 - MURASHIGE & SKOOG BASAL MEDIUM WITH VITAMINS, GLUCOSE AND SUCROSE SOLUTION (1x)

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Sterile Filtered
- 1x Solution
- Plant Tissue Culture Tested



Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt• 2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	15,000
Glucose	15,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

500mL 1L

FIND BIOCHEMICALS ON PAGES 15 TO 56

- Gelling Agents
- Plant Growth Regulators
- Media Components
- Stains and Dyes
- Carbohydrates



M5707 - MURASHIGE & SKOOG BASAL MEDIUM WITH VITAMINS, GLUCOSE, AND SUCROSE

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 34.43 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt• 2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
D-Glucose	20,000
Glycine	2
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	10,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M5825 - MURASHIGE & SKOOG BASAL MEDIUM WITH VITAMINS, SUCROSE AND GELZAN

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Partially soluble in Water
- Use at 36.43 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt• 2H ₂ O	0.25
Gelzan	2000
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	30,000
Thiamine•HCl	0.1
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	5L	10L	50L
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FIND MOLECULAR BIOLOGY PRODUCTS ON PAGES 131 TO 150

- Antibiotics
- Buffers
- DNA Extraction Kits
- Sterile Solutions
- IPTG, X-Gal & X-Gluc



M5642 - MURASHIGE & SKOOG BASAL MEDIUM, VAN DER SALM MODIFICATION

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the iron source as described by Van der Salm *et al.* (1994).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.46 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
FeNa-EDDHA	96
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.1
Approximate pH at Room Temperature	5.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M5541 - MURASHIGE & SKOOG BASAL SALT MIXTURE VAN DER SALM MODIFICATION

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962) with the iron source as described by Van der Salm *et al.* (1994).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.36 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
FeNa-EDDHA	96.0
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	approx. 5.0

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M576 - MURASHIGE & SKOOG BASAL SALT CONCENTRATE (20x)

Contains the macro- and micronutrients as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 50.0 mL per liter
- Plant Tissue Culture Tested



Components (mg/L)

Ammonium Nitrate	33,000
Boric Acid	124
Calcium Chloride, Anhydrous	6644
Cobalt Chloride•6H ₂ O	0.5
Cupric Sulfate•5H ₂ O	0.5
Na ₂ EDTA•2H ₂ O	745.2
Ferrous Sulfate•7H ₂ O	556
Magnesium Sulfate, Anhydrous	3614
Manganese Sulfate•H ₂ O	338
Molybdc Acid, Disodium Salt•2H ₂ O	5.0
Potassium Iodide	16.6
Potassium Nitrate	38,000
Potassium Phosphate, Monobasic, Anhydrous	3400
Zinc Sulfate•7H ₂ O	172
Approximate pH at Room Temperature	3.25 ± 0.5

AVAILABLE PACKAGE SIZES

500mL	1L
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M524 - MURASHIGE & SKOOG BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.33 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	5L	10L	10LFB	50L	100L
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FOR HELP PREPARING TISSUE CULTURE MEDIA

See "Figure 7. Basic Steps to Preparing 1 Liter of Medium" on page 233 in the Technical Section.

M502 - MURASHIGE & SKOOG MACRONUTRIENT SALT BASE

Contains the macronutrients as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.23 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Calcium Chloride, Anhydrous	332.2
Magnesium Sulfate, Anhydrous	180.7
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Approximate pH at Room Temperature	4.75 ± 0.75

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M654 - MURASHIGE & SKOOG MACRONUTRIENT STOCK SOLUTION (10x)

Contains the macronutrients as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 100.0 mL per liter
- Plant Tissue Culture Tested



Components (mg/L)

Ammonium Nitrate	16,500
Calcium Chloride, Anhydrous	3322
Magnesium Sulfate, Anhydrous	1807
Potassium Nitrate	19,000
Potassium Phosphate, Monobasic, Anhydrous	1700
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

500mL	1L
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M554 - MURASHIGE & SKOOG MICRONUTRIENT SALT BASE

Contains the micronutrients as described by Murashige & Skoog (1962).

- Store at -20 to 0 °C
- Soluble in Water
- Use at 0.10 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Boric Acid	6.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.3 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M5531 - MURASHIGE & SKOOG MEDIUM WITH 1G/L MES

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.43 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt• 2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.1
MES	1000
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M535 - MURASHIGE & SKOOG MODIFIED BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains 80 mg/L Adenine Hemisulfate. Comporable to Linsmaier & Skoog Basal Medium (L689) with an added 80 mg/L Adenine Hemisulfate.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.51 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdcic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
<i>myo</i> -Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	3.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M701 - MURASHIGE & SKOOG MODIFIED BASAL MEDIUM

This medium may be sold as Murashige Begonia Multiplication Medium by some media suppliers. Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains (mg/L): 30.0 Adenine Hemisulfate, 10.0 2iP, 1.0 IAA, and Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.44 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdcic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	30.0
6-(γ,γ-Dimethylallylamino)purine; 2iP	10.0
Indole-3-acetic Acid	1.0
<i>myo</i> -Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M541 - MURASHIGE & SKOOG MODIFIED BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and modified vitamins with the following exception: Without Potassium Phosphate Monobasic. Also contains (mg/L):

300 Sodium Phosphate Monobasic, 150 Adenine Hemisulfate, 1000 Casein, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.69 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Sodium Phosphate, Monobasic•H ₂ O	300
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	150
Casein, Enzymatic Hydrolysate	1000
Glycine	2.0
myo-Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	1.0
Thiamine•HCl	0.5
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M401 - MURASHIGE & SKOOG MODIFIED BASAL MEDIUM

Contains the macro- and micronutrients and vitamins as described by Murashige & Skoog (1962); modified with the addition of (mg/L): 1.0 BA and 0.1 NAA. Also contains 30 g/L Sucrose.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 34.44 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
6-Benzylaminopurine	1.0
Glycine	2.0
myo-Inositol	100
α-Naphthaleneacetic Acid	0.1
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M404 - MURASHIGE & SKOOG MODIFIED BASAL MEDIUM WITH GAMBORG VITAMINS

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Gamborg *et al.* (1968).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.44 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
myo-Inositol	100
Nicotinic Acid	1
Pyridoxine•HCl	1
Thiamine•HCl	10
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	10LFB	50L	100L
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M504 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE

Finer & Nagasawa (1988) Modification

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exceptions: Contains 1.6x Potassium Nitrate, 0.5x Ammonium Nitrate, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.61 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	180.54
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	3030
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	5.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M499 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exception: Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.30 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M290 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (½X NITRATES & ½X CALCIUM)

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exceptions: ½ Ammonium Nitrate, ½ Potassium Nitrate, and ½ Calcium Chloride.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.39 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	825
Boric Acid	6.2
Calcium Chloride, Anhydrous	166.1
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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FIND SEED TESTING PRODUCTS ON PAGES 165 TO 172

- *PhytoSelect Basal Medium*
- *mD5A Medium*
- *Stains & Dyes*
- *King's B Medium*
- *Selection Agents*



M153 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (1/2X MACROS & MICROS)

Contains 1/2 the macro- and micronutrients as described by Murashige & Skoog (1962).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.17 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166.1
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₃ EDTA•2H ₂ O	18.63
Ferrous Sulfate•7H ₂ O	13.9
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	4.3
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M561 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (1/2X NITRATES)

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exceptions: 1/2 Ammonium Nitrate and 1/2 Potassium Nitrate.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.56 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M531 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (WITHOUT NITROGEN)

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exceptions: Without Ammonium Nitrate & Potassium Nitrate.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 0.78 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M407 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (WITHOUT NITROGEN, PHOSPHOROUS, AND POTASSIUM)

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exceptions: Without Ammonium Nitrate, Potassium Nitrate, and Potassium Phosphate, Monobasic.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 0.61 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.3 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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TISSUE CULTURE KITS



PhytoTechnology Laboratories® offers a selection of plant tissue culture kits for educational use. For more information please see pages 179 to 185.

