PELLETS USED IN CELL CULTURE AND METHODS OF MAKING THEREOF

CROSS-REFERENCE

[0001] This application claims the benefit under 35 U.S.C. § 119(e) of U.S. Provisional Application no. 62/269,031, filed 17 December, 2015. The entire content of the aforementioned application is incorporated by reference herein.

FIELD OF THE INVENTION

[0002] The present invention relates to pelletized dry cell culture media, feeds, supplements, concentrates or media buffers useful in culturing cells and other such applications. The invention relates to processes for preparing such pelletized compositions and methods to tune the pellet to a desired particle size. The invention also relates to the use of such pellet preparations to produce proteins and polypeptides, and to increase cell growth and protein titers thereby.

SUMMARY

[0003] A first aspect of the invention is directed to a method of making a pelletized cell culture medium, the method comprising: a) subjecting a first dry powder to suspension in an upwardly moving column of a gas in a fluid bed apparatus, and to spinning in a disc rotor; b) introducing a solvent and/or a second dry powder into the fluid bed apparatus at step (a), such that the pellet is formed; and c) drying the pellet, wherein the first dry powder, the second dry powder, or the solvent comprises a binder, an excipient, or both.

[0003a] A second aspect of the invention is directed to a method of making a pelletized base powder module, the method comprising: a) subjecting a first dry powder to suspension in an upwardly moving column of a gas in a fluid bed apparatus, and to spinning in a disc rotor; b) introducing a solvent and optionally, a second dry powder into the fluid bed apparatus at step (a), such that the pellet of the based powder module is formed; and c) drying the pellet, wherein the first dry powder, the second dry powder, or the solvent comprises a binder, an excipient, or both; optionally wherein the module is selected from the group consisting of one or more water soluble vitamins, one or more acid soluble vitamins, one or more neutral soluble vitamins, one or more acid soluble amino acids, one or more base soluble amino acids, one or more neutral water soluble amino acids, one or more water soluble, inorganic salts, one or more inorganic, acid soluble salts, one or more sugars, one or more acid soluble, trace elements, one or more alcohol soluble polyamines, one or more alcohol soluble lipids, and one or more buffer salts; and or

optionally wherein the water soluble or acid or base or neutral soluble vitamin module, the water soluble or acid or base or neutral soluble amino acid module, or the water soluble or acid or base or neutral soluble salts module comprises at least one water insoluble excipient or water insoluble binder or both.

[0003b] A third aspect of the invention is directed to a method of producing a nutritive medium pellet, a nutritive medium supplement pellet, a nutritive medium subgroup pellet or a buffer pellet, the method comprising: subjecting a dry powder medium, supplement, medium subgroup, or medium buffer with a solvent and/or the powder and forming a pellet using a rotating disk in a fluid bed, wherein the pellet comprises a binder or excipient; optionally wherein the binder or excipient is sprayed in through the solvent, or is blended into the dry powder; and/or optionally wherein said dry powder is selected from the group consisting of one or more water soluble groups, one or more base soluble groups, one or more acid soluble groups, one or more acid soluble reactive groups, one or more alcohol soluble groups, one or more alcohol soluble reactive groups and one or more pH modifier groups; and/or wherein the water soluble group is selected from the group consisting of vitamins, bulk inorganic salts and sugars; and/or wherein the sugar is D-glucose.

[0003c] A fourth aspect of the invention is directed to the use of the pellets obtained from the methods as disclosed herein for culturing a cell; optionally wherein the cell is selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell is used for the cultivation of a virus or a viral particle; or optionally wherein the cell is an animal cell; or optionally wherein the cell is an mammalian cell, further optionally wherein the mammalian cell is selected from the group consisting of CHO, BHK, HEK, 293, VERO, etc.

[0003d] A fifth aspect of the invention is directed to a method of culturing a cell in a liquid reconstituted from the pellet as disclosed herein comprising: i) reconstituting the pellet in a suitable liquid or buffer; wherein said pellet is a cell culture medium, feed, supplement or concentrate; and ii) culturing the cell in the reconstituted liquid under conditions favorable for the growth of the cell; optionally wherein the cell is selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell is used for the cultivation of a virus or a viral particle; and/or optionally wherein the cell culture is used to produce increased amount of a polypeptide, further optionally wherein the polypeptide is a recombinant polypeptide; and/or wherein the culturing increases product production, increasing cell growth, as compared to a culture with liquid media not made from pellets.

