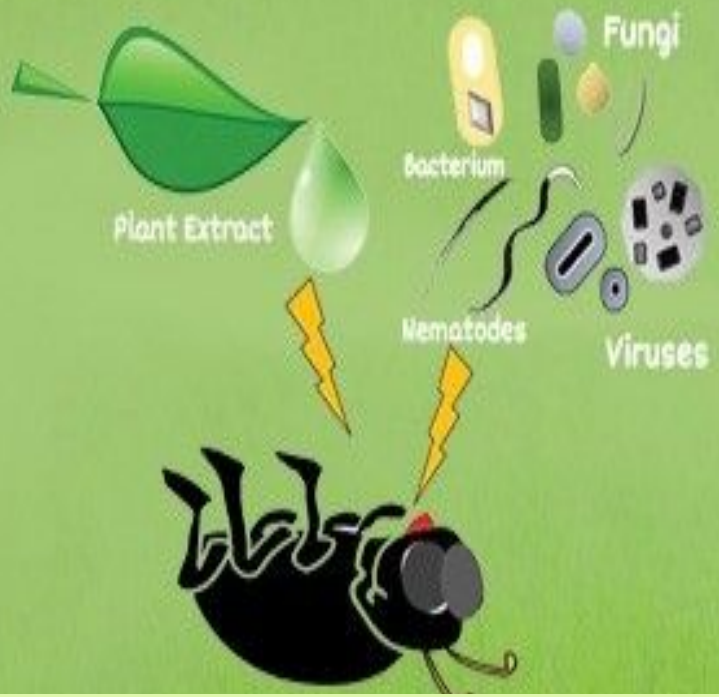
Trichoderma spp.: its characteristics and application



- Importance of Trichoderma spp – its characteristics and application.

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Trichoderma

- Free living fungus common in soil and root ecosystem
- Highly interactive in root, soil and foliar environment
- Suppresses the pathogen by different mechanism of biocontrol

Trichoderma harzianum

General Characters of *Trichoderma spp.*

- Cultures are fast growing at **25-30 C**
- Conidia forming within on week in compact or loose tufts in **shades of green** or **yellow or less frequently white**
- Yellow pigment may be secreted into the agar, specially on PDA
- A characteristic **sweet or 'coconut' odour** is produced by some species