Kits for:

- African Violet,
- Carrot,
- Carnivorous Plants,
- Fern,
- Hosta,
- Lily,
- Orchids, and
- Potato.

M571 - MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (WITHOUT NH_4NO_3)

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) with the following exception: Without Ammonium Nitrate.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.68 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M516 - MURASHIGE & SKOOG MODIFIED BC POTATO BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962). Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA. Also contains Kinetin (Product Number K750) and the vitamins cited below.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Glycine	2.0
myo-Inositol	100
Kinetin	0.04
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M702 - MURASHIGE & SKOOG MODIFIED MEDIUM		
Contains the macro- and micronutrients as described by Murashige and Skoog (1962) and the vitamins described by Linsmaier and Skoog (1965). Contains 30 g/L Sucrose. Also contains: 148 mg/L Sodium Phosphate Monobasic, 80 mg/L Adenine Hemisulfate, 30 mg/L 2iP, and 0.3 mg/L IAA.		
• Store at 2 to 6 °C • Soluble in Water • Use at 34.69 grams per liter • Plant Tissue Culture Tested		
Components (mg/L)		
Ammonium Nitrate	1650	
Boric Acid	6.2	
Calcium Chloride, Anhydrous	332.2	
Cobalt Chloride•6H ₂ O	0.025	
Cupric Sulfate•5H ₂ O	0.025	
Na ₂ EDTA•2H ₂ O	37.26	
Ferrous Sulfate•7H ₂ O	27.8	
Magnesium Sulfate, Anhydrous	180.7	
Manganese Sulfate•H ₂ O	16.9	
Molybdc Acid, Disodium Salt•2H ₂ O	0.25	
Potassium Iodide	0.83	
Potassium Nitrate	1900	
Potassium Phosphate, Monobasic, Anhydrous	170	
Sodium Phosphate, Monobasic•H ₂ O	148	
Zinc Sulfate•7H ₂ O	8.6	
Adenine Hemisulfate•2H ₂ O	80	
6-(γ,γ-Dimethylallylamino)purine; 2iP	30	
Indole-3-acetic Acid	0.3	
<i>myo</i> -Inositol	100	
Sucrose	30,000	
Thiamine•HCl	0.4	
Approximate pH at Room Temperature	4.0 ± 0.75	
AVAILABLE PACKAGE SIZES		
1L	10L	50L

M550 - MURASHIGE & SKOOG MODIFIED MEDIUM ARABIDOPSIS CULTURE MEDIUM		
Contains the macro- and micronutrients as described by Murashige and Skoog (1962) and modified vitamins. Contains 20 g/L Sucrose. Also contains: 2.0 mg/L 2,4-D and 0.05 mg/L Kinetin.		
• Store at 2 to 6 °C • Soluble in Water • Use at 24.44 grams per liter • Plant Tissue Culture Tested		
Components (mg/L)		
Ammonium Nitrate	1650	
Boric Acid	6.2	
Calcium Chloride, Anhydrous	332.2	
Cobalt Chloride•6H ₂ O	0.025	
Cupric Sulfate•5H ₂ O	0.025	
Na ₂ EDTA•2H ₂ O	37.26	
Ferrous Sulfate•7H ₂ O	27.8	
Magnesium Sulfate, Anhydrous	180.7	
Manganese Sulfate•H ₂ O	16.9	
Molybdc Acid, Disodium Salt•2H ₂ O	0.25	
Potassium Iodide	0.83	
Potassium Nitrate	1900	
Potassium Phosphate, Monobasic, Anhydrous	170	
Zinc Sulfate•7H ₂ O	8.6	
2,4-Dichlorophenoxyacetic Acid	2.0	
myo-Inositol	100	
Kinetin	0.05	
Nicotinic Acid	1.0	
Pyridoxine•HCl	1.0	
Sucrose	20,000	
Thiamine•HCl	10.0	
Approximate pH at Room Temperature	3.75 ± 0.5	
AVAILABLE PACKAGE SIZES		
1L	10L	50L

M555 - MURASHIGE & SKOOG MODIFIED MULTIPLICATION MEDIUM

This medium may be sold as Murashige & Skoog (MS) Shoot Multiplication Medium C by some media suppliers. Contains the macro- and micronutrients as described by Murashige and Skoog (1962) and the vitamins described by Linsmaier and Skoog (1965). Contains 30 g/L Sucrose. Also contains: 148 mg/L Sodium Phosphate Monobasic, 80 mg/L Adenine Hemisulfate, 1.0 mg/L Kinetin, 0.1 mg/L NAA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 34.66 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₃ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	148
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
<i>myo</i> -Inositol	100
Kinetin	1.0
α-Naphthaleneacetic Acid	0.1
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	3.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M547 - MURASHIGE & SKOOG MODIFIED VITAMIN POWDER (1000x)

Contains the vitamins as described by Murashige & Skoog (1962) modified with additional Thiamine HCl (Product Number T390).

myo-Inositol may precipitate out of the solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Soluble in Water
- Use 10.40 grams to make 100 mL
- Use at 1.0 mL per liter of Medium
- Plant Tissue Culture Tested

Components (mg/L)	
Glycine	2000
<i>myo</i> -Inositol	100,000
Nicotinic Acid	500
Pyridoxine•HCl	500
Thiamine•HCl	1000
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

100mL	250mL
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VITAMINS MIXTURES FOR USE IN PLANT TISSUE CULTURE

See "Vitamin Formulations Table" on page 287 in the Technical Section.

