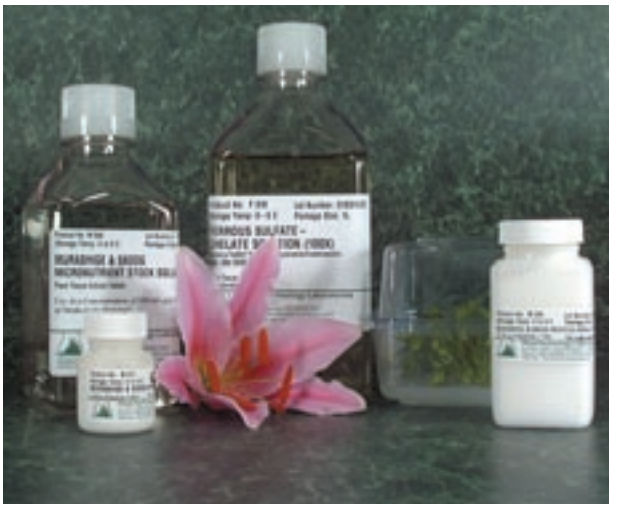
DEFICIENT PLANT TISSUE CULTURE MEDIA

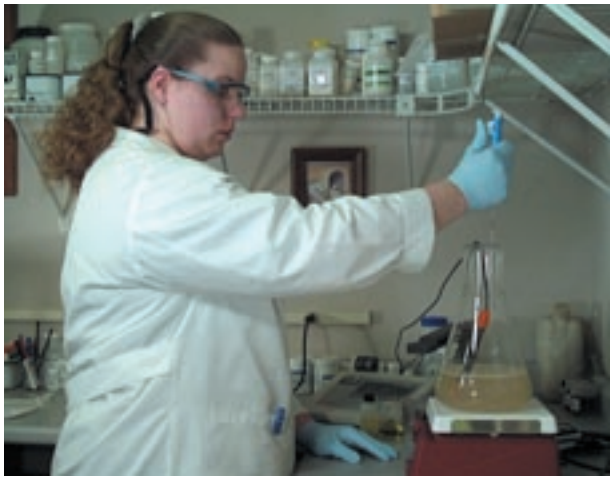
PhytoTechnology Laboratories offers a variety of deficient media designed for nutritional research with plant cell cultures. These media are deficient in key elements thus allowing the researcher the opportunity to vary the concentrations of a particular element.



*Phyto*Technology Laboratories offer the following deficient media in either dry powder form or as a 10X liquid concentrate:

- Deficient Murashige and Skoog Based Media
- Deficient Lloyd & McCown's Woody Plant Media
- Nitrogen-free MS Based Media
- Ammonia-free MS Based Media
- Potassium Phosphate-free MS Based Media
- Murashige and Skoog Macronutrient Liquid or Powdered Stock Bases
- Murashige and Skoog Micronutrient Liquid or Powdered Stock Bases
- Iron-Chelate Stock Solutions
- Lloyd & McCown's WPM Micronutrient Stock Base

All of our media are manufactured according to cGMPs standards in our environmentally controlled manufacturing facility in Overland Park, KS. Each medium is first tested for specific physio-chemical specifications and then biologically tested with two commercially significant plant cell lines. *Phyto*Technology Laboratories is committed to maintaining inventory of its entire plant tissue culture media. Some features of our manufactured media include:



- All media components meet USP or ACS quality standards where applicable.
- *Phyto*Technology Laboratories has capacity to manufacture lots of certain media up to 50,000 liters.
- Using powder media simplifies medium production and reduces technician error when preparing media batches.
- *Phyto*Technology Laboratories can custom package your media into sizes that fit your normal batch production of media. This reduces time in weighing and allows you to simply open the bottle and pour out the entire contents.
- Using *Phyto*Technology Laboratories Lot Reservation Program for manufactured media allows you to use the same lot of media for up to one year. This reservation program is offered to you at no additional cost.
- Custom liquid and powdered media can be manufactured for you using your confidential formulation in lots ranging from 100 liters up to 25,000 liters. Contact us for more details.
- Powdered media has a shelf life of 2-3 years whereas stock solutions should be made fresh every 3-6 months.
- There is no minimum order with *Phyto*Technology Laboratories.

VISIT US AT THE FOLLOWING UPCOMING TRADES SHOWS

June 24-28, 2002	**International Plant Tissue Culture & Biotechnology Meeting; Orlando, FL**
August 3-7, 2002	**American Society of Plant Biologist; Denver, CO**
August 11-17, 2002	**International Society for Horticultural Sciences; Toronto, Canada**

PhytoTechnology
LABORATORIES, L.L.C.

PRODUCT UPDATES

The following table will help in the selection of base media for use in your research applications.