[0003e] A sixth aspect of the invention is directed to a kit comprising: i) a first container comprising one or more pellets according to claim 12; ii) instructions for using the pellet.

[0003f] A seventh aspect of the invention is directed to a system comprising a liquid medium reconstituted from a pellet according to claim 12 and a cell; optionally wherein the cell is selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell is used for the cultivation of a virus or a viral particle; and/or optionally wherein the reconstituted liquid medium is used to cultivate a cell that produces a recombinant polypeptide, a virus, a secreted protein, or a cell either in suspension or an attached cell.

[0004] In one example, the first dry powder of step (a) may be pre-wetted, and optionally, no solvent may be introduced in step (b).

[0005] In some examples, the first and second dry powders can be the same, and in other examples, the first and second dry powders can be different.

[0006] In a particular example, the first dry powder may be selected from the group consisting of a basal media powder, a complete media powder, a feed, a supplement, a media or feed concentrate and an amino acid mixture that can support the cultivation of a cell in culture. In another example, the second dry powder may be selected from the group consisting of a basal media powder, a complete media powder, a

feed, a supplement, a media or feed concentrate and an amino acid mixture that can support the cultivation of a cell in culture.

[0007] A second example of the disclosure provides binders or excipients or both, that are present either in the first powder, the second powder, in the solvent or in any and are used in the methods described. In another example the binder or the excipient may be selected from the group consisting of a sugar, a natural substance, a synthetic substance and a semisynthetic substance. In a particular example, the natural substance may be for example, microcrystalline cellulose.

[0008] In a particular example the disclosure provides sugars, that are present either in the first powder, the second powder, in the solvent or in any and are used in the methods described; and the sugar may be selected from the group consisting of glucose, sucrose, trehelose, a monosaccharide, a disaccharide and an oligosaccharide. In a further example the sugar may be glucose, and the glucose in the pellet may be at a concentration of from 0.1 to 100% of the pellet composition. In a particular example, the sugar comprises D-glucose.

[0009] In one example, the disclosure provides vitamins that are present either in the first powder, the second powder, in the solvent or in any, and are used in the methods described. In a particular example, the vitamins are selected from one or more of vitamin B12, biotin, choline, folic acid, niacinamide, pyridoxine, riboflavin, thiamine, ascorbic acid, para-aminobenzoic acid (PABA), etc.

[0010] In another example the disclosure provides salts that may be present either in the first powder, the second powder, or in the solvent and are used in the methods described. In one example, the salts are selected from one or more of buffer salts, iron, zinc, calcium, copper, magnesium, manganese, ammonium, vanadium salts, etc.

[0011] In yet another example, the disclosure provides amino acids that are present either in the first powder, the second powder, in the solvent or in any and are used in the methods described. In one example, amino acids are selected from one or more of the well-known twenty amino acids, their salts or derivatives thereof. In another example, the amino acids are selected one or more of glycine, alanine, arginine, aspartic acid, glutamic acid, histidine, isoleucine, methionine, phenylalanine, proline, hydroxyproline, serine, threonine, tryptophan, valine, tyrosine, cysteine and lysine.

[0012] In yet another example, the disclosure provides binders that are present either in the first powder, the second powder, in the solvent or in any and are used in the methods described. In some examples, binders or excipients may be used interchangeably or together throughout the specification. In one example, the binders or excipients are selected from the group consisting of a sugar, a natural substance, a synthetic substance and a semisynthetic substance, microcrystalline cellulose, glucose, sucrose, trehelose, a monosaccharide, a disaccharide and an oligosaccharide, excipients and/or disintegrants. In one particular example, the binders are microcrystalline cellulose and glucose. In another example the percent composition of binder(s) in the pellet may be from about 0.1 to about 100%. In a particular example, the % composition of binder(s) in the pellet may be from about 30 to about 60%.