M557 - MURASHIGE & SKOOG MODIFIED VITAMIN SOLUTION (1000x)

Contains the vitamins as described by Murashige & Skoog (1962) modified with additional Thiamine HCl Product Number T390).

myo-Inositol may precipitate out of the solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 1.0 mL per liter of Medium
- Plant Tissue Culture Tested



Components (mg/L)	
Glycine	2000
<i>myo</i> -Inositol	100,000
Nicotinic Acid	500
Pyridoxine•HCl	500
Thiamine•HCl	1000
Approximate pH at Room Temperature	3.75 ± 0.5

AVAILABLE PACKAGE SIZES

100 mL

M553 - MURASHIGE & SKOOG VITAMIN SOLUTION (1000x)

Contains the vitamins as described by Murashige & Skoog (1962).

myo-Inositol may precipitate out of the solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 1.0 mL per liter of Medium
- Plant Tissue Culture Tested



Components (mg/L)

Glycine	2000
<i>myo</i> -Inositol	100,000
Nicotinic Acid	500
Pyridoxine•HCl	500
Thiamine•HCl	100
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

100 mL

M517 - MURASHIGE MODIFIED AFRICAN VIOLET/ GLOXINIA MULTIPLICATION BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains:
170 mg/L Sodium Phosphate Monobasic, 80 mg/L Adenine Hemisulfate, 2.0 mg/L IAA, 2.0 mg/L Kinetin, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.66 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
Indole-3-acetic Acid	2.0
Kinetin	2.0
<i>myo</i> -Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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PhytoTechnology Laboratories® offers a variety of kits for molecular biology. Please see the molecular biology section on pages 131 to 150 for more information.

- RNA Extraction Kits
- Genomic DNA Extraction Kits
- Plasmid DNA Extraction Kits
- DNA Ladder Kits

M518 - MURASHIGE MODIFIED AFRICAN VIOLET/ GLOXINIA PRETRANSPLANT BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains: 1.0 mg/L IAA, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.40 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Indole-3-acetic Acid	1.0
<i>myo</i> -Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M507 - MURASHIGE MODIFIED CATTLEYA ORCHID MULTIPLICATION MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and modified vitamins. Contains 20 g/L Sucrose. Also contains: 150 mg/L Citric Acid, 0.3 mg/L IAA, 1.75 mg/L IBA, 1.75 mg/L NAA, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 24.57 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Citric Acid, Anhydrous	150
Glycine	2.0
Indole-3-acetic Acid	0.3
Indole-3-butyric Acid	1.75
<i>myo</i> -Inositol	100
α -Naphthaleneacetic Acid	1.75
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	3.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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SELECTING EPIPHYTIC ORCHID MEDIA BY GENUS

See "Figure 25. Epiphytic Orchid Media Selection Guide by Genus" on page 252 in the Technical Section.

M508 - MURASHIGE MODIFIED FERN MULTIPLICATION BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains: 255 mg/L Sodium Phosphate Monobasic, 2.0 mg/L Kinetin, 0.1 mg/L NAA, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.66 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	255
Zinc Sulfate•7H ₂ O	8.6
Kinetin	2.0
myo-Inositol	100
α-Naphthaleneacetic Acid	0.1
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

M509 - MURASHIGE MODIFIED GERBERA MULTIPLICATION BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and modified vitamins. Also contains: 85 mg/L Sodium Phosphate Monobasic, 80 mg/L Adenine Hemisulfate, 10.0 mg/L Kinetin, 0.5 mg/L IAA, 100 mg/L L-Tyrosine, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.72 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	85
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
Kinetin	10.0
Indole-3-acetic Acid	0.5
myo-Inositol	100
Nicotinic Acid	10.0
Pyridoxine•HCl	1.0
Thiamine•HCl	30
L-Tyrosine	100
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

M510 - MURASHIGE MODIFIED GERBERA PRETRANSPLANT BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and modified vitamins. Also contains: 85 mg/L Sodium Phosphate Monobasic, 10.0 mg/L IAA, 100 mg/L L-Tyrosine, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.64 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	85
Zinc Sulfate•7H ₂ O	8.6
<i>myo</i> -Inositol	100
Indole-3-acetic Acid	10
Nicotinic Acid	10
Pyridoxine•HCl	1.0
Thiamine•HCl	30
L-Tyrosine	100
Approximate pH at Room Temperature	4.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

M511 - MURASHIGE MODIFIED KALANCHOE MULTIPLICATION BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains: 3.0 mg/L 2iP and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
<i>myo</i> -Inositol	100
6-(γ,γ-Dimethylallylamino)purine; 2iP	3.0
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

M512 - MURASHIGE MODIFIED KALANCHOE PRETRANSPLANT BASAL MEDIUM

This medium may be sold as Murashige Syngonium Pretransplant Medium by some media suppliers. Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains: 3.0 mg/L IAA and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
myo-Inositol	100
Indole-3-acetic Acid	3.0
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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M536 - MURASHIGE MODIFIED MULTIPLICATION BASAL MEDIUM

Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and modified vitamins. Also contains: 170 mg/L Sodium Phosphate Monobasic and 80 mg/L Adenine Hemisulfate.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.68 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	180.7
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
Glycine	2
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	3.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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M527 - MURASHIGE MODIFIED MULTIPLICATION BASAL MEDIUM

This medium may be sold as Murashige & Skoog (MS) Shoot Tip Rooting Medium by some media suppliers. Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains: 1.0 mg/L Kinetin, 0.3 mg/L IAA, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Indole-3-acetic Acid	0.3
myo-Inositol	100
Kinetin	1.0
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

M491 - MURASHIGE MODIFIED SHOOT MULTIPLICATION BASAL MEDIUM

This medium may be sold as Murashige & Skoog (MS) Shoot Multiplication Medium A by some media suppliers. Contains the macro- and micronutrients as described by Murashige & Skoog (1962) and the vitamins described by Linsmaier & Skoog (1965). Also contains: 170 mg/L Sodium Phosphate Monobasic, 80 mg/L Adenine Hemisulfate, 30.0 mg/L 2iP, 0.3 mg/L IAA, and Ferric Sodium EDTA in place of Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.68 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Sodium Phosphate, Monobasic•H ₂ O	170
Zinc Sulfate•7H ₂ O	8.6
Adenine Hemisulfate•2H ₂ O	80
6-(γ,γ-Dimethylallylamino)purine; 2iP	30.0
Indole-3-acetic Acid	0.3
myo-Inositol	100
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

FIND PHYCOLOGY PRODUCTS ON PAGES 173 TO 178

- *Bold's Basal Medium*
- *Blue-Green Medium*
- *Tris Acetate Phosphate*
- *Seawater*
- *Sueoka's High Salt Medium*



M462 - MUSA (BANANA) MULTIPLICATION MEDIUM	
IITA formulation as described by Vuylsteke (1989) (International Institute for Tropical Agriculture) Contains PGRs, sucrose, and gelling agent.	
• Store at 2 to 6 °C • Soluble in Water (Partially) • Use at 36.36 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	332.2
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.25
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	180.74
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
L-Ascorbic Acid	20
6-Benzylaminopurine	4.5
Gellan Gum – Biotech Grade	2000
Glycine	2.0
Indole-3-acetic Acid	0.175
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Sucrose	30,000
Thiamine•HCl	0.4
Approximate pH at Room Temperature	4.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	50L

