

## Technical Information

### Linsmaier and Skoog Medium

#### With Calcium chloride, FeNaEDTA, Vitamins, Sucrose and CleriGel

#### Product Code: PT1098G

**Application:** Linsmaier and Skoog Medium (LS) has been developed by Linsmaier and Skoog in 1965 for optimizing the organic requirement of tobacco cultures. The medium consists of standard Murashige and Skoog (MS) basal salts supplemented with Linsmaier and Skoog vitamins. It is widely used for micro propagation, organ culture, callus culture and suspension culture.

Linsmaier and Skoog Medium is a nutrient blend of inorganic salts, vitamins, carbohydrate and gelling agent. Potassium nitrate and ammonium nitrate provides nitrogen and help to maintain pH of the medium. 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 the carbohydrate metabolism. Increased concentration of thiamine hydrochloride to 0.4 mg/l from 0.1 mg/l compensates for absence of other vitamins except inositol, which acts as enzymatic cofactor in the universal pathways including glycolysis and TCA cycle along with the primary and secondary metabolism in plants. FeNaEDTA is added to ensure slow and continuous release of iron in the medium.

CleriGel, a gellan gum is used as an alternative to agar. It offers several advantages over conventional agar as it sets a clear gel which assists easy observation of cultures and their possible contamination. Unlike agar, gel strength of CleriGel is unaffected over a wide range of pH and contains no contaminants like phenolic compounds that can be toxic to plant tissues. It solidifies uniformly and rapidly. 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/Litre
<b>MACROELEMENTS</b>	
Ammonium nitrate	1650.000
Calcium chloride	332.200
Magnesium sulphate	180.690
Potassium nitrate	1900.000
Potassium phosphate monobasic	170.000
<b>MICROELEMENTS</b>	
Boric acid	6.200
Copper sulphate pentahydrate	0.025
Cobalt chloride hexahydrate	0.025
EDTA disodium salt dehydrate	36.040
Manganese sulphate monohydrate	16.900
Molybdcic acid (sodium salt)	0.213
Potassium Iodide	0.830
Zinc sulphate heptahydrate	8.600
<b>VITAMINS</b>	
myo-Inositol	100.000
Thiamine hydrochloride	0.400
<b>CARBOHYDRATE</b>	
Sucrose	30000.000
<b>GELLING AGENT</b>	
CleriGel (Gelrite)	3000.000
<b>Total</b>	<b>37.4 gms/litre</b>

### Material required but not provided

- Autoclaved distilled water
- Plant growth regulators
- 1N NaOH/HCl

### Quality Control

#### Appearance

White to off-white, homogenous, free flowing powder

#### Solubility

34.4 gms/litre soluble in distilled water

#### Colour and Clarity

Colourless to light yellow solution, clear gel is formed on cooling.

#### Gelling

Firm gel formed at pH : 5.75 ± 0.5

#### pH at 25°C

4.50 – 5.50

#### Plant Tissue Culture Test

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

### 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 ± 0.5 using 1N NaOH/HCl.
- Add 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

### 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.

### Disclaimer

- User must ensure suitability of the product(s) in their application prior to use.
- The product conforms solely to the technical information provided in this booklet and to the best of knowledge research and development work carried at **CDH** is true and accurate.
- **Central Drug House Pvt. Ltd.** reserves the right to make changes to specifications and information related to the products at any time.
- Products are not intended for human or animal diagnostic or therapeutic use but for laboratory, research or further manufacturing of diagnostic reagents extra.
- Statements contained herein should not be considered as a warranty of any kind, expressed or implied, and no liability is accepted for infringement of any patents.
- Do not use the products if it fails to meet specifications for identity and performance parameters.

## 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.