

## Murashige and Skoog Medium

With Vitamins, Sucrose and Agar  
Without Calcium Chloride

**Product Code: PT011**

### Product Description :

Murashige and Skoog Medium (MS) was originally formulated by Murashige and Skoog in 1962 to optimize tobacco callus bioassay system for facilitating the study of cytokinins. Since then, it is widely used for micro propagation, organ culture, callus culture and suspension culture. The formulation is a nutrient blend of inorganic salts, vitamins, amino acid, carbohydrate and gelling agent.

Murashige and Skoog Medium (MS) provides all essential macroelements and microelements. Potassium dihydrogen phosphate serves as a source of phosphate. Microelements like Boron, Manganese, Molybdenum, Copper, Iron and Zinc play vital role in plant metabolism. Boron plays a key role in carbohydrate metabolism. Thiamine, pyridoxine, nicotinic acid act as enzymatic cofactors in universal pathways including glycolysis and TCA cycle along with primary and secondary metabolism in the plants. Glycine serves as a source of amino acid.

The product is plant tissue culture tested but it is the sole responsibility of the user to ensure the suitability of the medium for individual species.

### Composition :

Ingredients	mg/L
<b>MACROELEMENTS</b>	
Ammonium nitrate	1650.000
Magnesium sulphate	180.690
Potassium nitrate	1900.000
Potassium phosphate monobasic	170.000
<b>MICROELEMENTS</b>	
Boric acid	6.200
Cobalt chloride hexahydrate	0.025
Copper sulphate pentahydrate	0.025
EDTA disodium salt dihydrate	37.300
Ferrous sulphate heptahydrate	27.800
Manganese sulphate monohydrate	16.900
Molybdic acid (sodium salt)	0.213

Potassium Iodide	0.830
Zinc sulphate heptahydrate	8.600
<b>VITAMINS</b>	
myo-Inositol	100.000
Nicotinic acid (free acid)	0.500
Pyridoxine HCl	0.500
Thiamine hydrochloride	0.100
<b>AMINO ACID</b>	
Glycine	2.000
<b>CARBOHYDRATE</b>	
Sucrose	30000.000
<b>GELLING AGENT</b>	
Agar	8000.000
<b>Total(gms/litre)</b>	<b>42.1</b>

### Material required but not provided :

- Autoclaved distilled water
- Plant growth regulators
- 1N NaOH/HCl
- Calcium Chloride (PCT0017 or PCT0004)

### Precautions :

- Ensure appropriate pH of the medium before addition of gelling agent as acidic pH will lead to decreased gelation resulting in semi solid flowing gel while alkaline pH will lead to formation of hardened gel.
- Use of Distilled water / Tissue culture grade water is recommended for media preparation as tap water or lower grade water may lead to salt precipitation and improper gelation.
- Avoid preparation of concentrated solutions, as it will lead to precipitation of salts.

### Directions :

- Reconstitute medium by adding required quantity of powder in two-third of total volume with constant, gentle stirring till the medium gets completely dissolved.
- Add heat stable supplements prior to autoclaving.
- Make up the final volume with distilled water.

- Adjust the pH of the medium to  $5.75 \pm 0.5$  using 1N NaOH/HCl.
- Add the gelling agent and heat the medium to boiling till complete dissolution of gelling agent.
- Sterilize the medium by autoclaving at 15 lbs and 121°C for 15 min.
- Cool the autoclaved medium to about 45°C before adding heat labile supplements.
- Aseptically dispense the desired amount of medium under a laminar airflow unit in sterile culture vessels.

## Quality Control:

### Appearance

White to off-white, homogenous, free flowing powder

### Solubility

42.1 gms/litre soluble after boiling in distilled water

### Colour and Clarity

Colourless to light yellow solution, hazy gel formed on cooling

### Gelling

Firm gel formed at pH :  $5.75 \pm 0.5$

### pH at 25°C

5.00 - 6.00

### Plant Tissue Culture Test

The growth promoting properties of medium is assessed by providing plant cultures with relative humidity of about  $60\% \pm 2\%$ , temperature  $22^\circ\text{C} \pm 2^\circ\text{C}$  and photoperiod of about 16:8. The plant species showed actively growing callus and shoots with no structural, necrotic and toxic deformity.

## Storage and Shelf Life:

- The plant tissue culture medium powder is extremely hygroscopic and must be stored at 2-8°C in air tight containers.
- Preferably, entire content of each package should be used immediately after opening.
- Use before the expiry date.

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### Disclaimer :

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