CLAIMS

1. A cultivation system for cell and/or tissue cultivation comprising:

   at least one cell culture bioreactor comprising:

   a first surface comprising an inlet port, a second surface comprising an outlet port, and at least one bioreactor wall, wherein the at least one bioreactor wall is extending from the first surface towards the second surface and is defining an internal chamber configured to accommodate therein at least one scaffold unit;

   an inlet manifold fluidly coupled to the inlet port and an outlet manifold fluidly coupled to the outlet port, wherein each manifold comprises openings positioned therealong configured to direct a flow of a liquid; and

   at least one scaffold unit comprising a plurality of scaffolds, wherein each scaffold is separated from its neighboring scaffolds to form spaces therebetween enabling liquid flow, wherein at least part of each scaffold comprises cells and/or tissue.

2. The cultivation system of claim 1, further comprising at least one pump, wherein the manifolds are fluidly coupled to the at least one pump, and wherein the at least one pump is configured to control the flow rate of liquid flowing through the at least one scaffold unit and to circulate the liquid within the system.

3. The cultivation system of claim 1 or 2, wherein each of the scaffolds comprises at least two surfaces facing opposite directions along and/or in parallel to a longitudinal axis of said scaffold, and wherein none of the surfaces defines an enclosed perimeter across any cross-section thereof.

4. The cultivation system of claims 2 and 3, wherein upon operation of the at least one pump, the liquid flows on at least one surface of each scaffold, within the spaces between neighboring scaffolds, or a combination thereof

~~5. The cultivation system of claim 3 or 4, wherein each of the scaffolds is planar.~~

~~6.~~5. The cultivation system of any one of claims 1-~~5~~4, wherein the thickness of

each of the scaffolds ranges from about 1mm to about 5cm.

~~7. The cultivation system of claim 6, wherein dimensions of each of the width axis and the length axis of each of the scaffolds is at least 10 times greater compared to the thickness of said scaffold.~~

~~8. The cultivation system of any one of claims 2-7, wherein the area of each of the two surfaces of each scaffold is at least 50cm^2.~~

~~9. The cultivation system of claim 4, wherein the liquid flows along the longitudinal axis of each scaffold of the plurality of scaffolds.~~

~~10. The cultivation system of any one of claims 1-9, wherein the scaffolds are made from a porous material.~~

~~11. The cultivation system of claim 10, wherein the porous material comprises pores having a diameter ranging from about 2µm to about 1.5mm.~~

~~12. The cultivation system of any one of claims 1-11, wherein each of the scaffolds in the plurality of scaffolds is of the same type.~~

~~13. The cultivation system of any one of claims 1-12, wherein the spaces separating between neighboring scaffolds are even.~~

~~14. The cultivation system of any one of claims 1-13, wherein a height of each space between neighboring scaffolds is below about 30 mm.~~

~~15.~~6. The cultivation system of any one of claims 1-~~14~~5, wherein the scaffold unit further comprises a plurality of supportive elements separating each scaffold from its neighboring scaffolds.

~~16. The cultivation system of claim 15, wherein each scaffold is at least partially placed onto at least one supportive element.~~

~~17. The cultivation system of claim 16, wherein each scaffold is placed between at least two supportive elements.~~

~~18.~~7. The cultivation system of any one of claims 4-~~17~~6, wherein the at least one scaffold unit is disposed within the cell culture bioreactor, so that each of the scaffolds is positioned with the two surfaces being in parallel to a bottom surface of the bioreactor, wherein during the operation of the at least one

pump, the liquid passes in parallel to the longitudinal axis within each space along at least one surface of each of the scaffolds, between neighboring scaffolds.

~~19.~~8. The cultivation system of any one of claims 2-~~18~~7, wherein the at least one scaffold unit is disposed within the internal chamber of the bioreactor, so that at least one of the openings of each manifold is positioned directly opposing a corresponding space between neighboring scaffolds of the scaffold unit, in order to enable direct liquid flow therethrough.

~~20. The cultivation system of any one of claims 2-19, wherein the at least one pump is configured to maintain a substantially constant liquid level within the cell culture bioreactor.~~

~~21.~~9. The cultivation system of any one of claims 2-~~20~~8, comprising a plurality of pumps, wherein a first pump is configured to deliver liquid into the at least one cell culture bioreactor via the inlet manifold at an inlet flow rate, and wherein a second pump is configured to collect liquid from the cell culture bioreactor via the outlet manifold at an outlet flow rate, and, optionally, wherein a third pump is fluidly coupled to the bioreactor, wherein one or more of the first pump, the second pump, and optionally the third pump control the liquid level within the cell culture bioreactor.

