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

(ii) raising the pH of a suspension comprising the biomass; or

(iii) lowering the pH of a suspension comprising the biomass.

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

(i) a polyhydroxyalkanoate (PHA), optionally . wherein the PHA comprises polyhydroxybutyrate (PHB).

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

[Claim 4]. 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]. The method of claim 1, wherein said second culture comprises animal cells.

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

(i) the culture medium for animal cells is a serum-free culture medium, optionallywherein the culture medium for animal cells is an animal component- free culture medium; or

(ii) the protein hydrolysate composition serves as a supplement for culturing recombinant animal cells, optionally 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]. 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]. The method of claim 7, wherein the autotrophic conditions comprises providing a gaseous substrate to grow the chemoautotrophic microorganism, optionally wherein:

(i) the gaseous substrate comprises one or more of CO_2, CO, and CH_4 as a carbon source, and/or

wherein the gaseous substrate comprises one or more of H_2, CO, and CH_4 as an electron donor; or

(ii) the gaseous substrate comprises pyrolysis gas, producer gas, syngas, natural gas or biogas.

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

(i) is a knallgas microorganism, optionally wherein the chemoautotrophic microorganism is selected from one or more of: Cupriavidus sp.;Aquifex 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

(ii) is genetically modified.

[Claim 10]. A cell culture media supplement, comprising a protein hydrolysate composition derived from a microorganism, optionallywherein the microorganism is a chemoautotrophic microorganism.

[Claim 11]. The media supplement of claim 10, wherein the protein hydrolysate composition comprises:

(i) PHA, optionally 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 12]. The media supplement of claim 10, wherein a total organic content of the supplement is enriched in proteins, peptides, and/or amino acids.

[claim 13]. A method for culturing animal cells, comprising:

adding a media supplement according to any of claims 10 to 12 to a serum-free culture medium; and

culturing animal cells in the serum-free culture medium.

[Claim 14]. The method of claim 13, wherein:

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

(ii) the culture medium comprises a plant-based and/or yeast-based protein hydrolysate composition.

[Claim 15]. The method of claim 13, wherein the animal cells comprise:

(i) recombinant cells; or

(ii) stem cells, optionallywherein the animal cells comprise myoblasts and/or myocytes; or

(iii) adipocytes and/or fibroblasts.

[Claim 16]. The method of claim 13, 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 wherein the scaffold comprises a PHA polymer, optionally wherein:

(i) the PHA polymer comprises PHB; and/or

(ii) the PHA polymer is derived from a chemoautotrophic microorganism.

[Claim 17]. The media supplement according to claim 10, where the supplement is formulated for use as an animal cell culture media supplement.