Product Number	Product Description	Liquid vs. Powder	Media Base	Ammonium Nitrate	Potassium Nitrate	Macronutrients	Micronutrients	Other
F 318	Ferrous Sulfate/Chelate Stock Solution	L	MS					Contains 1 X $FeSO_4$ & NA_2EDTA
L 444	Lloyd & McCown's WPM Micronutrient Mixture	P	WPM	NA	NA	NA	1 X	
M 153	Murashige & Skoog Modified -- 1/2 X	P	MS	1/2 X	1/2 X	1/2 X	1/2 X	Contains 1/2 X Macronutrients and 1/2 X Micronutrients
M 407	Murashige & Skoog Modified Mixture	P	MS	0	0	1 X	1 X	Media contains no nitrogen, potassium, or phosphorous
M 502	Murashige & Skoog Modified Basal Salts—Macronutrient Base	P	MS	1 X	1 X	1 X	NA	
M 654	Murashige & Skoog Macronutrient Stock Solution (10X)	L	10 X	10 X	10 X	NA		
M 522	Murashige & Skoog Modified Basal Salts—Micronutrient Base	P	MS	NA	NA	NA	1X	
M 529	Murashige & Skoog Micronutrient Stock Solution (10X)	L	MS	NA	NA	NA	10 X	
M 290	Murashige & Skoog Modified Basal Salt Mixture	P	MS	1/2 X	1/2 X	1 X	1 X	Contains 1/2 X Ammonium Nitrate, Potassium Nitrate and Calcium Chloride
M 541	Murashige & Skoog Modified Basal Salts—w/out KH_2PO_4	P	MS	1 X	1 X	1 X	1 X	Contains no KH_2PO_4
M 571	Murashige & Skoog Modified Basal Salts---w/out NH_4NO_3	P	MS	0	1 X	1 X	1 X	Contains no Ammonium Nitrate
M 531	Murashige & Skoog Modified Basal Salts—No Nitrogen	P	MS	0	0	1 X	1 X	Contains no Ammonium Nitrate or Potassium Nitrate
M 561	Murashige & Skoog Modified Basal Salts—1/2 Nitrogen	P	MS	1/2 X	1/2 X	1 X	1 X	Contains 1/2 X Ammonium Nitrate or Potassium Nitrate
M 524	Murashige & Skoog Basal Salts	P	MS	1 X	1 X	1 X	1 X	

NEW PRODUCTS

Timentin

PhytoTechnology Laboratories now offers Timentin, Product Number T869. Timentin is a combination of 1500 mg Disodium Ticarcillin and 100 mg Potassium Cavulanate. This product is very effective against resistant strains of Agrobacterium. Ticarcillin inhibits bacterial cell wall synthesis while potassium Cavulanate protects Ticarcillin from β-lactamase degradation. Use Timentin at 150-500 mg/L (same as Carbenicillin). Timentin is considered to be less toxic to plant cultures than Carbenicillin. Stocks of Timentin can be stored at –20 C. Cultures on Timentin should be subcultured every 3 weeks to prevent the reoccurrence of the bacterium.

CATALOGUE NUMBER	PRODUCT DESCRIPTION	PKG SIZE	PRICE
T 869 NEW!	TIMENTIN Ticarcillin Disodium/Potassium Cavulanate Plant Tissue Culture Tested	2 g	$44.50
		10 g	$211.50
		25 g	$500.50

CATALOGUE NUMBER	PRODUCT DESCRIPTION	PACKAGE SIZE	QTY	PRICE
F 318	**FERROUS SULFATE/CHELATE STOCK SOLUTION** Contains Ferrous Sulfate and Ethylenediaminetetraacetic Acid as described by Murashige and Skoog (1962). Plant Tissue Culture Tested	500 mL 1000 mL	1-9 10+ 1-9 10+	$7.50 $6.94 $11.50 $10.64
L 444	**LLOYD AND McCown's WPM MICRONUTRIENT MIXTURE** Contains the micronutrients as described by Lloyd & McCown's, 1981. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 153	**MURASHIGE AND SKOOG MODIFIED BASAL SALTS ($^1/_2$ MICROS AND $^1/_2$ MACROS)** Contains the macro- and micronutrients, sucrose, agar, and organic constituents as described by Murashige & Skoog, 1962. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 407	**MURASHIGE & SKOOG MODIFIED BASAL SALTS (CONTAINS NO N, P, OR K)** With the macro- and micronutrients as described by Murashige and Skoog, 1962. Modified by eliminating NH_4NO_3, and KNO_3, Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 502	**MURASHIGE AND SKOOG MODIFIED BASAL SALTS (Macronutrient Salt Base – 1X)** Contains the macronutrients as described by Murashige & Skoog, 1962. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 654	**MURASHIGE AND SKOOG MACRONUTRIENT STOCK SOLUTION (10X)** Contains the macronutrients as described by Murashige and Skoog, 1962. Plant Tissue Culture Tested	500 mL 1 L	1-9 10+ 1-9 10+	$7.50 $6.94 $11.50 $10.64
M 522	**MURASHIGE & SKOOG MODIFIED BASAL SALTS (Micronutrient Salt Base-1X)** With the macro- and micronutrients as described by Murashige and Skoog, 1962. Modified by eliminating NH_4NO_3, and KNO_3, Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 529	**MURASHIGE AND SKOOG MICRONUTRIENT STOCK SOLUTION (10X)** With the micronutrients as described by Murashige and Skoog, 1962. Plant Tissue Culture Tested	500 mL 1 L	1-9 10+ 1-9 10+	$7.50 $6.94 $11.50 $10.64
M 290	**MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE** With the macro- and micronutrients as described by Murashige and Skoog, 1962. Modified by reducing the NH_4NO_3, KNO_3, and $CaCl_2$ levels to $^1/_2$ X. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 541	**MURASHIGE AND SKOOG MODIFIED BASAL SALTS (W/OUT KH_2PO_4)** Contains the macro- and micronutrients, sucrose, agar, and organic constituents as described by Malmgren, 1996. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 571	**MURASHIGE AND SKOOG MODIFIED BASAL SALTS (W/OUT NH_4NO_3)** Contains the vitamins as described by Murashige and Skoog, 1962. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 531	**MURASHIGE & SKOOG MODIFIED BASAL SALT MIXTURE (NO NITROGEN)** With the macro- and micronutrients as described by Murashige and Skoog, 1962. Modified by eliminating NH_4NO_3, and KNO_3, Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 561	**MURASHIGE AND SKOOG MODIFIED BASAL SALTS ($^1/_2$ NITROGEN)** With the macro- and micronutrients as described by Murashige and Skoog, 1962. Modified by reducing NH_4NO_3, and KNO_3, to $^1/_2$ normal concentrations. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L	1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $7.50 $6.94 $24.50 $22.66
M 524	**MURASHIGE & SKOOG BASAL SALT MIXTURE** With the macro- and micronutrients as described by Murashige and Skoog, 1962. Plant Tissue Culture Tested	10 X 1 L 10 L 50 L 100 L	1-9 10+ 1-9 10+ 1-9 10+ 1-9 10+	$12.50 $11.56 $6.75 $6.24 $22.50 $20.81 $43.95 $40.65

