

## Simulation for Multi-Product and Multi-Train Facilities

Applying process simulation to complex problems eliminates waste, streamlines planning and operations, and reduces production costs.

*Critical areas for use of simulation include:*

- Percent utilization of equipment
- Facility configuration
- Equipment bottlenecks
- Conflicts among shared equipment or resources such as media prep, buffer prep, CIP skids.
- Water consumption, including USP & WFI
- Labor, including requirements & shift analysis
- Expansion & build-out options
- Campaign planning
- Re-scheduling of operations

## Process Design and Operations Applications

- Strategic planning
- New product development
- Conceptual design
- Preliminary engineering
- Manufacturing planning
- Emissions analysis
- Waste Handling analysis
- Scale-up or scale-down
- Analysis of
  - Separation performance
  - Detailed unit operations
  - Equipment sizing
  - Utility requirements
  - Resource requirements
  - Process economics

## About ChemSim



**ChemSim's** chemical and biochemical engineers are experts in applying process simulation tools to the design and optimization of industrial processes.

Our engineers have many years of experience working with a range of simulation tools in the biopharmaceutical industry.

**ChemSim** works directly with engineering companies, contract manufacturers, and end users to solve critical business and engineering problems.

Increase profitability by using process simulation to identify hot spots, eliminate equipment bottlenecks, discover undersized utilities, and improve process robustness.

Experience and understanding of facility operation and the input of many groups within the organization are critical to successful simulation.

