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# **Mass production technology of bio-pesticides**



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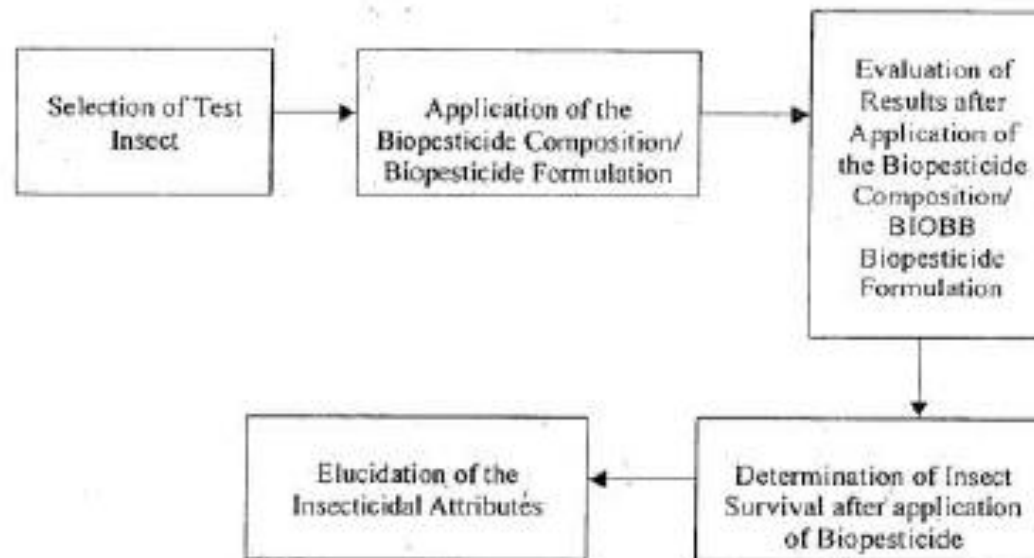
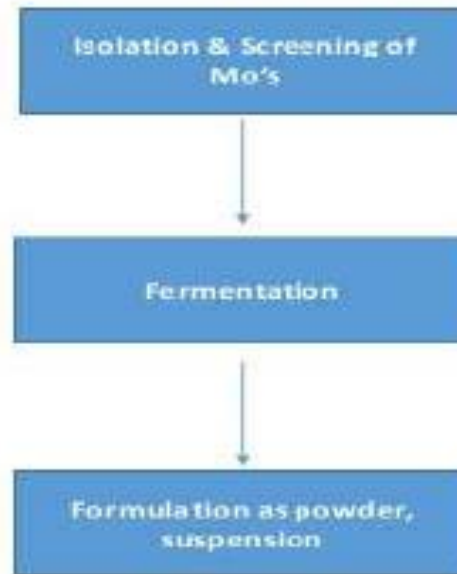
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# Introduction

- **Biopesticide** is a formulation made from naturally occurring substances that controls pests by non toxic mechanisms and in **ecofriendly** manner.
- Biopesticides may be derived from animals (e.g. nematodes), plants (*Chrysanthemum*, *Neem*) and microorganisms (e.g. *Bacillus thuringiensis*, *Trichoderma*, nucleopolyhedrosis virus).
- However, biopesticides are generally less toxic to the user and non-target organisms, making them desirable and sustainable tools for disease management.



