CLAIMS

What is claimed is:

[Claim 1]. A method for producing a culture medium for culturing microorganisms or cells, comprising:

culturing a first microorganism, thereby producing biomass;

processing the biomass generated by the first cultured microorganism to produce a protein hydrolysate composition; and

adding the protein hydrolysate composition to a culture medium for a second culture comprising a second microorganism or cells, wherein the protein hydrolysate composition serves as a nutrient source for the growth of the second microorganism or cells.

[Claim 2]. The method of claim 1, wherein the processing comprises:

(i) treating the biomass with one or more of elevated temperature, elevated pressure, and a protease; or.

~~3. The method of claim 1, wherein the processing comprises~~ (ii) raising the pH of a suspension comprising the biomass; or.

~~4. The method of claim 1, wherein the processing comprises~~ (iii) lowering the pH of a suspension comprising the biomass.

[Claim 3~~5~~]. The method of claim 1, wherein the protein hydrolysate composition comprises:

(i) a polyhydroxyalkanoate (PHA), optionally .

~~6. The method of claim 5,~~ wherein the PHA comprises polyhydroxybutyrate (PHB).

~~7. The method of claim 1, wherein the protein hydrolysate composition comprises~~(ii) a vitamin, optionally.

~~8. The method of claim 7,~~ wherein the vitamin comprises one or more of vitamin B_1, vitamin B_2, and vitamin B_{12}.

[Claim 4~~9~~]. The method of claim 1, wherein a total organic content of the protein hydrolysate composition is enriched in proteins, peptides, and/or amino acids.

[Claim 5~~10~~]. The method of claim 1, wherein said second culture comprises animal cells.

[Claim 6~~11~~]. The method of claim ~~10~~5, wherein:

(i) the culture medium for animal cells is a serum-free culture medium, optionally.

~~12. The method of claim 11,~~ wherein the culture medium for animal cells is an animal component- free culture medium; or~~.~~

~~13. The method of claim 10, wherein~~(ii) the protein hydrolysate composition serves as a supplement for culturing recombinant animal cells, optionally~~.~~

~~14. The method of claim 10,~~ wherein the protein hydrolysate composition serves as a supplement for culturing meat; or

(iii) the protein hydrolysate composition serves as a supplement for growth and/or differentiation of the animal cells.

[Claim 7~~15~~]. The method of claim 1, wherein the first microorganism is a chemoautotrophic microorganism, and wherein culturing of the first microorganism comprises culturing the chemoautotrophic microorganism under autotrophic conditions.

[Claim 8~~16~~]. The method of claim ~~15~~7, wherein the autotrophic conditions comprises providing a gaseous substrate to grow the chemoautotrophic microorganism, optionally wherein:~~.~~

~~17. The method of claim 16, wherein~~ (i) the gaseous substrate comprises one or more of CO_2, CO, and CH_4 as a carbon source, and/or~~.~~

~~18. The method of claim 16 or 17,~~ wherein the gaseous substrate comprises one or more of H_2, CO, and CH_4 as an electron donor; or~~.~~

~~19. The method of claim 16, wherein~~ (ii) the gaseous substrate comprises pyrolysis gas, producer gas, syngas, natural gas or biogas.

[Claim 9~~20~~]. The method of claim ~~15~~7, wherein the chemoautotrophic microorganism:

(i) is a knallgas microorganism, optionally~~.~~

~~21. The method of claim 20,~~ wherein the chemoautotrophic microorganism is selected from one or more of: Cupriavidus sp.;Aquifex sp.; ~~Cupriavidus sp.;~~ Corynebacterium sp.; Gordonia sp.; Nocardia sp.; Rhodopseudomonas sp.; Rhodobacter sp.; Rhodospirillum sp.; Rhodococcus sp.; Rhizobium sp.; Thiocapsa sp.; Pseudomonas sp.; Hydrogenomonas sp.; Hydrogenobacter sp.; Hydrogenophilus sp.; Hydrogenovibrio sp.; Hydrogenothermus sp.; Helicobacter sp.; Xanthobacter sp.; Hydrogenophaga sp.; Bradyrhizobium sp.; Ralstonia sp.; Alcaligenes sp.; Amycolata sp.; Aquaspirillum sp.; Arthrobacter sp.; Azospirillum sp.; Variovorax sp.; Acidovorax sp.; Bacillus sp.; Calderobactenum sp.; Derxia sp.; Flavobacterium sp.; Microcyclus sp.; Mycobacterium sp.; Paracoccus sp.; Persephonella sp.; Renobacter sp.; Seliberia sp., Streptomycetes sp.; Thermocrinis sp.; Wautersia sp.; Anabaena sp.; Arthrospira sp.; Scenedesmus sp.; Chlamydomonas sp.; Ankistrodesmus sp.; and Rhaphidium sp; or~~.~~

~~22. The method of claim 15, wherein the chemoautotrophic microorganism~~ (ii) is genetically modified.

[Claim 1023]. A cell culture media supplement, comprising a protein hydrolysate composition derived from a microorganism, optionally.

24. The media supplement according to claim 23, wherein the microorganism is a chemoautotrophic microorganism.

[Claim 1125]. The media supplement of claim 2310, wherein the protein hydrolysate composition comprises: a vitamin.

26. The media supplement of claim 25, wherein the vitamin comprises one or more of vitamin Bi, vitamin B2, and vitamin B12.

27. The media supplement of claim 23, wherein the protein hydrolysate composition comprises (i) PHA, optionally.

28. The media supplement of claim 27, wherein the PHA is PHB; and/or.

(ii) a vitamin, optionally wherein the vitamin comprises one or more of vitamin B_1, vitamin B_2, and vitamin B_{12}.

[Claim 129]. The media supplement of claim 2310, wherein a total organic content of the supplement is enriched in proteins, peptides, and/or amino acids.

[claim 130]. A method for culturing animal cells, comprising:

adding a media supplement according to any of claims 23 10 to 129 to a serum-free culture medium; and

culturing animal cells in the serum-free culture medium.

[Claim 314]. The method of claim 130, wherein:

(i) the serum-free culture medium is an animal component-free culture medium; or.

32. The method of claim 30, wherein (ii) the culture medium comprises a plant-based and/or yeast-based protein hydrolysate composition.

[Claim 1533]. The method of claim 130, wherein the animal cells comprise:

(i) recombinant cells; or.

34. The method of claim 30, wherein the animal cells comprise(ii) stem cells, optionally.

35. The method of claim 34, wherein the animal cells comprise myoblasts and/or myocytes; or.

36. The method of claim 30, wherein the animal cells comprise (iii) adipocytes and/or fibroblasts.

[Claim 1637]. The method of claim 130, wherein the culturing comprises contacting the animal cells with a biodegradable and/or consumable scaffold under conditions sufficient for the cells to grow on the scaffold, optionally.

38. The method of claim 37, wherein the scaffold comprises a PHA polymer, optionally wherein:.

39. The method of claim 38, wherein (i) the PHA polymer comprises PHB; and/or.

40. The method of claim 38 or 39, wherein (ii) the PHA polymer is derived from a chemoautotrophic microorganism.

41. The method of claim 10, wherein said protein hydrolysate composition serves as a supplement for growth and/or differentiation of the animal cells.

[Claim 1742]. The media supplement according to claim 2310, where the supplement is formulated for use as an animal cell culture media supplement.