N492 - NB BASAL MEDIUM	
Modified Chu/Gamborg Basal Medium Contains the macronutrients as described by Chu (1975) and the micronutrients as described by Gamborg <i>et al.</i> (1968).	
• Store at 2 to 6 °C • Soluble in Water • Use at 4.10 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Sulfate	463
Boric Acid	3.0
Calcium Chloride, Anhydrous	125.33
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	90.37
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.75
Potassium Nitrate	2830
Potassium Phosphate, Monobasic, Anhydrous	400
Zinc Sulfate•7H ₂ O	2.0
myo-Inositol	100
Nicotinic Acid	1.0
Pyridoxine•HCl	1.0
Thiamine•HCl	10
Approximate pH at Room Temperature	4.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	50L

N616 - NITSCH & NITSCH BASAL MEDIUM WITH VITAMINS

Contains the macro- and micronutrients and vitamins as described by Nitsch & Nitsch (1969).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.21 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	720
Boric Acid	10
Calcium Chloride, Anhydrous	166
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	90.372
Manganese Sulfate•H ₂ O	18.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	68
Zinc Sulfate•7H ₂ O	10
D-Biotin	0.05
Folic Acid	0.5
Glycine	2.0
<i>myo</i> -Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	0.5
Thiamine•HCl	0.5
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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N613 - NITSCH & NITSCH BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Nitsch & Nitsch (1969).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.10 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	720
Boric Acid	10
Calcium Chloride, Anhydrous	166
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	90.372
Manganese Sulfate•H ₂ O	18.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	68
Zinc Sulfate•7H ₂ O	10
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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N608 - NITSCH & NITSCH VITAMIN POWDER (1000x)

Contains the vitamins as described by Nitsch & Nitsch (1969). *myo*-Inositol may precipitate out of the solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Soluble in Water
- Use 10.86 grams to make 100 mL
- Use at 1.0 mL per liter of Medium
- Plant Tissue Culture Tested

Components (mg/L)

D-Biotin	50
Folic Acid	500
Glycine	2000
<i>myo</i> -Inositol	100,000
Nicotinic Acid	5000
Pyridoxine•HCl	500
Thiamine•HCl	500
Approximate pH at Room Temperature	3.75 ± 0.75

AVAILABLE PACKAGE SIZES

100mL	250mL
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N603 - NITSCH & NITSCH VITAMIN SOLUTION (1000x)

Contains the vitamins as described by Nitsch & Nitsch (1969). *myo*-Inositol may precipitate out of the solution when cold; warming with occasional agitation will redissolve the precipitated *myo*-Inositol.

- Store at 2 to 6 °C
- Sterile Filtered
- Miscible with Water
- Use at 1.0 mL per liter of medium
- Plant Tissue Culture Tested



Components (mg/L)

D-Biotin	50
Folic Acid	500
Glycine	2000
<i>myo</i> -Inositol	100,000
Nicotinic Acid	5000
Pyridoxine•HCl	500
Thiamine•HCl	500
Approximate pH at Room Temperature	8.0 ± 0.75

AVAILABLE PACKAGE SIZES

100mL

N479 - NLN BASAL MEDIUM

Contains the macro- and micronutrients and organic components as described by Lichter (1982).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.77 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Boric Acid	10
Calcium Nitrate	347
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	61
Manganese Sulfate•H ₂ O	18.95
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Nitrate	125
Potassium Phosphate, Monobasic, Anhydrous	125
Zinc Sulfate•7H ₂ O	10
D-Biotin	0.05
Folic Acid	0.5
L-Glutamine	800
Glutathione (Reduced)	30
Glycine	2
<i>myo</i> -Inositol	100
Nicotinic Acid	5
Pyridoxine•HCl	0.5
L-Serine	100
Thiamine•HCl	0.5
Approximate pH at Room Temperature	4.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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NUTRIENT BROTH & AGAR

See Microbiology Section for Complete Listings

O606 - OAT MEAL AGAR

See Phytopathology Section for Complete Listing

CUSTOM MEDIA & SERVICES



PhytoTechnology Laboratories® offers custom manufacturing and testing services. For more information please see page 12.

- Custom Dry Powder Media
- Custom Liquid Media
- Custom Packaging
- Testing Services

O139 - ORCHID MAINTENANCE/REPLATE MEDIUM

Without Charcoal and Agar

- Store at 2 to 6 °C
- Soluble in Water
- Use at 25.31 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
<i>myo</i> -Inositol	100
MES•H ₂ O	1000
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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O156 - ORCHID MAINTENANCE/REPLATE MEDIUM

Contains Banana Powder (Product Number B852) and Charcoal (Product Number C325), Without Agar

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 57.31 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
Activated Charcoal	2000
Banana Powder	30,000
<i>myo</i> -Inositol	100
MES•H ₂ O	1000
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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P748 - ORCHID MAINTENANCE/REPLATE MEDIUM	
Contains Banana Powder (Product Number B852) and Charcoal (Product Number C325), and Agar (Product Number A111)	
• Store at 2 to 6 °C • Soluble in Water (Partially) • Use at 64.31 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
Activated Charcoal	2000
Agar	7000
Banana Powder	30,000
myo-Inositol	100
MES•H ₂ O	1000
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.0 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

P658 - ORCHID MAINTENANCE MEDIUM	
Contains Charcoal (Product Number C325) and Agar (Product Number A111)	
• Store at 2 to 6 °C • Soluble in Water (Partially) • Use at 35.31 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
Activated Charcoal	2000
Agar	8000
myo-Inositol	100
MES•H ₂ O	1000
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L 100L

P668 - ORCHID MAINTENANCE MEDIUM

Contains Charcoal (Product Number C325), Without Agar

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 27.31 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
Activated Charcoal	2000
myo-Inositol	100
MES•H ₂ O	1000
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L	100L
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SELECTING TERRESTRIAL ORCHID MEDIA BY GENUS

See "Figure 24. Terrestrial Orchid Media Selection Guide by Genus" on page 251 in the Technical Section.

O753 - ORCHID MULTIPLICATION MEDIUM

Contains Agar (Product Number A111), Without Charcoal

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 32.30 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdc Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
Agar	7000
6-Benzylaminopurine	2.0
myo-Inositol	100
MES•H ₂ O	1000
α-Naphthaleneacetic Acid	0.5
Nicotinic Acid	0.5
Peptone from Meat	2000
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	1.0
Approximate pH at Room Temperature	5.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND PHYTOPATHOLOGY MEDIA ON PAGES 161 TO 164

- Oat Meal Agar
- Czapek & Dox Agar & Broth
- Bacterial Screening Media
- Potato Dextrose Agar & Broth
- Corn Meal Agar



P793 - ORCHID MULTIPLICATION MEDIUM	
Without Charcoal and Agar	
• Store at 2 to 6 °C • Soluble in Water • Use at 25.30 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	825
Boric Acid	3.1
Calcium Chloride, Anhydrous	166
Cobalt Chloride•6H ₂ O	0.0125
Cupric Sulfate•5H ₂ O	0.0125
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.85
Magnesium Sulfate, Anhydrous	90.35
Manganese Sulfate•H ₂ O	8.45
Molybdic Acid, Disodium Salt•2H ₂ O	0.125
Potassium Iodide	0.415
Potassium Nitrate	950
Potassium Phosphate, Monobasic, Anhydrous	85
Zinc Sulfate•7H ₂ O	5.3
6-Benzylaminopurine	2.0
myo-Inositol	100
MES•H ₂ O	1000
α-Naphthaleneacetic Acid	0.5
Nicotinic Acid	0.5
Peptone from Meat	2000
Pyridoxine•HCl	0.5
Sucrose	20,000
Thiamine•HCl	1.0
Approximate pH at Room Temperature	5.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