# Large scale production of microbial pesticides

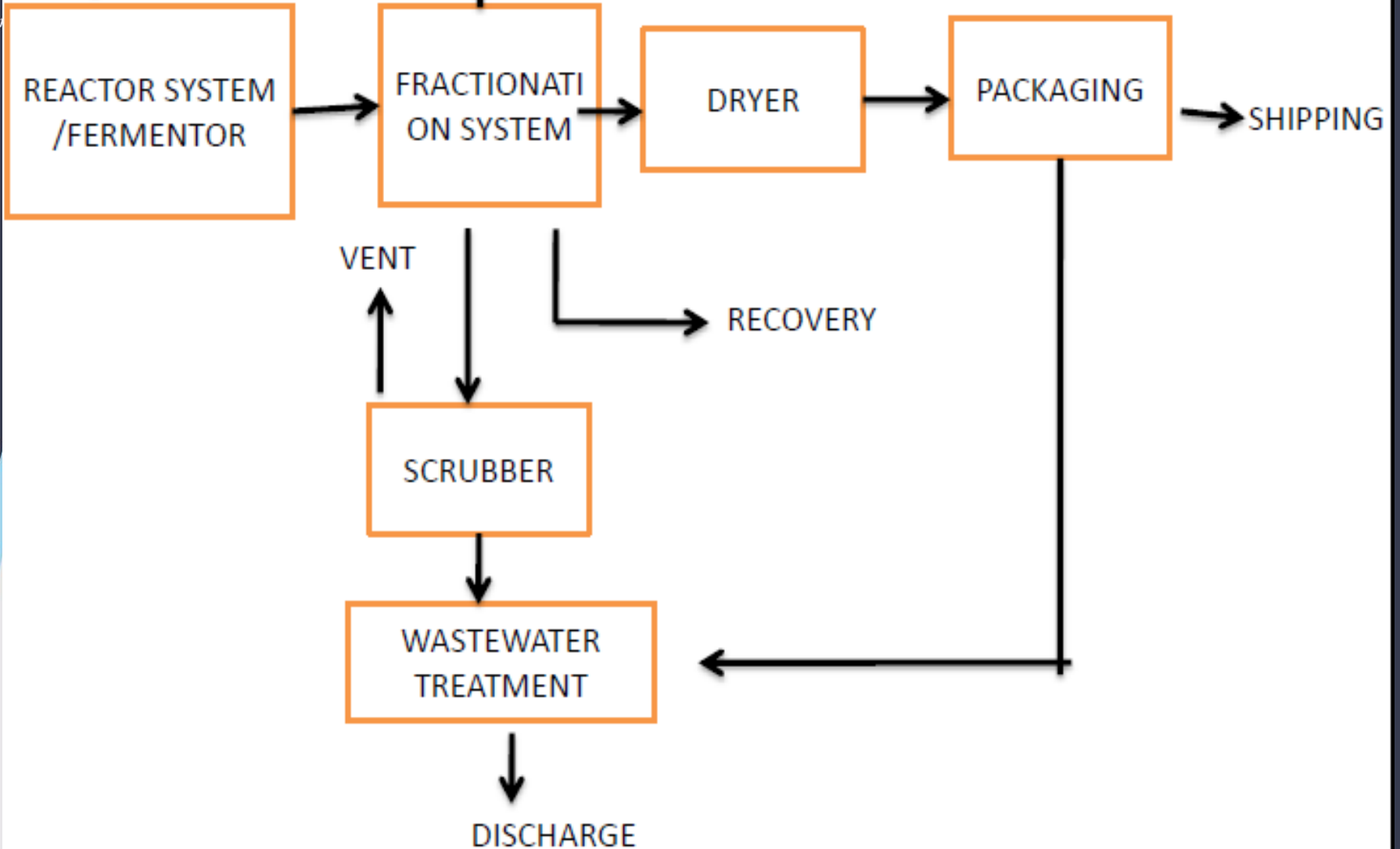




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RAW MATERIALS

# Manufacturing process





### •RAW MATERIAL

- May be organic or inorganic compounds
- Different raw material for different pesticide

### •REACTOR SYSTEM

- Chemical process takes place in the presence of chemicals such as oxidation, nitration, condensation, etc.

### •FRACTIONATION SYSTEM

- Separation process in which certain quantity of a mixture(solid,liquid,solute,suspension or isotope) is divided up in a number of smaller fractions in which composition change
- Recovery

### •DRYER

- Removal of water or other solvent by evaporation from solid, semi-solid or liquid
- Final production step before selling or packaging products.



## •SCRUBBERS

- To remove priority pollutants from pesticide product using scrubbing liquor
- Wastewater go to treatment plant

## •PACKAGING

- Packed in dry and clean containers e.g., drums type depend on type of pesticide
- Capacity 10,25,50,100,200 lits.
- Temper-proof, closer to avoid leakage, sturdy

## •FORMULATION

- Processing a pesticide into granules, liquid, dust and powder to improve its properties of storage, handling, application, effectiveness, or safety.
- Dry mixing, grinding of solids, dissolving solids and blending