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FACULTY OF ENGINEERING & TECHNOLOGY

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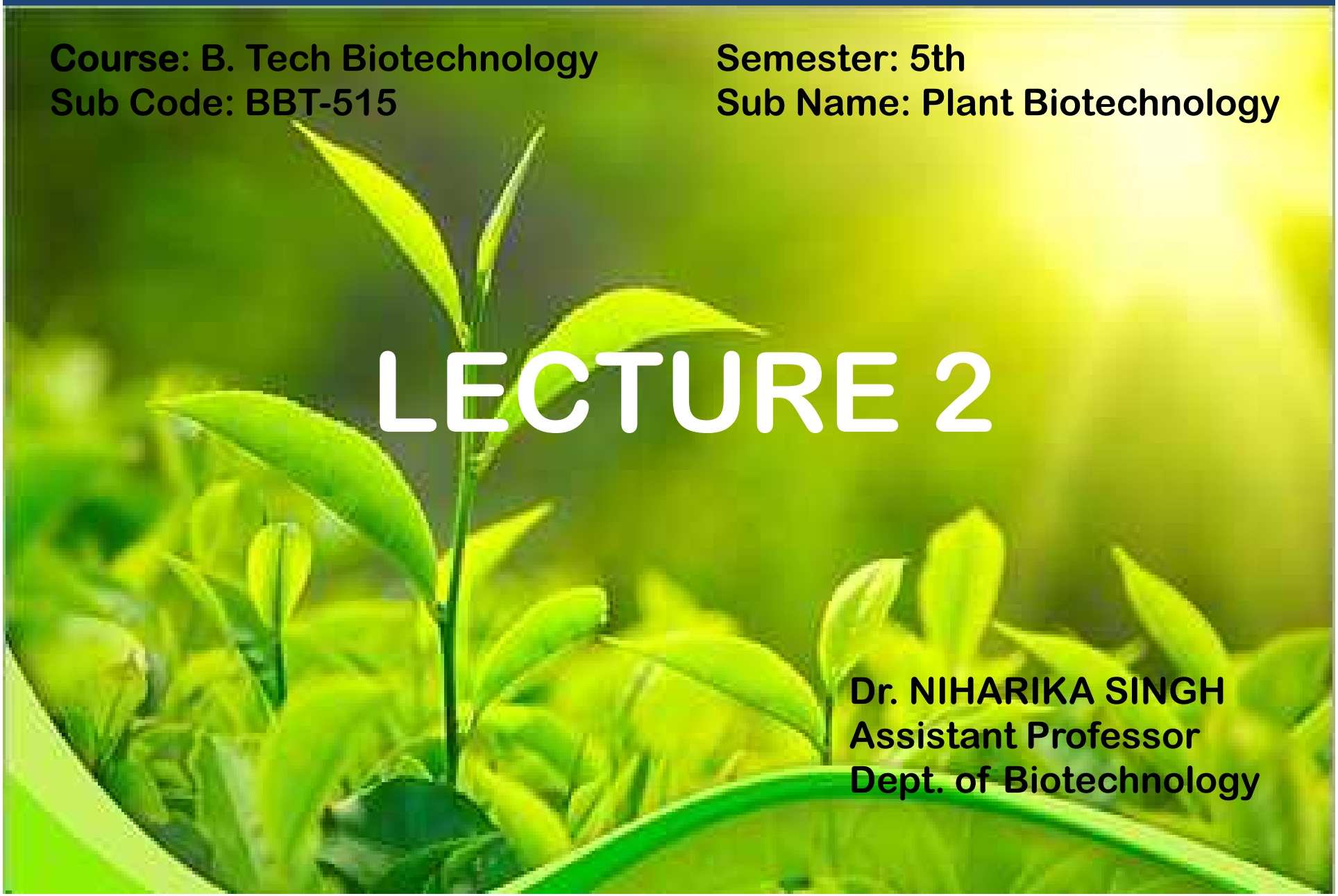

LECTURE 2

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1. **Multiplication by axillary buds/apical shoots**.

- Actively dividing meristems are present at the axillary buds and apical shoots (shoot tips).

- The axillary buds located in the axils of leaves are capable of developing into shoots.

- By means of induced in vitro multiplication in micro propagation, it is possible to develop plants from meristem and shoot tip cultures and from bud cultures.

Shoot tip cultures-

- Apical meristem is a dome of tissue located at the extreme tip of a shoot.
- The apical meristem along with the young leaf primordia constitutes the shoot apex.

- Meristem or shoot tip is isolated from a stem by a V- shaped cut.
- The size (frequently 0.2 to 0.5 mm) of the tip is critical for culture. In general, the larger the explant (shoot tip), the better are the chances for culture survival.
- For good results of micro propagation, explants should be taken from the actively growing shoot tips, and the ideal timing is at the end of the plants dormancy period.
- The most widely used media for meristem culture are MS medium andWhite's medium.

- In stage I, the culture of meristem is established. Addition of growth regulators namely cytokinins (kinetin, BA) and auxins (NAA or IBA) will support the growth and development.

- In stage II, shoot development along with axillary shoot proliferation occurs. High levels of cytokinins are required for this purpose.

- Stage III is associated with rooting of shoots and further growth of plantlet.

- Consequently, stage II medium and stage III medium should be different in composition. The optimal temperature for culture is in the range of 20-28°C (for majority 24-26°C). Lower light intensity is more appropriate for good micro propagation.

Bud Cultures

The plant buds possess quiescent or active meristems depending on the physiological state of the plant.

Two types of bud cultures are used:

- ✓ Single node culture
- ✓ Axillary bud culture.

Single node culture:

This is a natural method for vegetative propagation of plants both in vivo and in vitro conditions. A bud along with a piece of stem is isolated and cultured to develop into a plantlet. Closed buds are used to reduce the chances of infections. In single node culture, no cytokinin is added.

Axillary bud culture:

In this method, a shoot tip along with axillary bud is isolated. The cultures are carried out with high cytokinin concentration. As a result of this, apical dominance stops and axillary buds develop.

For a good axillary bud culture, the cytokinin/ auxin ratio is around 10: 1.This is however, variable and depends on the nature of the plant species and the developmental stage of the explant used. In general, juvenile explants require less cytokinin compared to adult explants. Sometimes, the presence of apical meristem may interfere with axillary shoot development. In such a case, it has to be removed.

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