P723 - ORCHID SEED SOWING MEDIUM	
Contains Charcoal (Product Number C325) and Agar (Product Number A111)	
• Store at 2 to 6 °C • Soluble in Water (Partially) • Use at 32.74 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	412.5
Boric Acid	1.65
Calcium Chloride, Anhydrous	83
Cobalt Chloride•6H ₂ O	0.00625
Cupric Sulfate•5H ₂ O	0.00625
Na ₂ EDTA•2H ₂ O	18.65
Ferrous Sulfate•7H ₂ O	13.93
Magnesium Sulfate, Anhydrous	75.18
Manganese Sulfate•H ₂ O	4.23
Molybdic Acid, Disodium Salt•2H ₂ O	0.0625
Potassium Iodide	0.2075
Potassium Nitrate	475
Potassium Phosphate, Monobasic, Anhydrous	42.5
Zinc Sulfate•7H ₂ O	2.65
Activated Charcoal	1000
Agar	8000
myo-Inositol	100
MES•H ₂ O	500
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.75 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

P727 - ORCHID SEED SOWING MEDIUM II

Contains Agar (Product Number A111), Without Charcoal

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 31.74 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	412.5
Boric Acid	1.65
Calcium Chloride, Anhydrous	83
Cobalt Chloride•6H ₂ O	0.0063
Cupric Sulfate•5H ₂ O	0.0063
Na ₂ EDTA•2H ₂ O	18.65
Ferrous Sulfate•7H ₂ O	13.93
Magnesium Sulfate, Anhydrous	75.18
Manganese Sulfate•H ₂ O	4.23
Molybdc Acid, Disodium Salt•2H ₂ O	0.0625
Potassium Iodide	0.2075
Potassium Nitrate	475
Potassium Phosphate, Monobasic, Anhydrous	42.5
Zinc Sulfate•7H ₂ O	2.65
Agar	8000
myo-Inositol	100
MES•H ₂ O	500
Nicotinic Acid	1.0
Peptone from Meat	2000
Pyridoxine•HCl	1.0
Sucrose	20,000
Thiamine•HCl	10
Approximate pH at Room Temperature	5.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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P713 - PARKER THOMPSON FERN BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Hickok *et al.* (1995).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 0.77 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Molybdate(VI)•4H ₂ O	0.037
Ammonium Nitrate	125
Boric Acid	1.86
Calcium Chloride, Anhydrous	19.628
Cupric Sulfate•5H ₂ O	0.37
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	58.565
Manganese Sulfate•H ₂ O	0.25
Potassium Phosphate, Monobasic, Anhydrous	500
Zinc Sulfate•7H ₂ O	0.52
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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PEPTONE WATERS

See Microbiology Section for Complete Listings

NEW PRODUCT

P6700 - PHYTO-ORGANIC™ POTATO MEDIA KIT

Proprietary media formulation. Kit contains sufficient *Phyto*-Organic Organic Plant Growth Regulators (OPGR) Liquid Supplements for amount of media purchased. OPGR Supplements are allotted as one-liter applications.

Phyto-Organic Media are manufactured from chemical components sourced from the Organic Material Review Institute's (OMRI) list of organic chemicals.

For use in laboratory research only.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 8.71 grams per liter of medium
- Plant Tissue Culture Tested

pH at Room Temperature	5.7 ± 1.0
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AVAILABLE PACKAGE SIZES

1L	10L
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NEW PRODUCT

P7000 - PHYTO-ORGANIC™ POTATO MEDIA II KIT

Proprietary media formulation. Kit contains sufficient *Phyto*-Organic Organic Plant Growth Regulators (OPGR) Liquid Supplements for amount of media purchased. OPGR Supplements are allotted as one-liter applications.

Phyto-Organic Media are manufactured from chemical components sourced from the Organic Material Review Institute's (OMRI) list of organic chemicals.

For use in laboratory research only.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 8.88 grams per liter of medium
- Plant Tissue Culture Tested

pH at Room Temperature	5.7 ± 1.0
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AVAILABLE PACKAGE SIZES

1L	10L
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P6800 - PHYTOSELECT BASAL MEDIUM

See Seed Testing Section for Complete Listing

P781 - PHYTO TECH™ ORCHID REPLATE MEDIUM

Proprietary Formulation
Contains Sucrose
Does not contain Banana Powder, Activated Charcoal, or a Gelling Agent
An orchid replate and seed sowing medium.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 35.81 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	4.75 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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P782 - PHYTO TECH™ ORCHID REPLATE MEDIUM

Proprietary Formulation
Contains Sucrose and a Gelling Agent
Does not contain Banana Powder or Activated Charcoal
An orchid replate and seed sowing medium.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 43.81 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	5.0 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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EPIPHYTIC ORCHID MEDIA SELECTION GUIDE

See "Figure 23. Epiphytic Orchid Media Selection Guide" on page 250 in the Technical Section.

P785 - PHYTO TECH™ ORCHID REPLATE MEDIUM II

Proprietary Formulation
Contains Sucrose, Banana Powder, and a Gelling Agent
Does not contain Activated Charcoal
A complete orchid replate and seed sowing medium.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 65.79 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	4.75 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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P656 - PHYTO TECH™ PHALAENOPSIS REPLATE MEDIUM

Proprietary Formulation
Contains Sucrose, Banana Powder, Potato Powder, Activated Charcoal, and a gelling agent.
A complete orchid replate medium.

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 61.31 grams per liter
- Plant Tissue Culture Tested

Approximate pH at Room Temperature	5.5 ± 0.5
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AVAILABLE PACKAGE SIZES

1L	10L	50L
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P6647 - PHYTO TECH™ SPATHIPHYLLUM MULTIPLICATION MEDIUM

A complete medium for the micropropagation of *Spathiphyllum*. Contains gelling agent, carbohydrates, and plant growth regulators.

*Phyto*Tech™ *Spathiphyllum* Multiplication Medium is a proprietary plant cell culture medium that was originally developed for the culture of foliage plants such as *Spathiphyllum*.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 33.85 grams per liter
- Plant Tissue Culture Tested

AVAILABLE PACKAGE SIZES

1L	10L	50L
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POTATO DEXTROSE BROTH & AGAR

See Phytopathology Section for Complete Listings

Q673 - QUOIRIN & LEPOIVRE BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Quoirin & Lepoivre (1977) and Quoirin *et al.* (1977).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.56 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	400
Boric Acid	6.2
Calcium Nitrate	833.77
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	37.3
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	175.79
Manganese Sulfate•H ₂ O	0.76
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.08
Potassium Nitrate	1800
Potassium Phosphate, Monobasic, Anhydrous	270
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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R756 - ROSE MODIFIED INITIATION BASAL MEDIUM

Stage I

Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.51 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
L-Ascorbic Acid	50
6-Benzylaminopurine	2.0
Citric Acid, Anhydrous	50
Glycine	2.0
Indole-3-acetic Acid	0.3
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	3.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FOR FIND MEDIA FOR THE VARIOUS STAGES OF TISSUE CULTURE PLANT GROWTH

See "Figure 5. Examples of Media Designed for a Specific Stage of Growth" on page 231 in the Technical Section.

