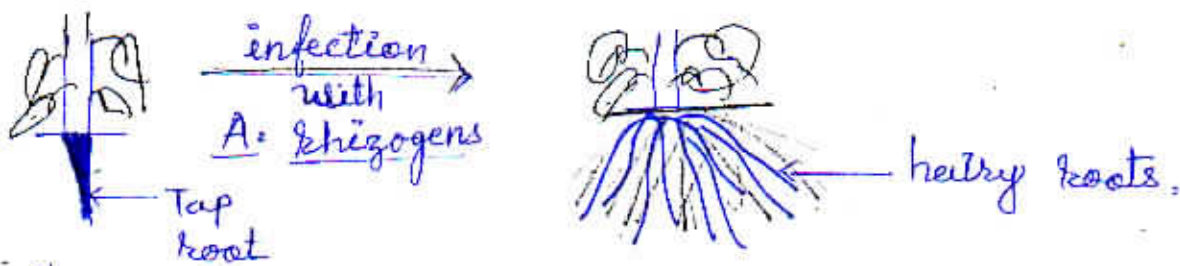


Hairy root formation using *Agrobacterium rhizogenes*

- *Agrobacterium rhizogenes* is a soil bacterium known to infect dicot plants.
- It is similar to *A. tumefaciens* in having tumour inducing plasmids, but this plasmid is known as root inducing plasmid (Ri-Plasmid) because it induces the infected site to proliferate to form large number of roots and is known as hairy roots. This change results from insertion of T-DNA from Ri-Plasmid into plant genome.
- The T-DNA of the Ri-Plasmid codes for auxins synthesis and other rhizogenic functions. The transformed regions after infection with *A. rhizogenes* produce high degree of lateral branching, which results formation of more root hairs and absence of geotropism.
- All these characteristics increased root hairs make suitable for the production of require root specific chemicals which are useful in the commercial market.



- These infected root can be removed from the parent plant and grown continuously on culture medium free of growth hormones (Auxins). But normal root cells requires auxins exogenously for growth.
- The hairy root culture of any plant can be started by inoculating bacterial suspension by wounding of surface sterilised leaf disc, stem of plantlets or seeds or petioles.

Steps (methods) for Production of hairy root culture

1. - Grows plants
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2. - Surface sterilise plant materials
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3. - Innoculate with A. shizogens
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4. - Sub-culture regularly onto the same medium to minimise bacterial growth and then eliminate bacteria.
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4. - Culture on antibiotic-free growth medium
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5. - Culture on agar-based growth medium containing antibiotics
↓
6. - Culture regularly onto the medium to minimise bacterial growth and then eliminate bacteria.
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7. - when ~~root~~ hairy roots appear, excised them and culture them on the same medium.
↓
8. - Transfer to antibiotic-free liquid medium
↓
9. - Culture in bulk on a shaking medium.

Application of hairy root cultures -

The hairy root cultures are having great potentiality in the production of root derived secondary metabolites. These compounds are tropane, alkaloids atropine, catharanthin, betalanin, orcinine, shikonin etc. These secondary metabolites are produced in high quality & quantity by using the specific plants in the hairy root culture medium.