~~The cultivation system of claim 21, further comprising a third pump fluidly coupled to the bioreactor, wherein said third pump is configured to control liquid level therein.~~

~~22. The cultivation system of claim 21 or 22, wherein the inlet flow rate is above about 0.5 volume exchanges per day (VVD).~~

~~23.~~10. The cultivation system of ~~any one of~~ claim~~s 20-23~~ 9, wherein the liquid level within the cell culture bioreactor is at least about 0.1 mm above the upper scaffold of the scaffold unit.

~~24.~~11. The cultivation system of any one of claims 1-~~24~~10, further comprising at least one sensor, wherein said at least one sensor is configured to measure one or more of: liquid level within the cell culture bioreactor;

liquid presence within the cell culture bioreactor; and at least one liquid parameter selected from the group consisting of: temperature, pH, dissolved oxygen content, concentration of one or more nutrients, and concentration of one or more waste products, and optionally, a control unit in operative communication with the at least one sensor, configured to receive measurements of one or more of the liquid level, presence, or the at least one liquid parameter, and adjust it based on the measurement thereof.

~~25. The cultivation system of claim 25, further comprising a control unit in operative communication with the at least one sensor, configured to receive measurements of one or more of the liquid level, presence, or the at least one liquid parameter, and adjust it based on the measurement thereof.~~

~~26.~~12. The cultivation system of any one of claims 1-~~26~~11, wherein the liquid is a cell culture medium and wherein said cultivation system, further comprising a medium reservoir for supplying cell culture medium into the at least one cell culture bioreactor, wherein the medium reservoir is in fluid communication with the at least one cell culture bioreactor, and wherein said medium reservoir contains a homogenous cell culture medium for the cultivation of cells and/or tissues.

~~27. The cultivation system of claim 27, further comprising a medium reservoir for supplying cell culture medium into the at least one cell culture bioreactor, wherein the medium reservoir is in fluid communication with the at least one cell culture bioreactor, and wherein said medium reservoir contains a homogenous cell culture medium for the cultivation of cells and/or tissues.~~

~~28. The cultivation system of claim 28, further comprising a cell trap located between the outlet of the cell culture bioreactor and an inlet to the medium reservoir.~~

~~29. The cultivation system of any one of claims 28-29, further comprising a separation system configured to remove waste products from the medium entering thereto.~~

~~30. The cultivation system of any one of claims 27-30, wherein the flow rate of the cell culture medium is controlled to support the cell cultivation on at least~~

~~one surface of each of the scaffolds or therewithin.~~

~~31.~~13. The cultivation system of claim ~~31~~12, wherein the flow rate is controlled according to a measure of at least one parameter selected from the group consisting of dissolved oxygen, pH, nutrient concentration of one or more nutrients, concentration of one or more waste products, and any combination thereof.

~~32.~~14. The cultivation system of any one of claims 1-~~32~~13, wherein the cells are non-human-animal cells, and wherein said system is for use in producing cultured food products.

~~33. The cultivation system of claim 33, for use in producing cultured food products.~~

~~34.~~15. The cultivation system of any one of claims 1-~~34~~14, wherein the scaffolds are made of at least one edible material.

~~35.~~16. A method for producing at least one scaffold unit comprising a plurality of scaffolds comprising cultured cells and/or tissues, the method comprising the steps of:

a. providing at least one scaffold unit comprising a plurality of scaffolds, wherein each scaffold is separated from its neighboring scaffolds to form spaces therebetween enabling liquid flow, wherein each scaffold is porous;

b. seeding cells on at least part of a surface of each scaffold of the plurality of scaffolds or within each scaffold of the plurality of scaffolds;

c. optionally placing the scaffold unit under conditions enabling adherence of the seeded cells thereto, until said cells are at least partially covering at least one surface of each of the scaffolds, or until the cells are covering at least a part of the pores and/or channels of each of the scaffolds;

d. placing the scaffold unit in a cell culture bioreactor comprising an inlet manifold and an outlet manifold, wherein each manifold comprises a plurality of openings configured to direct a flow of a liquid

therethrough, wherein the manifolds are connected to at least one pump configured to control the flow rate of said liquid;

e. operating the at least one pump to deliver the liquid from the inlet manifold, along said spaces between neighboring scaffolds of at least one scaffold unit, and into the outlet manifold; and

f. cultivating the cells on and/or within the plurality of scaffolds,

thereby producing a plurality of scaffolds comprising cultured cells and/or tissues.

