Claims

1. Apparatus for processing a liquid comprising a target substance, said apparatus comprising at least a first and a second means for carrying out a unit operation, each means for carrying out a unit operation comprising:

(i) a feed for a liquid in fluid connection with the inlet of a flow-controller comprising a variable flow inlet valve and an outlet, wherein at least one of the means for carrying out a unit operation comprises feeds for at least two liquids, the feeds being in fluid connection with the inlets of a multiple inlet flow-controller comprising two or more variable flow inlet valves for dosing the at least two liquids, the flow- controller also comprising an outlet;

(ii) a feed for a liquid feedstock comprising the target substance in fluid connection with the outlet from the flow-controller thereby to enable combination of the feed for a liquid comprising the target substance with the liquids fed in part (i) ~~mixed bioprocessing liquids~~ to produce a device feed;

(iii) a device for achieving a processing operation comprising a device inlet and a device outlet, the device inlet being in fluid connection with the device feed; and

(iv) a single pump, located downstream of the fluid connection between the feedstock and the outlet from the flow-controller, ~~means~~ for imparting flow through the flow controller and from the feed for the liquid feedstock through the processing device via the device inlet;

wherein the feed for a liquid feedstock comprising the target substance for the second means for carrying out a unit operation comprises the outlet from the first means for carrying out a unit operation.

2. Apparatus according to claim 1, wherein the unit operations are selected from chromatography, viral inactivation, filtration, ultrafiltration, diafiltration, microfiltration, in-line conditioning and refolding, in each case where the target substance comprises a recombinant polypeptide.

3. Apparatus according to either preceding claim, wherein ~~the means for imparting flow comprises a single pump, located downstream of the fluid connection between the connection between the feedstock and the outlet from the flow-controller.~~

~~4. Apparatus according to claim 3, wherein~~ the pump is located upstream of the device for achieving a bioprocessing operation.

~~5~~4. Apparatus according to any preceding claim, wherein the means for carrying out a unit operation are connected in series, with the feed for a liquid feedstock comprising the target substance for a subsequent means for carrying out a unit operation comprising the outlet from the preceding means for carrying out a unit operation.

~~6~~5. Apparatus according to any preceding claim, wherein each unit operation differs from the other unit operations.

~~7~~6. Apparatus according to any preceding claim, wherein each means for carrying out a unit operation comprises substantially the same flow path.

~~8~~7. Apparatus according to claim 1, comprising:

(i) feeds for at least two liquids;

(ii) a multiple inlet flow-controller comprising two or more variable flow inlet valves for mixing at least two liquids, the flow-controller also comprising a single outlet;

(iii) a feed for a liquid feedstock comprising the target substance in fluid connection with the outlet from the flow-controller;

(iv) a means for imparting flow, typically by use of a pump, through the flow controller and from the feed for the liquid feedstock through the bioprocessing apparatus via the feed inlets;

(v) a device for ensuring homogeneous mixing of the at least two liquids;

(vii) a device for trapping air bubbles from the process liquids

(vii) a common flowpath for achieving a bioprocessing operation comprising a device inlet and a device outlet, the device inlet being in fluid connection with the feed inlets;

(viii) the device inlet and outlet being in fluid connection with modules used for chromatography, filtration (including viral filtration), tangential flow filtration, single pass tangential flow filtration, refold and viral inactivation;

(ix) a means to bypass the device inlet and outlet;

(x) a means downstream of the device outlet to regulate the pressure;

(xi) a number of sensors appropriate for monitoring the bioprocessing operation upstream and downstream of the device inlet and device outlet; and

(xii) at least one outlet in fluid connection with the feed inlets.

~~9. Apparatus for preparing a liquid mixture, said apparatus comprising:~~

~~(i) feeds for at least two liquids;~~

~~(ii) a multiple inlet flow-controller comprising two or more variable flow inlet valves for dosing at least two liquids, the flow-controller also comprising an outlet;~~

~~(iii) a pump for imparting flow through the flow-controller and from the feed for the liquid feedstock through the bioprocessing apparatus via the feed inlets;~~

~~(iv) a static mixer for in-line mixing of the at least two liquids; and~~

~~(v) an outlet for the liquid mixture; wherein the pump is upstream of the device for in-line mixing, and both the pump and the device for in-line mixing are located downstream of the multiple inlet flow.~~

~~10. Apparatus according to claim 9, which comprises a single pump.~~

~~11. Apparatus according to either of claims 9 or 10, wherein the static mixer is a time- delay, split flow static mixer.~~

~~12. A process for preparing a buffer solution, which comprises mixing liquids, preferably acid and/or salt solutions, using apparatus according to any one of claims 9, 10 and 11.~~

~~13~~8. A process for preparing a biomolecule, comprising processing the biomolecule using apparatus according to any preceding claim.

~~14~~9. A process according to claim ~~13~~8, wherein the biomolecule is a recombinant polypeptide.