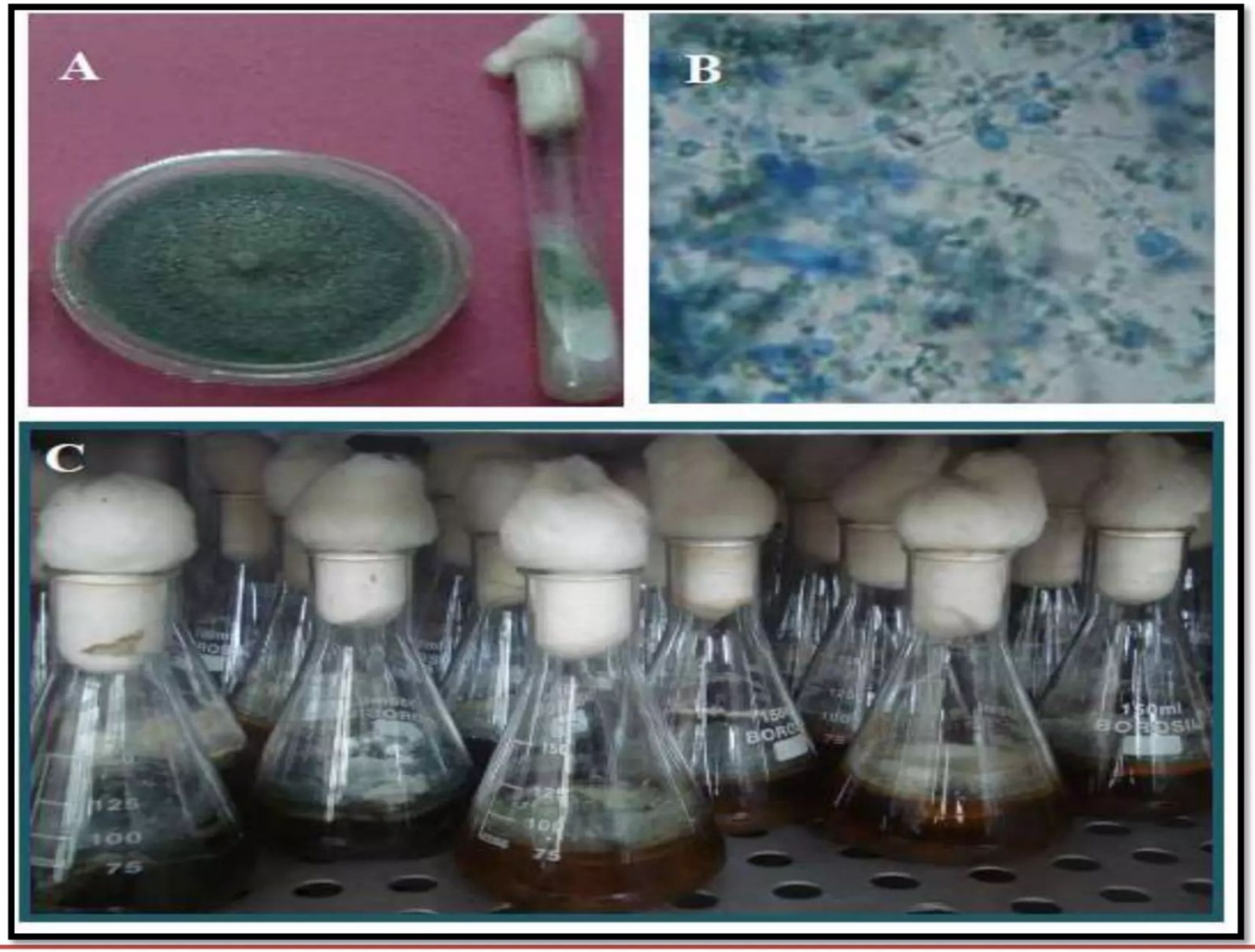
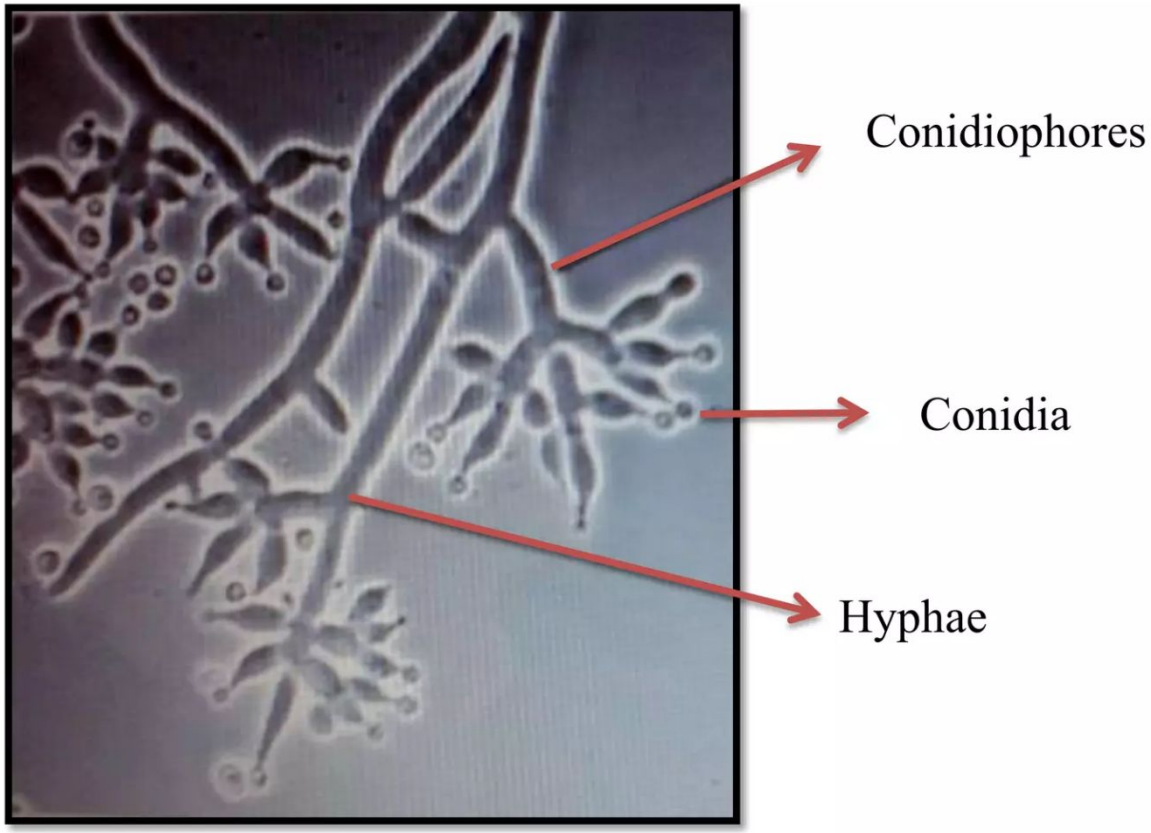