~~36.~~17. The method of claim ~~36~~16, wherein step (b) of seeding the cells comprises administering the cells directly into each scaffold, or into the spaces separating neighboring scaffolds; step (e) comprises delivering the cell culture medium (i) from the plurality of openings of the inlet manifold into each space separating neighboring scaffolds of the scaffold unit, (ii) from the spaces into the plurality of openings of the outlet manifold, and (iii) from the plurality of openings of the outlet manifold into the plurality of openings of the inlet manifold, thereby circulating the liquid within the bioreactor; and step (f) comprises cultivating the cells on and/or within the plurality of scaffolds to reach at least one pre-set parameter selected from the group consisting of a desired tissue mass; nutrient uptake rate; oxygen uptake rate; waste production rate; and any combination thereof, thereby producing a plurality of scaffolds comprising cultured cells and/or tissues thereon and/or therewithin.

~~37. The method of any one of claims 36-37, wherein step (d) comprises placing the scaffold unit in the cell culture bioreactor such that at least one opening of each manifold is positioned directly opposing a corresponding space separating neighboring scaffolds, thereby enabling direct liquid flow therethrough.~~

~~38.The method of any one of claims 36-38, wherein step (e) comprises delivering the cell culture medium (i) from the plurality of openings of the inlet manifold into each space separating neighboring scaffolds of the scaffold unit, (ii) from the spaces into the plurality of openings of the outlet manifold,~~

~~and (iii) from the plurality of openings of the outlet manifold into the plurality of openings of the inlet manifold, thereby circulating the liquid within the bioreactor.~~

~~39.~~18. The method of claim ~~39~~16, wherein the at least one pump comprises a plurality of pumps, wherein during step (e) a first pump is delivering the liquid into the cell culture bioreactor via the inlet manifold at an inlet flow rate, wherein a second pump is collecting used liquid from the cell culture bioreactor via the outlet manifold at an outlet flow rate, and optionally wherein a third pump is fluidly coupled to the bioreactor, wherein one or more of the first pump, the second pump, and optionally the third pump control the liquid level within the cell culture bioreactor.

~~40.The method of any one of claims 36-40, wherein step (f) comprises cultivating the cells on and/or within the plurality of scaffolds to reach at least one pre-set parameter selected from the group consisting of a desired tissue mass; nutrient uptake rate; oxygen uptake rate; waste production rate; and any combination thereof, thereby producing a plurality of scaffolds comprising cultured cells and/or tissues thereon and/or therewithin.~~

~~41.~~19. The method of any one of claims ~~36-41~~16-18, wherein the liquid is a cell culture medium, the cells are non-human-animal cells and the scaffold unit is edible.

~~42. The method of any one of claims 36-42, wherein said method is performed under aseptic conditions.~~

~~43. The method of any one of claims 36-43, wherein the cells are non-human-animal cells.~~

~~44. The method of claim 44, wherein the scaffold unit is edible.~~

~~45. The method of any one of claims 36-45, for use in producing a cultured food product.~~

~~46. The method of claim 46, wherein the cultured food product is cultured meat.~~

~~47.~~20. A scaffold unit comprising a plurality of scaffolds comprising cultured cells and/or tissues thereon and/or therewithin, produced by the

method of any one of claims ~~36-45~~16-19.

~~48.~~21. A cultured food product comprising at least one scaffold unit according to claim ~~48~~20, or a portion thereof.

~~49.~~22. A bioreactor configured to deliver a liquid to a plurality of scaffolds, the bioreactor comprising:

(a) at least one bioreactor wall defining an internal chamber and is extending between a bottom surface and an upper surface, in parallel to a vertical axis;

(b) at least one main tube, positioned along the vertical axis, and is extending perpendicularly from the upper surface;

(c) a plurality of cultivation trays disposed within the internal chamber, wherein said plurality of cultivation trays extends radially from at least one supportive element directly or indirectly attached to the main tube, wherein each cultivation tray is configured to support at least one scaffold and is further configured to enable a liquid to flow along and/or through each scaffold; and

(d) at least one mixing apparatus attached to the main tube, wherein the mixing apparatus is configured to circulate the liquid within the bioreactor,

wherein the bioreactor is configured to deliver the liquid to a plurality of scaffolds disposed therein.

~~50.~~23. The bioreactor according to claim ~~50~~22, wherein the at least one supportive element is shaped as a hollow tube encompassing the main tube, thus defining an inner supportive element space therebetween which is configured to enable the liquid to flow therethrough, and wherein the at least one supportive element comprises a plurality of openings spaced apart from each other along a circumference thereof.

~~51.~~24. The bioreactor according to claim ~~51~~23, wherein a portion of the plurality of openings is located above each respective cultivation tray, and wherein each cultivation tray comprises at least one scaffold disposed therein

or thereon.

~~52.~~25. The bioreactor according to claim ~~52~~24, wherein the plurality of cultivation trays extends radially from a corresponding plurality of supportive elements fluidly coupled to one another, wherein each supportive element is attached to at least one cultivation tray.