[0013] A third example of the disclosure provides methods of making the pellet of various sizes; in some instances, the pellet has a size of about 0.05mm to 7 mm. In a particular example the disclosure provides pellets having a size of about 0.05 mm to about 0.5mm, or about 0.05 mm to about 1mm, or about 0.05 mm to about 2mm, or about 0.05 mm to about 3mm, or about 0.05 mm to about 4mm, or about 0.05 mm to about 5mm, or about 0.05 mm to about 6mm, or about 0.05 mm to about 0.1mm, or about 0.05 mm to about 0.2mm, or about 0.05 mm to about 0.3mm, or about 0.05 mm to about 0.4mm, or about 0.1mm to about 1mm, or about 0.1mm to about 2mm, or about 0.1mm to about 3mm, or about 0.1mm to about 4mm, or about 0.1mm to about 5mm, or about 0.1mm to about 6mm, or about 0.5mm to about 1mm, or about 0.5mm to about 2mm, or about 0.5mm to about 3mm, or about 0.5mm to about 4mm, or about 0.5mm to about 5mm, or about 0.5mm to about 6mm, or about 0.5mm to about 7mm, or about 1mm to about 2mm, or about 1 mm to about 3mm, or about 1 mm to about 4mm, or about 1 mm to about 5mm, or about 1 mm to about 6mm, or about 1 mm to about 7mm. In a particular example, the disclosure provides pellet preparations mostly having a size pellet size may be larger than about 0.1 mm, or larger than about 0.2 mm, or larger than about 0.3 mm, or larger than about 0.4mm, or larger than about 0.5 mm, or larger than about 0.6 mm, or larger than about 0.7 mm, or larger than about 0.8 mm, or larger than about 0.9mm, or larger than about 1mm, or larger than about 2mm.

[0014] In other examples of making the pellets of the disclosure, the methods may be directed to the use of disc rotors in the process chamber that spin at variable speeds.

[0015] In other examples, the solvent introduced into step (a) when subjecting a first dry powder to suspension in an upwardly moving column of a gas in a fluid bed apparatus, and to spinning in a disc

rotor, the solvent is introduced through a tangential spray, a top spray, or a bottom spray. In a further example, the rate of the solvent introduced into step (a) may be between about 1 gm/min up to about 30 gm/ min. In a particular example, rate of the solvent introduced into step (a) may be about 5 gm/min.

[0016] A fifth example of the disclosure provides methods of making the pellets, wherein the temperature of the inlet gas may be at about 20° C to 30° C. In a particular example, the temperature of the inlet gas may be at about 25° C. In a further example, the pellet temperature may be maintained at about 20° C to 30° C. In yet another example, the temperature for drying the pellet may be about 50° C to 60° C. And in an example, the pellet may be dried to a moisture content of about 0.5% to 3% .

[0017] A sixth example of the disclosure provides method sof making a pelletized base powder modules, the method comprising: a) subjecting a first dry powder to suspension in an upwardly moving column of a gas in a fluid bed apparatus, and to spinning in a disc rotor; b) introducing a solvent and optionally, a second dry powder into the fluid bed apparatus at step (a), such that the pellet of the base powder module may be formed; and c) drying the pellet, wherein the first dry powder, the second dry powder, or the solvent comprises a binder, an excipient, or both.

[0018] A further example of the disclosure provides method of making a pelletized base powder module wherein the module may be selected from the group consisting of one or more water soluble vitamins, one or more acid soluble vitamins, one or more neutral soluble vitamins, one or more acid soluble amino acids, one or more based soluble amino acids, one or more neutral water soluble amino acids, one or more water soluble, inorganic salts, one or more inorganic, acid soluble salts, one or more sugars, one or more acid soluble, trace elements, one or more alcohol soluble polyamines, one or more alcohol soluble lipids, and one or more buffer salt. In one example of the disclosure, the water soluble or acid or base or neutral soluble vitamin module, the water soluble or acid or base or neutral soluble amino acid module, or the water soluble or acid or base or neutral soluble salts module comprises at least one water insoluble excipient or water insoluble binder or both.

[0019] In another example, the pelletized base powder module may be selected from the group consisting of one or more water soluble groups, one or more base soluble groups, one or more acid soluble groups, one or more acid soluble reactive groups, one or more alcohol soluble groups, one or more alcohol soluble reactive groups and one or more pH modifier groups. In a particular example, the water soluble group may be selected from the group consisting of vitamins, bulk inorganic salts and sugars.

[0020] A seventh example of the disclosure provides pellets obtained by or obtainable by any one of the methods described above.