Fig. 1 (A) *Trichoderma* on solid media (B) microscopic view (C) *Trichoderma* in liquid medium



Morphological structure of *Trichoderma*

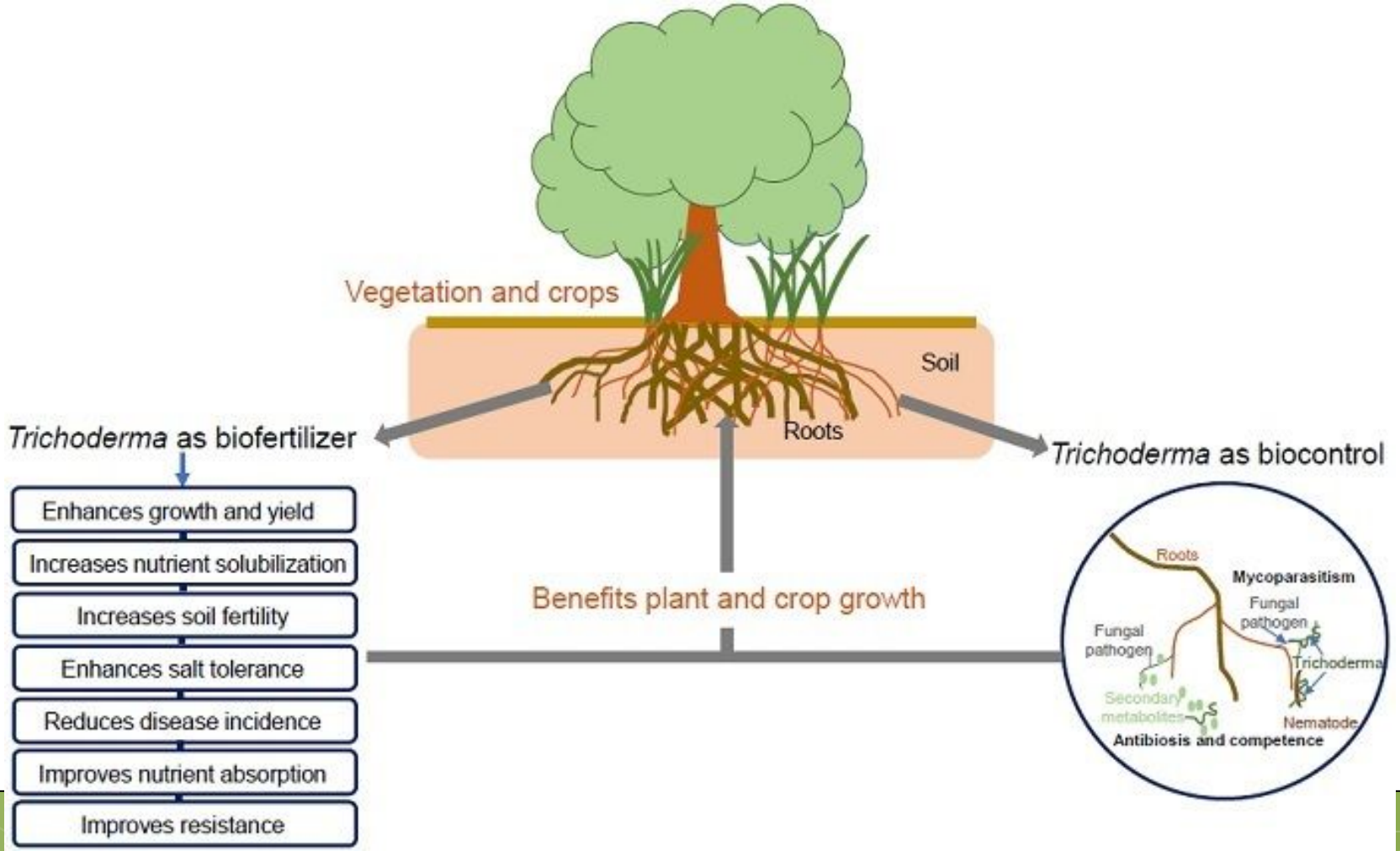
Where do they come from?

