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FACULTY OF ENGINEERING &  
TECHNOLOGY

**Course: B. Tech Biotechnology**  
**Sub Code: BBT-515**

**Semester: 5th**  
**Sub Name: Plant Biotechnology**

# LECTURE 3

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#### 4. Gelling agents:

It can be used in either liquid or 'solid' forms, depending on the type of culture being grown.

Purified agar or agarose can be used, as can a variety of gellan gums.

Using Agar as a gelling agent main advantage is that agar does not react with any components of the medium and is not digested by enzymes from the plant tissue. If necessary, agar can be washed to remove inhibitory impurities.

Agarose is a purified extract of agar used for more demanding procedures like culturing protoplasts.

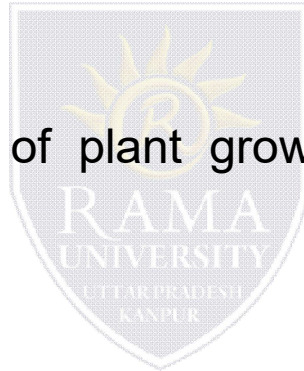
Gellan gum, used primarily as a gelling agent, in microbiological culture is able to withstand 120 °C heat, making it especially useful in culturing thermophilic organisms.

## 5. Plant growth regulators:

Plant growth regulators are the critical media components in determining the developmental pathway of the plant cells.

There are five main classes of plant growth regulator used in plant cell culture, namely:

- a. Auxins
- b. Cytokinins
- c. Gibberellins
- d. Abscisic acid
- e. Ethylene



## **Activated charcoal:**

Supplementation of the medium with activated charcoal stimulates the growth and differentiation of certain plant cells (carrot, tomato, orchids).

Some toxic/inhibitory compounds (e.g. phenols) produced by cultured plants are removed (by adsorption) by activated charcoal, and this facilitates efficient cell growth in cultures.

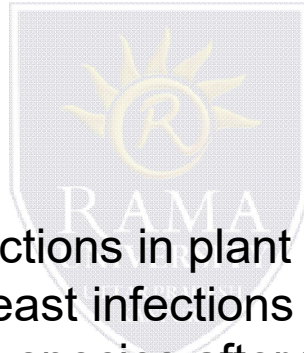
Addition of activated charcoal to certain cultures (tobacco, soybean) is found to be inhibitory, probably due to adsorption of growth stimulants such as phytohormones.

## 6. Antibiotics:

Antibiotics are substances produced by certain microorganisms that suppress the growth of other microorganisms and eventually destroy them.

Their applications include:

- a. Suppresses bacterial infections in plant cell and tissue culture.
- b. Suppresses mould and yeast infections in cell cultures.
- c. Eliminates *Agrobacterium* species after the transformation of plant tissue.
- d. As a selective agent in plant transformation experiments.



**TABLE 1** Composition of commonly used plant tissue culture media

Components	Amount (mg l <sup>-1</sup> )				
	White's	Murashige and Skoog (MS)	Gamborg (B5)	Chu(N6)	Nitsch's
<b>Macronutrients</b>					
MgSO <sub>4</sub> ·7H <sub>2</sub> O	750	370	250	185	185
KH <sub>2</sub> PO <sub>4</sub>	—	170	—	400	68
NaH <sub>2</sub> PO <sub>4</sub> ·H <sub>2</sub> O	19	—	150	—	—
KNO <sub>3</sub>	80	1900	2500	2830	950
NH <sub>4</sub> NO <sub>3</sub>	—	1650	—	—	720
CaCl <sub>2</sub> ·2H <sub>2</sub> O	—	440	150	166	—
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	—	—	134	463	—
<b>Micronutrients</b>					
H <sub>3</sub> BO <sub>3</sub>	1.5	6.2	3	1.6	—
MnSO <sub>4</sub> ·4H <sub>2</sub> O	5	22.3	—	4.4	25
MnSO <sub>4</sub> ·H <sub>2</sub> O	—	—	10	3.3	—
ZnSO <sub>4</sub> ·7H <sub>2</sub> O	3	8.6	2	1.5	10
Na <sub>2</sub> MoO <sub>4</sub> ·2H <sub>2</sub> O	—	0.25	0.25	—	0.25
CuSO <sub>4</sub> ·5H <sub>2</sub> O	0.01	0.025	0.025	—	0.025
CoCl <sub>2</sub> ·6H <sub>2</sub> O	—	0.025	0.025	—	0.025
KI	0.75	0.83	0.75	0.8	—
FeSO <sub>4</sub> ·7H <sub>2</sub> O	—	27.8	—	27.8	27.8
Na <sub>2</sub> EDTA·2H <sub>2</sub> O	—	37.3	—	37.3	37.3
Sucrose (g)	20	30	20	50	20
<b>Organic supplements</b>					
<b>Vitamins</b>					
Thiamine HCl	0.01	0.5	10	1	0.5
Pyridoxine (HCl)	0.01	0.5	1	0.5	0.5
Nicotinic acid	0.05	0.5	1	0.5	5
Myoinositol	—	100	100	—	100
<b>Others</b>					
Glycine	3	2	—	—	2
Folic acid	—	—	—	—	0.5
Biotin	—	—	—	—	0.05
<b>pH</b>	<b>5.8</b>	<b>5.8</b>	<b>5.5</b>	<b>5.8</b>	<b>5.8</b>

# QUIZ