[0021] In an eighth example, the disclosure may be directed to a pelletized cell culture medium, feed, supplement or additive comprising one or more amino acids, one or more binders or excipients and one or more trace components.

[0022] In one example, the pelletized cell culture medium, feed, supplement or additive further comprises vitamins. In a particular example, the vitamins are selected from one or more of vitamin B12, biotin, choline, folic acid, niacinamide, pyridoxine, riboflavin, thiamine, ascorbic acid, para-aminobenzoic acid (PABA), etc.

[0023] In another example, the pelletized cell culture medium, feed, supplement or additive further comprises salts. In one example, the salts are selected from one or more of buffer salts, iron, zinc, calcium, copper, magnesium, manganese, ammonium, vanadium salts, etc.

[0024] In yet another example, the pelletized cell culture medium, feed, supplement or additive comprises amino acids selected from one or more of the well-known twenty amino acids, their salts or derivatives thereof. In one example, the amino acids are selected one or more of glycine, alanine, arginine, aspartic acid, glutamic acid, histidine, isoleucine, methionine, phenylalanine, proline, hydroxyproline, serine, threonine, tryptophan, valine, tyrosine, cysteine and lysine.

[0025] In an ninth example, the disclosure may be directed to a pelletized cell culture medium, feed, supplement or additive of claim comprising binders or excipients, which may be used interchangeably or together throughout the specification. In one example, the binders or excipients are selected from the group consisting of a sugar, a natural substance, a synthetic substance and a semisynthetic substance, microcrystalline cellulose, glucose, sucrose, trehelose, a monosaccharide, a disaccharide and an oligosaccharide, excipients and/or disintegrants. In one particular example, the binders are microcrystalline cellulose and glucose. In another example the % composition of binder(s) in the pellet may be from about 0.1 to about 100%. In a particular example, the % composition of binder(s) in the pellet may be from about 30 to about 60%.

[0026] In an tenth example, the composition described throughout the disclosure may be directed to a pelletized cell culture medium, feed, supplement or additive of claim comprising one or more of 25-

40% amino acids, 20-65% binders, 1-5% vitamins, 2-10% salts, 0.01-0.05% trace components. In a particular example, the pellet compositions comprises one or more of 31-32% amino acids, 59-60% binders, 25% vitamins, 6-7% salts, 0.01-0.05% trace components. In a preferred composition the binder is D-glucose.

[0027] In an eleventh example, the disclosure provides methods of producing a nutritive medium pellet, a nutritive medium supplement pellet, a nutritive medium subgroup pellet or a buffer pellet, the method comprising: agglomerating a dry powder medium, supplement, medium subgroup, or medium buffer with a solvent and forming a pellet using a rotating disk in a fluid bed, wherein the pellet comprises a binder or excipient.

[0028] Another example of the disclosure provides methods of producing a nutritive medium pellet, a nutritive medium supplement pellet, a nutritive medium subgroup pellet or a buffer pellet, wherein the binder or excipient may be sprayed in through the solvent, or may be blended into the dry powder before pelletization. In a particular example, the binder may be a sugar, and in a preferred example, the sugar comprises D-glucose. The percent of binder, for e.g. glucose can be varied to achieve differential pellet size, or variable bulk density, or variable angle of repose, or variable stickiness or dryness. For example, in some examples, the amount could be varied from, 0-60%, or 10-16%, or 20-60% , preferably 30-40%, 40-50%, 30-35%, 30-45%, 40-50%, 40-55% and so on, to achieve the desired characteristics.

[0029] In another example, the disclosure may be directed to pellets obtained by, or obtainable by any one of the methods above, in all variations described above.

[0030] In a twelfth example, the disclosure provides methods of making a pellet for culturing cells comprising: preparing a microsuspension of a dry powder medium or module; extruding the microsuspension through an extruding device to form droplets; drying the droplets to pellets. An example may be directed to the pellets obtained thereby.

[0031] A thirteenth example may be directed to use of the pellets obtained by the methods of any of the above claims for culturing a cell. In an example, the cell may be selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell may be used for the cultivation of a virus or a viral particle. In a particular example, the cell may be an animal cell. In yet another example, the cell may be a mammalian cell. In a particular example, the mammalian cell may be selected from the group consisting of CHO, BHK, HEK, 293, VERO, etc.