They can be easily isolated from soil, root, decaying wood and other forms of plant organic matter

Characteristics of Trichoderma spp

- **Trichoderma spp. are characterized by rapid growth, mostly bright green conidia and a repetitively branched conidiophore structure**

- **It significantly suppress the growth of plant pathogenic microorganisms and regulate the rate of plant growth.**



METHODS OF APPLICATION

1. **Seed treatment**: Mix 6 - 10 g of *Trichoderma* powder per Kg of seed before sowing.

2. **Nursery treatment**: Apply 10 - 25 g of *Trichoderma* powder per 100 m^2 of nursery bed. Application of neem cake and FYM before treatment increases the efficacy.

3. **Cutting and seedling root dip**: Mix 10g of *Trichoderma* powder along with 100g of well rotten FYM per litre of water and dip the cuttings and seedlings for 10 minutes before planting.

4. **Soil treatment**: Apply 5 Kg of *Trichoderma* powder per ha after turning of sun hemp or dhaincha into the soil for green manuring Or Mix 1kg of *Trichoderma* formulation in 100kg of farmyard manure and cover it for 7 days with polythene. Sprinkle the heap with water intermittently. Turn the mixture in every 3-4 days interval and then broadcast in the field.

5. **Plant Treatment**: Drench the soil near stem region with 10g *Trichoderma* powder mixed in a litre of water

6. **Wound application**

7. **Furrow application**

Kulkarni and Sagar, 2007

PRECAUTIONS

- Don't use chemical fungicide after application of *Trichoderma* for 4-5 days.
- Don't use *Trichoderma* in dry soil. Moisture is a essential factor for its growth and survivability.
- Don't put the treated seeds in direct sun rays.
- Don't keep the treated FYM for longer duration.

ADVANTAGES

- ✓ Enhances yield along with quality of produce
- ✓ Boost germination rate
- ✓ Increase in shoot & Root length
- ✓ Solubilising various insoluble forms of Phosphates
- ✓ Augment Nitrogen fixing
- ✓ Promote healthy growth in early stages of crop
- ✓ Increase Dry matter Production substantially

- Harmless to humans and livestock
- Act against a wide range of pathogenic fungi
- Perpetuate themselves by producing ample spores
- Grow rapidly and quickly colonize the soil
- They can promote nutrient uptake and enhance plant growth
- Provide natural long term immunity to crops and soil.

DISADVANTAGES

- Harmful parasite of mushrooms
- Looses its effectivity if not placed in its native condition.
- It cannot be used as foliar spray
- It do not grow in alkaline pH (above 8).
- Zone specific & slow growth

Mass production of Trichoderma spp (Biopesticides)

Procedure for isolation of *Trichoderma* from soil

Isolation from soil on selective medium incubate 7 days at 25^0 C

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Sub culturing on PDA plates

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Purification

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Inoculation of purified culture on PDA slants

