



# Comparative Formulation

## Murashige & Skoog

 Powdered Media	MSP01	MSP02	MSP03	MSP04	MSP05	MSP06	MSP07	MSP08
<b>Macronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Ammonium Nitrate	1650.0000	1650.0000	1650.0000	825.0000		1650.0000		825.0000
Calcium Chloride, Anhydrous	332.2000	332.2000	332.2000	166.1000	332.2000	332.2000	332.2000	166.1000
Magnesium Sulfate, Anhydrous	180.7000	180.7000	180.7000	180.7000	180.7000	180.7000	180.7000	90.3500
Potassium Chloride							709.9100	
Potassium Nitrate	1900.0000	1900.0000	1900.0000	950.0000	1900.0000	1900.0000		950.0000
Potassium Phosphate, Monobasic, Anhydrous	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	85.0000
Potassium Sulfate, Anhydrous							1637.8900	
<b>Micronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Boric Acid	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000
Cobalt Chloride, Hexahydrate	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
Cupric Sulfate, Pentahydrate	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
EDTA, Disodium Salt, Dihydrate	37.2600	37.2600	37.2600	37.2600	37.2600	37.2600	37.2600	18.6300
Ferrous Sulfate, Heptahydrate	27.8000	27.8000	27.8000	27.8000	27.8000	27.8000	27.8000	13.9000
Manganese Sulfate, Monohydrate	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000
Molybdic Acid Sodium Salt, Dihydrate	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Potassium Iodide	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Zinc Sulfate, Heptahydrate	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000
<b>Other Components</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Adenine Sulfate, Dihydrate			80.0000					



## Powdered Media

MSP01

MSP02

MSP03

MSP04

MSP05

MSP06

MSP07

MSP08

### Vitamins

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

Myo-Inositol

100.0000

100.0000

100.0000

100.0000

Nicotinic Acid

0.5000

1.0000

0.5000

Pyridoxine, Hydrochloride

0.5000

1.0000

0.5000


Thiamine, Hydrochloride

0.1000

0.4000

10.0000

0.1000

 Powdered Media	MSP09	MSP10	MSP11	MSP12	MSP13	MSP14	MSP16	MSP17
<b>Amino Acids</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Glycine	2.0000					2.0000		
<b>Macronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Ammonium Nitrate	1650.0000		1650.0000	1650.0000	1650.0000	1650.0000	825.0000	1650.0000
Calcium Chloride, Anhydrous	332.2000	332.2000	332.2000	332.2000	332.2000	332.2000	332.2000	332.2000
Magnesium Sulfate, Anhydrous	180.7000	180.7000	180.7000	180.7000	180.7000	180.7000	180.7000	180.7000
Potassium Nitrate	1900.0000		1900.0000	1900.0000	1900.0000	1900.0000	950.0000	1900.0000
Potassium Phosphate, Monobasic, Anhydrous	170.0000	170.0000		170.0000	170.0000	170.0000	170.0000	170.0000
Sodium Phosphate, Monobasic, Monohydrate				148.0000				
<b>Micronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Boric Acid	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000	
Cobalt Chloride, Hexahydrate	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	
Cupric Sulfate, Pentahydrate	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	
EDTA, Disodium Salt, Dihydrate	37.2600	37.2600	37.2600	37.2600	37.2600	37.2600	37.2600	
Ferrous Sulfate, Heptahydrate	27.8000	27.8000	27.8000	27.8000	27.8000	27.8000	27.8000	
Manganese Sulfate, Monohydrate	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	
Molybdic Acid Sodium Salt, Dihydrate	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	
Potassium Iodide	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	
Zinc Sulfate, Heptahydrate	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	
<b>Other Components</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Adenine Sulfate, Dihydrate				80.0000				
Kinetin				1.0000				
Naphthaleneacetic Acid				0.1000				
Sucrose				30000.0000	30000.0000	30000.0000		