[0032] In a fourteenth example, the disclosure provides methods of culturing a cell in a liquid reconstituted from any of the pellets obtained or obtainable by the methods described above, the method comprising: i) reconstituting the pellet in a suitable liquid or buffer; wherein said pellet may be a cell culture medium, feed, supplement or concentrate; ii) culturing the cell may be the reconstituted liquid under conditions favorable for the growth of the cell. In one example, the cell may be selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell may be used for the cultivation of a virus or a viral particle. In another example the culturing may be done to produce increased amount of a polypeptide. In a further example, the polypeptide may be a recombinant polypeptide. In another example, the culturing increases product production, increasing cell growth, as compared to a culture with liquid media not made from pellets.

[0033] In a fourteenth example, the disclosure provides kits comprising: i) a first container comprising a pellet obtained by, or obtainable by the methods described above, wherein said pellet may be a cell culture medium, feed, supplement or concentrate; and ii) instructions for using the pellet. In other examples, the kits may further comprise additional containers, each of which may comprise, cells for culturing, buffers, and other components including other media (liquid or dry power, AGT format), additives, feeds, antibiotics, etc.

[0034] In a fifteenth example, the disclosure provides systems comprising a liquid medium / feed / supplement/ additive reconstituted from a pellet as described above, obtainable by any one of the methods described above, and a cell. In one example, the cell may be selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell may be used for the cultivation of a virus or a viral particle. In another example, the reconstituted liquid medium / feed / supplement/ additive from the pellet may be used to cultivate a cell that produces a recombinant polypeptide, a virus, a secreted protein, or a cell either in suspension or an attached cell.

INCORPORATION BY REFERENCE

[0035] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference. In case of conflict, the specification herein, including definitions, will control. Citation or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention.

CLAIMS

1. A method of making a pelletized cell culture medium, the method comprising:

a) subjecting a first dry powder to suspension in an upwardly moving column of a gas in a fluid bed apparatus, and to spinning in a disc rotor;

b) introducing a solvent and/or a second dry powder into the fluid bed apparatus at step (a), such that the pellet is formed; and

c) drying the pellet,

wherein the first dry powder, the second dry powder, or the solvent comprises a binder, an excipient, or both.

2. The method of making pelletized cell culture medium of claim 1, wherein the first dry powder of step (a) is pre-wetted, and optionally, no solvent is introduced in step (b); and/or wherein the first and second dry powders are the same or wherein the first and second dry powders are different.

3. The method of making pelletized cell culture medium of claim 1 or claim 2 , wherein the first dry powder is selected from the group consisting of a basal media powder, a complete media powder, a feed, a supplement, a media or feed concentrate and an amino acid mixture that can support the cultivation of a cell in culture; and/or

wherein the second dry powder is selected from the group consisting of a basal media powder, a complete media powder, a feed, a supplement, a media or feed concentrate and an amino acid mixture that can support the cultivation of a cell in culture.

4. The method of making pelletized cell culture medium of any preceding claims, wherein the binder or the excipient is selected from the group consisting of a sugar, a natural substance, a synthetic substance and a semisynthetic substance;

optionally wherein the natural substance is a microcrystalline cellulose; or

optionally wherein the sugar is selected from the group consisting of glucose, sucrose, trehelose, a monosaccharide, a disaccharide and an oligosaccharide; further optionally wherein the % composition of glucose in the pellet is from about 0.1 to about 100%.

5. The method of making the pelletized cell culture medium of any preceding claims, wherein said pellet size is about 0.05mm to 7 mm; optionally wherein said pellet size is about 0.05 mm to about 0.5mm, or about 0.05 mm to about 1mm, or about 0.05 mm to about 2mm, or about 0.05 mm to

about 3mm, or about 0.05 mm to about 4mm, or about 0.05 mm to about 5mm, or about 0.05 mm to about 6mm, or about 0.05 mm to about 0.1mm, or about 0.05 mm to about 0.2mm, or about 0.05 mm to about 0.3mm, or about 0.05 mm to about 0.4mm, or about 0.1mm to about 1mm, or about 0.1mm to about 2mm, or about 0.1mm to about 3mm, or about 0.1mm to about 4mm, or about 0.1mm to about 5mm, or about 0.1mm to about 6mm, or about 0.5mm to about 1mm, or about 0.5mm to about 2mm, or about 0.5mm to about 3mm, or about 0.5mm to about 4mm, or about 0.5mm to about 5mm, or about 0.5mm to about 6mm, or about 0.5mm to about 7mm, or about 1mm to about 2mm, or about 1 mm to about 3mm, or about 1 mm to about 4mm, or about 1 mm to about 5mm, or about 1 mm to about 6mm, or about 1 mm to about 7mm; and/or