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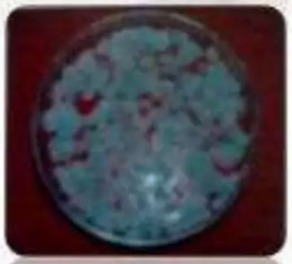
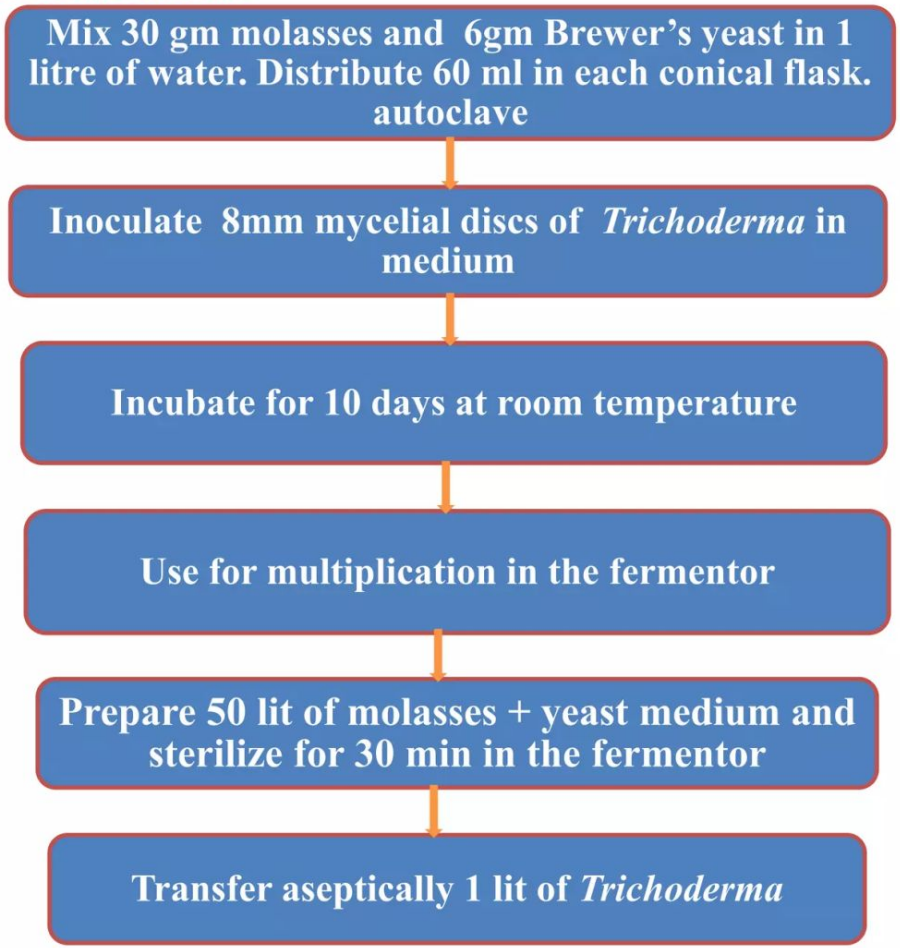
Preservation in deep freezer (-20^0 C)



Mass production of biocontrol agents

Liquid fermentation method



Incubate for 10 days

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using haemocytometer (10^8 /ml spore)

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500 ml of fungal biomass + 1 kg of talc powder

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Air dry & and carboxy methyl cellulose (CMC) + sticker 5 gm / kg

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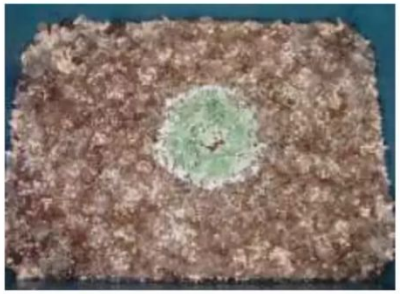
Store in polythene bag

- **Substrates for mass multiplication:** wheat bran, wheat straw, FYM, press mud, coir pith, ground nut shell, rice bran, etc



- **Carrier/ food base materials:**
  Talc, vermiculite, molasses, gypsum, kaolin, peat, sodium alginate, Cacl2


- Let us nurture the nature for our future by ECO- SUSTAINABLE AGRICULTURE Using Bio-control

THANK YOU