## Powdered Media

MSP09

MSP10

MSP11

MSP12

MSP13

MSP14

MSP16

MSP17

### Vitamins

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

Myo-Inositol

100.0000

100.0000

100.0000

Nicotinic Acid

0.5000

0.5000

Pyridoxine, Hydrochloride

0.5000

0.5000


0.5000

Thiamine, Hydrochloride

0.1000

0.4000

0.1000

 Powdered Media	MSP18	MSP19	MSP20	MSP21	MSP22	MSP23	MSP24	MSP25
<b>Amino Acids</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Glycine		2.0000	2.0000			2.0000		
<b>Macronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Ammonium Chloride							364.0000	364.0000
Ammonium Nitrate		1650.0000	1650.0000		1650.0000	616.0000		
Calcium Chloride, Anhydrous		332.2000	332.2000	332.2000	332.2000	332.2000	332.2000	332.2000
Magnesium Sulfate, Anhydrous		180.7000	180.7000	180.7000	180.7000	180.7000	180.7000	180.7000
Potassium Chloride				709.9100				
Potassium Nitrate		1900.0000	1900.0000		1900.0000	1532.0000	3033.0000	3033.0000
Potassium Phosphate, Monobasic, Anhydrous			170.0000	170.0000	170.0000	170.0000	170.0000	170.0000
Potassium Sulfate, Anhydrous				1637.8900				
Sodium Phosphate, Monobasic, Monohydrate					170.0000			
<b>Micronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Boric Acid	620.0000	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000	6.2000
Cobalt Chloride, Hexahydrate	2.5000	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
Cupric Sulfate, Pentahydrate	2.5000	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
EDTA, Disodium Salt, Dihydrate	3726.0000	37.2600		37.2600	37.2600	37.2600	37.2600	37.2600
EDTA, Iron Sodium Salt			36.7000					
Ferrous Sulfate, Heptahydrate	2780.0000	27.8000		27.8000	27.8000	27.8000	27.8000	27.8000
Manganese Sulfate, Monohydrate	1690.0000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000
Molybdc Acid Sodium Salt, Dihydrate	25.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Potassium Iodide	83.0000	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Zinc Sulfate, Heptahydrate	860.0000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000
<b>Other Components</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Activated Charcoal							500.0000	500.0000
Adenine Sulfate, Dihydrate					80.0000			
Sucrose							60000.0000	



## Powdered Media

MSP18

MSP19

MSP20

MSP21

MSP22

MSP23

MSP24

MSP25

### Vitamins

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

Myo-Inositol

100.0000

100.0000

100.0000

100.0000

1000.0000

1000.0000

Nicotinic Acid

0.5000

0.5000

0.5000

0.5000

0.5000

Pyridoxine, Hydrochloride

0.5000

0.5000

0.5000

0.5000

0.5000

Thiamine, Hydrochloride

0.1000

0.1000

0.4000

0.1000

0.1000

0.1000

 Powdered Media	MSP26	MSP27	MSP29	MSP31	MSP32	MSP33	MSP34	MSP38
<b>Amino Acids</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Glycine			2.0000		2.0000			
<b>Macronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Ammonium Nitrate	1650.0000	1650.0000	1650.0000	1650.0000	1650.0000	1650.0000	1650.0000	1650.0000
Calcium Chloride, Anhydrous	166.1000	332.2000	332.0200	332.2000	332.2000	332.2000	332.2000	333.0000
Magnesium Sulfate, Anhydrous	180.7000	180.7000	180.5400	180.7000	180.7000	180.7000	180.7000	181.0000
Potassium Nitrate	1900.0000	1900.0000	1900.0000	1900.0000	1900.0000	1900.0000	1900.0000	1900.0000
Potassium Phosphate, Monobasic, Anhydrous	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000
Sodium Phosphate, Monobasic, Monohydrate								85.0000
<b>Micronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Boric Acid	6.2000		6.2000	6.2000	6.2000	6.2000	6.2000	6.2000
Cobalt Chloride, Hexahydrate	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
Cupric Sulfate, Pentahydrate	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
EDTA, Disodium Salt, Dihydrate	37.2600	37.2600		37.2600	37.2600			
EDTA, Iron Sodium Salt			36.7000				36.7000	36.7000
Ferrous Sulfate, Heptahydrate	27.8000	27.8000		27.8000				
Manganese Sulfate, Monohydrate	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000	16.9000
Molybdic Acid Sodium Salt, Dihydrate	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Potassium Iodide	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Zinc Sulfate, Heptahydrate	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000	8.6000
<b>Other Components</b>	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Adenine Sulfate, Dihydrate								80.0000
Gibberellic Acid					5.0000			
Indole-3-Acetic Acid								0.5000
Kinetin								10.0000
L-Tyrosine								100.0000
Putrescine, Dihydrochloride				36.5500				