R757 - ROSE MODIFIED MULTIPLICATION BASAL MEDIUM

Stage II

Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.51 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
L-Ascorbic Acid	50
6-Benzylaminopurine	3.0
Citric Acid, Anhydrous	50
Glycine	2.0
Indole-3-acetic Acid	0.30
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	3.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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R758 - ROSE MODIFIED ROOTING BASAL MEDIUM

Stage III

Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.18 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	412.5
Boric Acid	1.55
Calcium Chloride, Anhydrous	83.25
Cobalt Chloride•6H ₂ O	0.00625
Cupric Sulfate•5H ₂ O	0.00625
Ferric Sodium EDTA	9.175
Magnesium Sulfate, Anhydrous	45.25
Manganese Sulfate•H ₂ O	4.725
Molybdc Acid, Disodium Salt•2H ₂ O	0.0625
Potassium Iodide	0.2075
Potassium Nitrate	475
Potassium Phosphate, Monobasic, Anhydrous	42.5
Zinc Sulfate•7H ₂ O	2.15
Glycine	2.0
myo-Inositol	100
α-Naphthaleneacetic Acid	0.03
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.0 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND MICROBIOLOGY MEDIA ON PAGES 151 TO 159

- *LB Agars and Broths*
- *Tryptic Soy Broth*
- *YEP Media*
- *Hanahan's Broth*
- *Peptone Waters*



R7100 - RUGINI OLIVE MEDIUM

Contains the Macronutrients, Micronutrients, and Vitamins as described by Rugini (1984).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 4.05 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	412
Boric Acid	12.4
Calcium Chloride, Anhydrous	332.16
Calcium Nitrate, anhydrous	416.9
Cobalt Chloride, hexahydrate	0.025
Cupric Sulfate, pentahydrate	0.25
Disodium EDTA dihydrate	37.5
Ferrous Sulfate, heptahydrate	27.8
Magnesium Sulfate, anhydrous	732.5
Manganese Sulfate, monohydrate	16.9
Molybdc Acid, sodium salt dihydrate	0.25
Potassium Chloride	500
Potassium Iodide	0.83
Potassium Nitrate	1100
Potassium Phosphate, monobasic	340
Zinc Sulfate, heptahydrate	14.3
D-Biotin	0.05
Folic Acid	0.5
Glycine	2
<i>myo</i> -Inositol	100
Nicotinic Acid	5
Pyridoxine HCl	0.5
Thiamine HCl	0.5
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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S7536 - SABOURAUD DEXTROSE BROTH

See Microbiology Section for Complete Listing

S813 - SCHENK & HILDEBRANDT BASAL MEDIUM

Contains 10 g/L Sucrose (Product Number S391)

Contains the macro- and micronutrients and vitamins as described by Schenk & Hildebrandt (1972).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 14.21 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Phosphate, Monobasic	300
Boric Acid	5
Calcium Chloride, Anhydrous	151
Cobalt Chloride•6H ₂ O	0.1
Cupric Sulfate•5H ₂ O	0.2
Na ₂ EDTA•2H ₂ O	20
Ferrous Sulfate•7H ₂ O	15
Magnesium Sulfate, Anhydrous	195.4
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.1
Potassium Iodide	1
Potassium Nitrate	2500
Zinc Sulfate•7H ₂ O	1
<i>myo</i> -Inositol	1000
Nicotinic Acid	5
Pyridoxine•HCl	0.5
Sucrose	10,000
Thiamine•HCl	5
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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S826 - SCHENK & HILDEBRANDT VITAMIN POWDER (100x)

Contains the vitamins as described by Schenk & Hildebrandt (1972).

- Store at 2 to 6 °C
- Soluble in Water
- Use 10.11 grams to make 100 mL
- Use at 10.0 mL per liter of Medium
- Plant Tissue Culture Tested

Components (mg/L)

<i>myo</i> -Inositol	100,000
Nicotinic Acid	500
Pyridoxine•HCl	50
Thiamine•HCl	500
Approximate pH at Room Temperature	4.0 ± 0.75

AVAILABLE PACKAGE SIZES

100mL	1L
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S808 - SCHENK & HILDEBRANDT MODIFIED BASAL MEDIUM (1/2X)

Contains 10 g/L Sucrose
Contains 1/2 the macro- and micronutrients and 1/2 the vitamins as described by Schenk & Hildebrandt (1972).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 12.10 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Phosphate, Monobasic	150
Boric Acid	2.5
Calcium Chloride, Anhydrous	75.5
Cobalt Chloride•6H ₂ O	0.05
Cupric Sulfate•5H ₂ O	0.1
Na ₂ EDTA•2H ₂ O	10
Ferrous Sulfate•7H ₂ O	7.5
Magnesium Sulfate, Anhydrous	97.7
Manganese Sulfate•H ₂ O	5.0
Molybdic Acid, Disodium Salt•2H ₂ O	0.05
Potassium Iodide	0.5
Potassium Nitrate	1250
Zinc Sulfate•7H ₂ O	0.5
myo-Inositol	500
Nicotinic Acid	2.5
Pyridoxine•HCl	0.25
Sucrose	10,000
Thiamine•HCl	2.5
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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S811 - SCHENK & HILDEBRANDT MODIFIED BASAL MEDIUM

Contains 10 g/L Sucrose (Product Number S391)
Contains the macro- and micronutrients as described by Schenk & Hildebrandt (1972); without vitamins.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 13.20 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Phosphate, Monobasic	300
Boric Acid	5.0
Calcium Chloride, Anhydrous	151
Cobalt Chloride•6H ₂ O	0.1
Cupric Sulfate•5H ₂ O	0.2
Na ₂ EDTA•2H ₂ O	20
Ferrous Sulfate•7H ₂ O	15
Magnesium Sulfate, Anhydrous	195.4
Manganese Sulfate•H ₂ O	10
Molybdic Acid, Disodium Salt•2H ₂ O	0.1
Potassium Iodide	1.0
Potassium Nitrate	2500
Zinc Sulfate•7H ₂ O	1.0
Sucrose	10,000
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND BIOCHEMICALS ON PAGES 15 TO 56

- Gelling Agents
- Plant Growth Regulators
- Media Components
- Stains and Dyes
- Carbohydrates



S806 - SCHENK & HILDEBRANDT MODIFIED BASAL SALT MIXTURE WITHOUT CALCIUM

Contains the macro- and micronutrients as described by Schenk & Hildebrandt (1972); without Calcium Chloride.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.05 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Phosphate, Monobasic	300
Boric Acid	5.0
Cobalt Chloride•6H ₂ O	0.1
Cupric Sulfate•5H ₂ O	0.2
Na ₂ EDTA•2H ₂ O	20
Ferrous Sulfate•7H ₂ O	15
Magnesium Sulfate, Anhydrous	195.4
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.1
Potassium Iodide	1.0
Potassium Nitrate	2500
Zinc Sulfate•7H ₂ O	1.0
Approximate pH at Room Temperature	4.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

S816 - SCHENK & HILDEBRANDT BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Schenk & Hildebrandt (1972).

