



Comparative Formulation

Murashige & Skoog

|  Powdered Media | MSP01 | MSP02 | MSP03 | MSP04 | MSP05 | MSP06 | MSP07 | MSP08 |
|---|-----------|-----------|-----------|----------|-----------|-----------|-----------|----------|
| Macronutrients | 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 | |
| Micronutrients | 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, 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 |
| Other Components | 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 |
|--|-----------|----------|-----------|------------|------------|------------|----------|-----------|
| Macronutrients | 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 | | | | |
| Micronutrients | 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, 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 | |
| Molybdcic 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 | |
| Other Components | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| Adenine Sulfate, Dihydrate | | | | 80.0000 | | | | |
| Glycine | 2.0000 | | | | | 2.0000 | | |
| 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 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|
| Macronutrients | 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 | | | |
| Micronutrients | 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, 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 |
| Other Components | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| Adenine Sulfate, Dihydrate | | | | | 80.0000 | | | |
| Charcoal, Activated, Acid Washed | | | | | | | 500.0000 | 500.0000 |
| Glycine | | | 2.0000 | | | 2.0000 | | |
| 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

Glycine

2.0000

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 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Macronutrients | 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 |
| Micronutrients | 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, 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 | 27.8000 | | | |
| Manganese Sulfate, Monohydrate | 16.9000 | 16.9000 | 16.9000 | 16.9000 | 16.9000 | 16.9000 | 16.9000 | 16.9000 |
| Molybdc 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 |
| Other Components | 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 | | | |
| Glycine | | | 2.0000 | | 2.0000 | | | |
| 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 |
|--|-----------|-----------|----------|-----------|
| Macronutrients | 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 |
| Magnesium Chloride, Anhydrous | | | | 142.9300 |
| Magnesium Sulfate, Anhydrous | 181.0000 | 181.0000 | 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 | | |
| Micronutrients | mg/L | mg/L | mg/L | mg/L |
| Boric Acid | 6.2000 | 6.2000 | 6.2000 | 6.2000 |
| Cobalt Chloride, Hexahydrate | 0.0250 | 0.0250 | 0.0250 | 0.0250 |
| Copper II Chloride, Anhydrous | | | | 0.0135 |
| Cupric Sulfate, Pentahydrate | 0.0250 | 0.0250 | 0.0250 | |
| EDTA, Disodium, Dihydrate | | | 37.2600 | 37.2600 |
| EDTA, Iron Sodium Salt | 36.7000 | 36.7000 | | |
| Ferrous Sulfate, Heptahydrate | | | 27.8000 | |
| Iron III Chloride, Anhydrous | | | | 16.2200 |
| Manganese Sulfate, Monohydrate | 16.9000 | 16.9000 | 16.9000 | |
| Molybdic Acid Sodium Salt, Dihydrate | 0.2500 | 0.2500 | 0.5000 | 0.2500 |
| Potassium Iodide | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Zinc Chloride, Anhydrous | | | | 4.0800 |
| Zinc Sulfate, Heptahydrate | 8.6000 | 8.6000 | 8.6000 | |
| Other Components | 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

Vitamins

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

Vitamins

mg/L

| | |
|---------------------------|-------------|
| Glycine | 2000.0000 |
| Myo-Inositol | 100000.0000 |
| | 0 |
| Nicotinic Acid | 500.0000 |
| Pyridoxine, Hydrochloride | 500.0000 |
| Thiamine, Hydrochloride | 100.0000 |