## Powdered Media

MSP26

MSP27

MSP29

MSP31

MSP32

MSP33

MSP34

MSP38

### Vitamins

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

Biotin

0.0500

Folic Acid

0.5000

Myo-Inositol

100.0000

100.0000

100.0000

Nicotinic Acid

5.0000

0.5000

10.0000

Pyridoxine, Hydrochloride

0.5000

0.5000

1.0000


Thiamine, Hydrochloride

0.5000

0.1000

30.0000



 Powdered Media	MSP39	MSP41	MSP42	MSP44	MSP46
<b>Macronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L
Ammonium Nitrate	1650.0000	1650.0000		1650.0000	
Calcium Chloride, Anhydrous	333.0000	333.0000	332.2000	332.2000	332.2000
Magnesium Chloride, Anhydrous				142.9300	
Magnesium Sulfate, Anhydrous	181.0000	181.0000	180.7000		180.7000
Potassium Nitrate	1900.0000	1900.0000	250.0000	1900.0000	
Potassium Phosphate, Monobasic, Anhydrous	170.0000	170.0000	170.0000	170.0000	
Sodium Phosphate, Monobasic, Monohydrate	170.0000	85.0000			
<b>Micronutrients</b>	mg/L	mg/L	mg/L	mg/L	mg/L
Boric Acid	6.2000	6.2000	6.2000	6.2000	6.2000
Cobalt Chloride, Hexahydrate	0.0250	0.0250	0.0250	0.0250	0.0250
Copper II Chloride, Anhydrous				0.0135	
Cupric Sulfate, Pentahydrate	0.0250	0.0250	0.0250		0.0250
EDTA, Disodium Salt, Dihydrate			37.2600	37.2600	37.2600
EDTA, Iron Sodium Salt	36.7000	36.7000			
Ferrous Sulfate, Heptahydrate			27.8000		27.8000
Iron III Chloride, Anhydrous				16.2200	
Manganese Chloride, Tetrahydrate				19.7900	
Manganese Sulfate, Monohydrate	16.9000	16.9000	16.9000		16.9000
Molybdic Acid Sodium Salt, Dihydrate	0.2500	0.2500	0.5000	0.2500	0.2500
Potassium Iodide	0.8300	0.8300	0.8300	0.8300	0.8300
Zinc Chloride, Anhydrous				4.0800	
Zinc Sulfate, Heptahydrate	8.6000	8.6000	8.6000		8.6000
<b>Other Components</b>	mg/L	mg/L	mg/L	mg/L	mg/L
Adenine Sulfate, Dihydrate	80.0000	80.0000			
Indole-3-Acetic Acid	2.0000				
Kinetin	2.0000				
L-Tyrosine		100.0000			



## Powdered Media

MSP39

MSP41

MSP42

MSP44

MSP46

### Vitamins

mg/L

mg/L

mg/L

mg/L

mg/L

Myo-Inositol

100.0000

100.0000

100.0000

Nicotinic Acid

10.0000

1.0000

Pyridoxine, Hydrochloride

1.0000

1.0000

Thiamine, Hydrochloride

0.4000

30.0000

10.0000



## Liquid Media

MVL01

### Amino Acids

mg/L

Glycine

2000.0000

### Vitamins

mg/L

Myo-Inositol

100000.000  
0

Nicotinic Acid

500.0000

Pyridoxine, Hydrochloride

500.0000

Thiamine, Hydrochloride

100.0000