- Store at 2 to 6 °C
- Soluble in Water
- Use at 3.20 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)	
Ammonium Phosphate, Monobasic	300
Boric Acid	5.0
Calcium Chloride, Anhydrous	151
Cobalt Chloride•6H ₂ O	0.1
Cupric Sulfate•5H ₂ O	0.2
Na ₂ EDTA•2H ₂ O	20
Ferrous Sulfate•7H ₂ O	15
Magnesium Sulfate, Anhydrous	195.4
Manganese Sulfate•H ₂ O	10
Molybdc Acid, Disodium Salt•2H ₂ O	0.1
Potassium Iodide	1.0
Potassium Nitrate	2500
Zinc Sulfate•7H ₂ O	1.0
Approximate pH at Room Temperature	4.5 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 10LFB 50L 100L

S657 - SOC MEDIUM SOLUTION

See Microbiology Section for Complete Listing

S7478 - SODARIA CROSSING AGAR

See Microbiology Section for Complete Listing

S743 - STABA MODIFIED VITAMIN SOLUTION (100x)

Contains a modification of the Staba (1969) vitamins as described by Skirvin & Chu (1979). This modification differs from the original Staba formulation in that *myo*-Inositol was reduced from 2000 mg/L to 100 mg/L.

- Store at -20 to 0 °C
- Sterile Filtered
- Miscible with Water
- Use at 10.0 mL per liter of Medium
- Plant Tissue Culture Tested



Components (mg/L)	
<i>p</i> -Aminobenzoic Acid	50
D-Biotin	100
Calcium Pantothenate	100
Choline Chloride	100
Cyanocobalamin	0.15
Folic Acid	50
<i>myo</i> -Inositol	10,000
Niacinamide	200
Pyridoxine•HCl	200
Riboflavin	50
Thiamine•HCl	100
Approximate pH at Room Temperature	6.0 ± 0.5
AVAILABLE PACKAGE SIZES	
100mL	500mL

S7668 - SUEOKA's HIGH-SALT MEDIUM (HSM)

See Phycology Section for Complete Listing

T839 - TERRESTRIAL (CYPRIPEDIUM) ORCHID MEDIUM	
Contains 400 mg/L Calcium Nitrate (Product Number C180) and 400 mg/L Casein (Product Number C184) Without Ammonium Nitrate Contains a modification of the macro- and micronutrients, Glucose, and Agar as described by Steele (1996).	
• Store at 2 to 6 °C • Soluble in Water (Partially) • Use at 27.44 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Citrate, Dibasic	19
Boric Acid	0.5
Calcium Nitrate	400
Cupric Sulfate•5H ₂ O	0.025
Ferric Ammonium Citrate	25
Magnesium Sulfate, Anhydrous	97.69
Manganese Sulfate•H ₂ O	1.54
Molybdic Acid, Diodium Salt•2H ₂ O	0.02
Potassium Chloride	100
Potassium Iodide	0.1
Potassium Nitrate	200
Potassium Phosphate, Monobasic, Anhydrous	200
Zinc Sulfate•7H ₂ O	0.5
Agar	6000
Casein, Enzymatic Hydrolysate	400
D-Glucose, Anhydrous	20,000
Approximate pH at Room Temperature	5.5 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

T849 - TERRESTRIAL (CYPRIPEDIUM) ORCHID MEDIUM	
Contains 400 mg/L Calcium Nitrate (Product Number C180) Without Casein Mother Flasking Medium V Contains the macro- and micronutrients, Glucose, and Agar as described by Steele (1996).	
• Store at 2 to 6 °C • Soluble in Water (Partially) • Use at 28.44 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Citrate, Dibasic	19
Ammonium Nitrate	1400
Boric Acid	0.5
Calcium Nitrate	400
Cupric Sulfate•5H ₂ O	0.025
Ferric Ammonium Citrate	25
Magnesium Sulfate, Anhydrous	97.69
Manganese Sulfate•H ₂ O	1.54
Molybdic Acid, Disodium Salt•2H ₂ O	0.02
Potassium Chloride	100
Potassium Iodide	0.1
Potassium Nitrate	200
Potassium Phosphate, Monobasic, Anhydrous	200
Zinc Sulfate•7H ₂ O	0.5
Agar	6000
D-Glucose, Anhydrous	20,000
Approximate pH at Room Temperature	5.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

TISSUE CULTURE KITS	
	<i>PhytoTechnology Laboratories®</i> offers a selection of plant tissue culture kits for educational use. For more information please see pages 179 to 185. Kits for: – African Violet, – Carrot, – Carnivorous Plants, – Fern, – Hosta, – Lily, – Orchids, and – Potato.

T842 - TERRESTRIAL (CYPRIPEDIUM) ORCHID MEDIUM

Contains 600 mg/L Calcium Nitrate (Product Number C180) and 200 mg/L Casein (Product Number C184)

Without Ammonium Nitrate

Contains a modification of the macro- and micronutrients, Glucose, and Agar as described by Steele (1996).

- Store at 2 to 6 °C
- Soluble in Water (Partially)
- Use at 27.44 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Citrate, Dibasic	19
Boric Acid	0.5
Calcium Nitrate	600
Cupric Sulfate•5H ₂ O	0.025
Ferric Ammonium Citrate	25
Magnesium Sulfate, Anhydrous	97.69
Manganese Sulfate•H ₂ O	1.54
Molybdc Acid, Disodium Salt•2H ₂ O	0.02
Potassium Chloride	100
Potassium Iodide	0.1
Potassium Nitrate	200
Potassium Phosphate, Monobasic, Anhydrous	200
Zinc Sulfate•7H ₂ O	0.5
Agar	6000
Casein, Enzymatic Hydrolysate	200
D-Glucose, Anhydrous	20,000
Approximate pH at Room Temperature	5.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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TERRIFIC BROTHS

See Microbiology Section for Complete Listings

T7954 - TM4 BASAL MEDIUM

Contains the Macro- and Micronutrients and Vitamins as described by Shahin (1984).

