

Claims:

1. Production plant for continuous production and/or preparation of biopharmaceutical products with at least two units connected together in series for implementation of at least two downstream and/or upstream steps, characterized in that the production plant comprises:
 - at least one slave unit and at least one master unit,
 - wherein each slave unit is connected to at least one buffer volume either in the same unit or in an adjacent unit along the product stream and has one or more sensors for monitoring the buffer volume and one or more actuators for influencing the buffer volume and wherein the state variable of each buffer volume is controlled by means of the sensor and the actuator connected to at least one controller in a closed action sequence,
 - wherein a master unit comprises at least one device for conveying the product stream and is characterized in that its flow rate is not controlled via the control of the state variable buffer volume, but is regulated,
 - and wherein, if the master unit is adjacent to one or more slave units, it is connected to the buffer volume of each slave unit, andwherein in the case of several master units at least one auxiliary stream is present between two flow rate-determining actuators of the master units.
2. Production plant according to Claim 1, characterized in that one or more of the controllers are components of a control system, especially a process control system.
3. Production plant according to Claim 1 or 2, characterized in that the master unit is connected to the control system.
4. Production plant according to one of Claims 1 to 3, characterized in that the last or the penultimate unit along the product stream performs a virus filtration.
5. Production plant according to one of Claims 1 to 4, characterized in that it comprises one or more residence time components to ensure defined residence times.
6. Production plant according to one of Claims 1 to 5, characterized in that it comprises one or more conditioning components for setting defined parameters of the product stream.
7. Production plant according to Claim 6, characterized in that the conditioning component is a conditioning loop.

8. Production plant according to Claim 7, characterized in that the conditioning loop is connected to a buffer volume.
9. Production plant according to one of Claims 1 to 8, characterized in that the buffer volume is provided by means of an expandable hose.
10. Production plant according to one of Claims 1 to 9, characterized in that the buffer volume, the sensors, controllers and actuators acting together on the state variable buffer volume are assigned in the same unit.
11. Production plant according to one of Claims 1 to 10, characterized in that the production plant has flexible pipes in which a liquid flow is conveyed, which is measured through the use of a compensating flow rate measurement.
12. Computer-implemented method for process control of the production plant according to the invention, characterized in that:
 - in step a) the values of the state variable buffer volume and the flow rate in the production plant are specified by the following statements:
 - o order of the units along the product stream is stated,
 - o a target value for the flow rate is specified for each master unit,
 - o a target value for the state variable is specified for each buffer volume,
 - o for each closed action sequence, the connection of the controllers to the sensors for monitoring the buffer volume and to the actuators for influencing the buffer volume and if appropriate their connection to one another are specified,
 - o a parameterization of the controllers is carried out,and in that the method comprises the following further steps for the operation of the production plant:
 - b) The target value for the flow rate of the master units is transmitted by the control system to an actuator for regulating the flow rate in the master unit, with the proviso that in the case of several master units an auxiliary stream is opened, and
 - c) The actual value of the state variable buffer volume is determined by the corresponding sensor for monitoring the particular buffer volume, passed on to the controller connected in the respective closed action sequence and there compared with the respective corresponding target value,
 - d) The respective control signals are calculated and transmitted to the respective actuators connected in the closed action sequence for influencing the buffer volume,

- e) The actuators for influencing the buffer volume react upon the sensors for monitoring the buffer volume and
 - f) Steps b) to e) are repeated until the production plant is switched off or shut down.
13. Method according to Claim 12, characterized in that in step a) shutdown conditions are additionally defined by the following statement:
- o a maximum and/or minimum value for the state variable is specified for each buffer volume,
 - o a maximum and/or minimum value for the flow rate is specified for each master unit.
14. Method according to one of claims 12 or 13, characterized in that the time-averaged value of the state variable remains constant for each buffer volume.
15. Method according to one of claims 12 to 14, characterized in that for the control of a slave unit, fuzzy control or PID (proportional-integral-differential) control, particularly preferably PID control, is used.
16. Computer program for implementing the method according to one of Claims 12 to 15.