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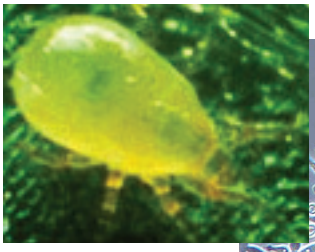
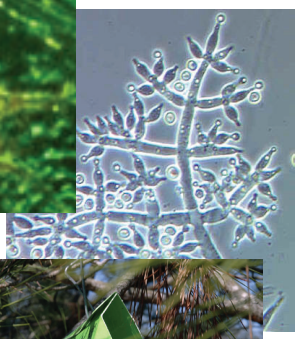
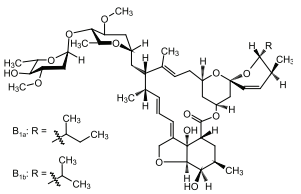
Why biopesticides did not develop to a significant business?

In agriculture and public hygiene bio-control agents -also called biologicals or biopesticides- are used as an alternative to synthetic chemicals to prevent or reduce damages made by insects or pathogens to plants, animals, and human beings. Control is achieved either by eradication of the pest, inhibition of pest development, or by providing the host with defence mechanisms against it.
While the chemical pesticide business has grown up to a $45 billion level, the market for bio-control agents is stagnating at a low [unknown] level.

Product categories:

- Living biologicals
  - Microorganisms as pest for pathogens or insects
  - Macro-organisms: beneficial predators, insects, mites, nematodes
- Non-living biologicals, substances of natural origin.
  - Extracts, e.g. pyrethrum
  - Products of biotechnology, e.g, Bt toxins, cell metabolites
  - Approach very similar to chemicals
- Semiochemicals: pheromones


Efficacy and Agricultural Use

- 3 lives to live with
  - Pest
  - Plant
  - Control Agent
- Specific, narrow scope of use
- Sophisticated application recommendations
- System approach needed: change crop management practices, integrate.

Product Safety

- Bio or natural does not mean benign!
- Few toxicological concerns
- Favourable residue situation
- But significant environmental questions:
  - If no impact no efficacy!
  - What impact?
  - Dissemination, multiplication?
- Good or bad for biodiversity?

Regulatory Requirements

- No difference with chemicals
- But some specificities
- And testing issues
- Some data waivers possible
- Data packages cost a lot time to produce, a lot of time to be reviewed, and a lot money.

Product Development

- Many challenges!Innovation is also needed in development methodology
- Field testing
- Use instructions
- Production process
- Formulation and packaging
  - Stability for storage and transport
  - Activity when applied

Intellectual Property

- Few products patentable,many commodities
- Each living strain to be deposited
- Formulation and process patents are weaker than substances and uses
- Enforcement issues
- Registration data is IP too!

Market Expectations

- Put the grower in the centre!
- Today he is quite satisfied with chemical solutions
- Public aversion for chemicals
- Pressure for more «bio»
- Grower is OK with it, but
  - Must work well
  - Must be easy to use
  - Must not imply big changes
  - Must not cost more

Marketing Requirements

- More complex technical positioning
- Tough benefit communication:
  - Lower performance level
  - Soft values
  - Adoption by the value chain
- Crop management changes
- Many resources needed for support and training

Economic Considerations

- Niche markets, niche products
- Large upfront investment, particularly for safety package
- Risks at many places: technical, regulatory, market acceptance
- Barriers to entry for competitors are not high

OUTLOOK

- Likely to remain niche products for niche markets
- Cannot afford large upfront investments
- Public support welcome:
  - Regulatory burden to be eased
  - Partnerships needed for technical marketing tasks