COMPONENT	Ferrous Sulfate/Chelate Stock Solution F318	Lloyd and McCown's WPM Micronut. Mixture L444	M & S Modified (1/2 Micros & Micros) M153	M & S Modified (No N, P, or K) M407	M & S Modified (Macro-1X) M502	M& S Macronutrient Stock Solution M654	M & S Modified (Micro-1X) Micronutrient Stock Sol. (10X) M522	Murashige & Skoog Micronutrient M529	Murashige & Skoog Mod. Basal Salt Mixture (1/2 N & CA) M290	M & S Modified (W/O KH_2PO_4) M541	M & S Modified (w/out NH_4NO_3) M571	M & S Modified (1/2 Nitrogen) M561	M & S Modified (No Nitrogen) M531	Murashige & Skoog Basal Salt Mixture M524
Ammonium Nitrate			825.0		1650.0	1650.0			825.0	1650.0		825.0		1650.0
Boric Acid		6.2	3.1	6.2			6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Calcium Chloride Anhydrous		72.5	166.1	332.2	332.2	332.2	332.2		166.1	332.2	332.2	332.2	332.2	332.2
Cobalt Chloride•$6H_2O$			0.0125	0.025			0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Cupric Sulfate•$5H_2O$		0.25	0.0125	0.025			0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
FeNaEDTA		37.3							37.26	36.7				
Na2-EDTA	37.3		18.63	37.26			37.26	37.3			37.26	37.26	37.26	37.26
Ferrous Sulfate•$7H_2O$	27.8	27.85	13.9	27.8			27.8	27.8	27.8		27.8	27.8	27.8	27.8
Magnesium Sulfate		180.7	93.5	180.7	180.7	180.7	180.7		180.7	180.7	180.7	180.7	180.7	180.7
Manganese Sulfate•H_2O		22.3	8.45	16.9			16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
Molybdic Acid (Sodium Salt)•$2H_2O$		0.25	0.125	0.25			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Potassium Iodide			0.415	0.83			0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Potassium Nitrate					1900.0	1900.0			950.0	1900.0	950.0	950.0		1900.0
Potassium Phosphate Monobasic		170.0	85.0		170.0	170.0	170.0		170.0		170.0	170.0	170.0	170.0
Sodium Phosphate Monobasic										300.0				
Zinc Sulfate•$7H_2O$		8.6	4.3	8.6			8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Grams of powder to prepare 1 liter		0.53	2.17	0.61	4.23		2.39	NA		5.69	2.56	2.56	0.78	4.3
pH±0.5 at Room Temperature				4.3			4.3	3.2		4.0		4.3	4.3	3.9

PhytoTechnology LABORATORIES, L.L.C.

PhytoTechnology Laboratories, LLC

SHIPPING ADDRESS: 7895 MASTIN • OVERLAND PARK, KS 66204

MAILING ADDRESS: P.O. BOX 13481 • SHAWNEE MISSION, KS 66282

PHONE: 1-888-749-8682 • 913-341-5343 • **FAX:** 1-888-449-8682 • 913-341-5442

Visit Our Web Site at: http://www.phytotechlab.com