**ChemSim** believes that there is more to simulation than just solving equations.



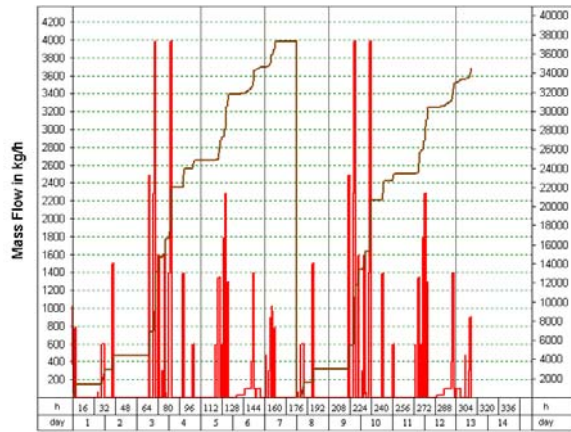
For more information, contact

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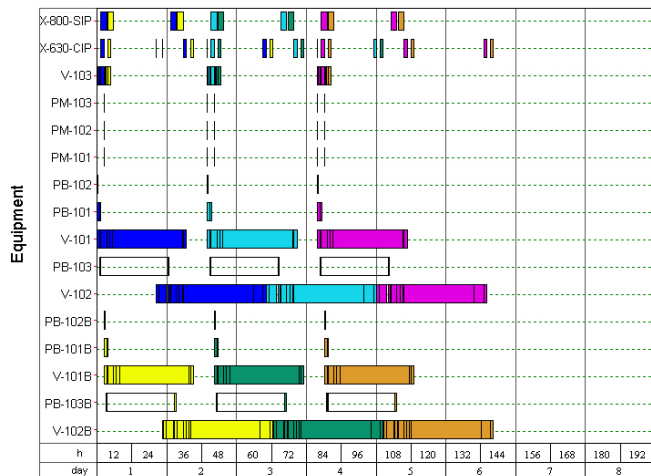
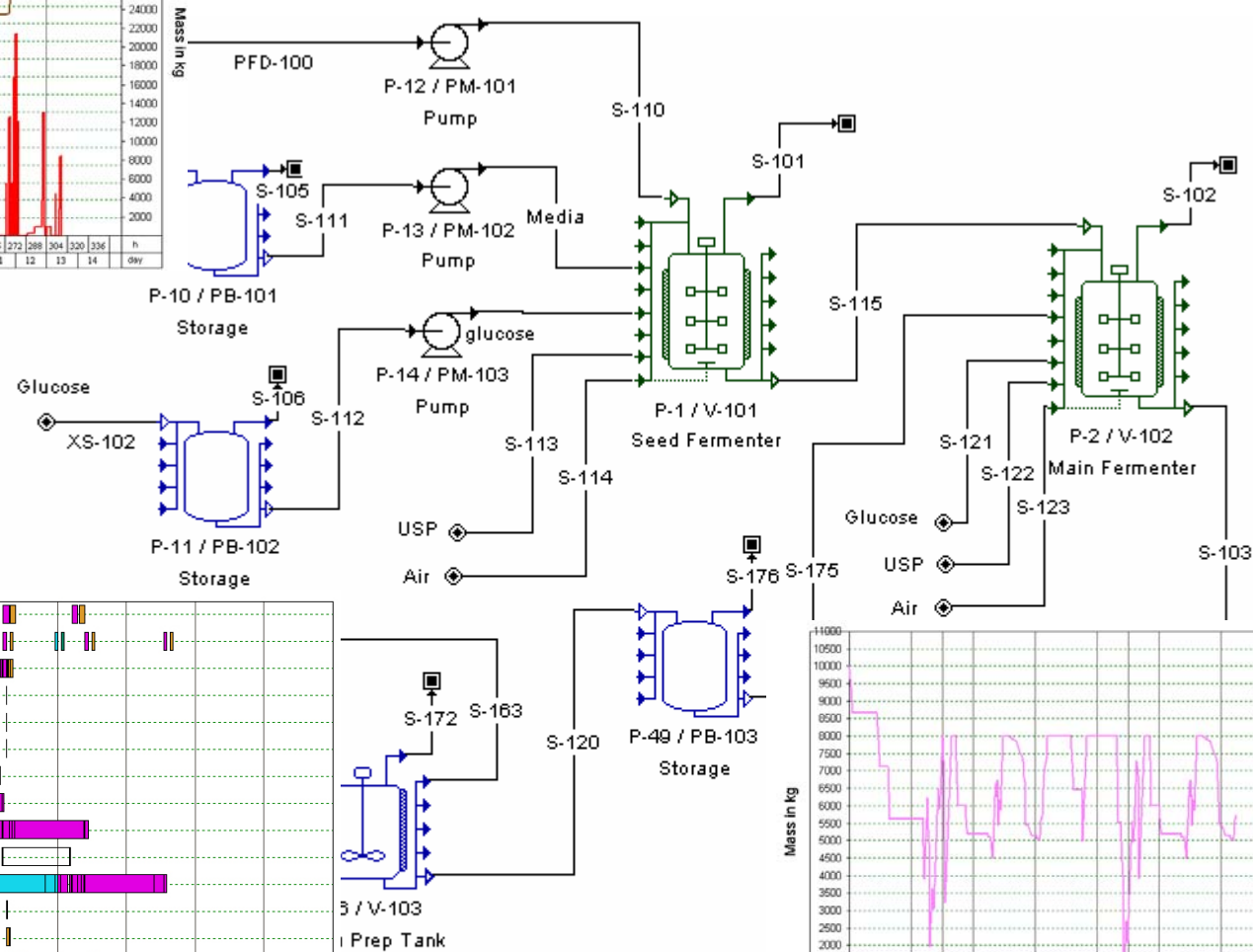
**ChemSim**

# Profiling Multi-Product Facilities

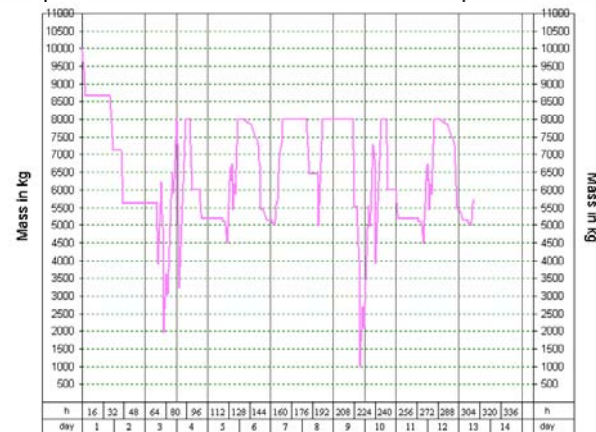


Resource profile for multiple batches

## Flowsheet for a Fermentation Process



Equipment occupancy for two processes, each running three batches, with shared CIP and SIP skids



Track inventory levels and determine adequate utility sizing

Process Simulation