Originally developed for work with tomato protoplasts.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.99 grams per liter of medium
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	320
Ammonium Phosphate, Monobasic	230
Ammonium Sulfate	134
Boric Acid	6.2
Calcium Chloride, Anhydrous	113.25
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	18.5
Ferrous Sulfate•7H ₂ O	13.9
Magnesium Sulfate, Anhydrous	122.12
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Zinc Sulfate•7H ₂ O	8.6
D-Biotin	0.05
Choline Chloride	0.10
Folic Acid	0.5
Glycine (Free Base)	2.5
myo-Inositol	100
Nicotinic Acid	5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.5
Approximate pH at Room Temperature	4.5 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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T8024 - TM4 BASAL SALT MIXTURE	
Contains the Macro- and Micronutrients and Vitamins as described by Shahin (1984). Originally developed for work with tomato protoplasts.	
• Store at 2 to 6 °C • Soluble in Water • Use at 2.88 grams per liter of medium • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	320
Ammonium Phosphate, Monobasic	230
Ammonium Sulfate	134
Boric Acid	6.2
Calcium Chloride, Anhydrous	113.25
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	18.5
Ferrous Sulfate•7H ₂ O	13.9
Magnesium Sulfate, Anhydrous	122.12
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Zinc Sulfate•7H ₂ O	8.6
Approximate pH at Room Temperature	4.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

T868 - TM4G BASAL MEDIUM	
• Store at 2 to 6 °C • Soluble in Water • Use at 2.99 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	320
Ammonium Phosphate, Monobasic	230
Ammonium Sulfate	130
Boric Acid	6.2
Calcium Chloride, Anhydrous	113.25
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	18.65
Ferrous Sulfate•7H ₂ O	13.9
Magnesium Sulfate, Anhydrous	122.12
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Zinc Sulfate•7H ₂ O	9.2
D-Biotin	0.05
Folic Acid	0.5
Glycine	2.5
myo-Inositol	100
Nicotinic Acid	5.0
Pyridoxine•HCl	0.5
Thiamine•HCl	0.5
Approximate pH at Room Temperature	4.25 ± 0.5
AVAILABLE PACKAGE SIZES	
1L	10L 50L

T853 - TM4G BASAL SALT MIXTURE

- Store at 2 to 6 °C
- Soluble in Water
- Use at 2.88 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	320
Ammonium Phosphate, Monobasic	230
Ammonium Sulfate	130
Boric Acid	6.2
Calcium Chloride, Anhydrous	113.25
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Na ₂ EDTA•2H ₂ O	18.65
Ferrous Sulfate•7H ₂ O	13.9
Magnesium Sulfate, Anhydrous	122.12
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Zinc Sulfate•7H ₂ O	9.2
Approximate pH at Room Temperature	4.25 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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T856 - TOBACCO MODIFIED CALLUS INITIATION BASAL MEDIUM

Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Casein, Enzymatic Hydrolysate	1000
Glycine	2.0
Indole-3-acetic Acid	2.0
myo-Inositol	100
Kinetin	0.2
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.5 ± 1.0

AVAILABLE PACKAGE SIZES

1L	10L	50L
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FIND MOLECULAR BIOLOGY PRODUCTS ON PAGES 131 TO 150

- Antibiotics
- Buffers
- DNA Extraction Kits
- Sterile Solutions
- IPTG, X-Gal & X-Gluc



T867 - TOBACCO MODIFIED SHOOT & ROOT BASAL MEDIUM	
Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.	
• Store at 2 to 6 °C • Soluble in Water • Use at 5.41 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Casein, Enzymatic Hydrolysate	1000
Glycine	2.0
Indole-3-acetic Acid	0.03
<i>myo</i> -Inositol	100
Kinetin	1.0
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.5 ± 1.0
AVAILABLE PACKAGE SIZES	
1L	50L

T864 - TOBACCO MODIFIED SHOOT MULTIPLICATION BASAL MEDIUM	
Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.	
• Store at 2 to 6 °C • Soluble in Water • Use at 5.41 grams per liter • Plant Tissue Culture Tested	
Components (mg/L)	
Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdc Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Casein, Enzymatic Hydrolysate	1000
Glycine	2.0
<i>myo</i> -Inositol	100
Kinetin	1.0
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.5 ± 1.0
AVAILABLE PACKAGE SIZES	
1L	50L

T861 - TOBACCO MODIFIED ROOT INITIATION BASAL MEDIUM

Contains Ferric Sodium EDTA in place of both Ferrous Sulfate and Disodium EDTA.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 5.41 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Nitrate	1650
Boric Acid	6.2
Calcium Chloride, Anhydrous	333
Cobalt Chloride•6H ₂ O	0.025
Cupric Sulfate•5H ₂ O	0.025
Ferric Sodium EDTA	36.7
Magnesium Sulfate, Anhydrous	181
Manganese Sulfate•H ₂ O	16.9
Molybdic Acid, Disodium Salt•2H ₂ O	0.25
Potassium Iodide	0.83
Potassium Nitrate	1900
Potassium Phosphate, Monobasic, Anhydrous	170
Zinc Sulfate•7H ₂ O	8.6
Casein, Enzymatic Hydrolysate	1000
Glycine	2.0
Indole-3-acetic Acid	3.0
myo-Inositol	100
Nicotinic Acid	0.5
Pyridoxine•HCl	0.5
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.5 ± 1.0

AVAILABLE PACKAGE SIZES

1L	10L	50L
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TRYPTIC SOY BROTHS

See Microbiology Section for Complete Listings

T8050 - TRIS-ACETATE-PHOSPHATE (TAP) 1x SOLUTION

See Phycology Section for Complete Listing

T8224 - TRIS-ACETATE-PHOSPHATE (TAP)

See Phycology Section for Complete Listing

V505 - VACIN & WENT MODIFIED ORCHID BASAL SALT MIXTURE

Contains the macro- and micronutrients as described by Vacin & Went (1949) modified with an equivalent Iron molar concentration of Ferrous Sulfate in place of Ferric Tartrate.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.67 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	500
Calcium Phosphate, Tribasic	200
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	122.1
Manganese Sulfate•H ₂ O	5.6
Potassium Nitrate	525
Potassium Phosphate, Monobasic, Anhydrous	250
Approximate pH at Room Temperature	5.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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SELECTING EPIPHYTIC ORCHID MEDIA BY GENUS

See "Figure 25. Epiphytic Orchid Media Selection Guide by Genus" on page 252 in the Technical Section.

V882 - VACIN & WENT MODIFIED ORCHID BASAL MEDIUM

Without Sucrose

Contains the macro- and micronutrients as described by Vacin & Went (1949) modified with an equivalent Iron molar concentration of Ferrous Sulfate in place of Ferric Tartrate. Also contains (mg/L): 0.4 Thiamine.

- Store at 2 to 6 °C
- Soluble in Water
- Use at 1.67 grams per liter
- Plant Tissue Culture Tested

Components (mg/L)

Ammonium Sulfate	500
Calcium Phosphate, Tribasic	200
Na ₂ EDTA•2H ₂ O	37.26
Ferrous Sulfate•7H ₂ O	27.8
Magnesium Sulfate, Anhydrous	122.1
Manganese Sulfate•H ₂ O	5.6
Potassium Nitrate	525
Potassium Phosphate, Monobasic, Anhydrous	250
Thiamine•HCl	0.4
Approximate pH at Room Temperature	5.75 ± 0.5

AVAILABLE PACKAGE SIZES

1L	10L	50L
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