wherein said pellet size is larger than about 0.1 mm, or larger than about 0.2 mm, or larger than about 0.3 mm, or larger than about 0.4mm, or larger than about 0.5 mm, or larger than about 0.6 mm, or larger than about 0.7 mm, or larger than about 0.8 mm, or larger than about 0.9mm, or larger than about 1mm, or larger than about 2mm.

6. The method of making the pelletized cell culture medium of medium of any preceding claim, wherein, the disc rotor spins at variable speeds; and/or

wherein the pellet is dried to a moisture content of about 0.5% to 3%.

7. The method of making the pelletized cell culture medium of medium of any of the above claims, wherein the solvent is introduced into step (a) through a tangential spray, a top spray, or a bottom spray.

8. The method of making the pelletized cell culture medium of medium of any of the above claims, wherein the rate of the solvent introduced into step (a) is between about 1 gm/min up to about 30 gm/ min;

optionally wherein the rate of the solvent introduced into step (a) is about 5 gm/min.

9. The method of making the pelletized cell culture medium of medium of any preceding claims, wherein a temperature of an inlet gas is at about 20° C to 30° C, optionally wherein the temperature of the inlet gas is at about 25° C; and/or

wherein the pellet temperature is maintained at about 20° C to 30° C; and/or

wherein the temperature for drying the pellet is about 50° C to 60° C.

10. A method of making a pelletized base powder module, the method comprising:

a) subjecting a first dry powder to suspension in an upwardly moving column of a gas in a fluid bed apparatus, and to spinning in a disc rotor;

b) introducing a solvent and optionally, a second dry powder into the fluid bed apparatus at step (a), such that the pellet of the based powder module is formed; and

c) drying the pellet,

wherein the first dry powder, the second dry powder, or the solvent comprises a binder, an excipient, or both;

optionally wherein the module is selected from the group consisting of one or more water soluble vitamins, one or more acid soluble vitamins, one or more neutral soluble vitamins, one or more acid soluble amino acids, one or more base soluble amino acids, one or more neutral water soluble amino acids, one or more water soluble, inorganic salts, one or more inorganic, acid soluble salts, one or more sugars, one or more acid soluble, trace elements, one or more alcohol soluble polyamines, one or more alcohol soluble lipids, and one or more buffer salts; and or

optionally wherein the water soluble or acid or base or neutral soluble vitamin module, the water soluble or acid or base or neutral soluble amino acid module, or the water soluble or acid or base or neutral soluble salts module comprises at least one water insoluble excipient or water insoluble binder or both.

11. A method of producing a nutritive medium pellet, a nutritive medium supplement pellet, a nutritive medium subgroup pellet or a buffer pellet, the method comprising: subjecting a dry powder medium, supplement, medium subgroup, or medium buffer with a solvent and/or the powder and forming a pellet using a rotating disk in a fluid bed, wherein the pellet comprises a binder or excipient;

optionally wherein the binder or excipient is sprayed in through the solvent, or is blended into the dry powder; and/or

optionally wherein said dry powder is selected from the group consisting of one or more water soluble groups, one or more base soluble groups, one or more acid soluble groups, one or more acid soluble reactive groups, one or more alcohol soluble groups, one or more alcohol soluble reactive groups and one or more pH modifier groups; and/or

wherein the water soluble group is selected from the group consisting of vitamins, bulk inorganic salts and sugars; and/or

wherein the sugar is D-glucose.

12. The pellets obtained by the method of any preceding claim.

13. Use of the pellets obtained from the methods of any of claims 1 to 11 for culturing a cell; optionally wherein the cell is selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell is used for the cultivation of a virus or a viral particle; or

optionally wherein the cell is an animal cell; or

optionally wherein the cell is an mammalian cell, further optionally wherein the mammalian cell is selected from the group consisting of CHO, BHK, HEK, 293, VERO, etc.

14. A method of culturing a cell in a liquid reconstituted from the pellet of claims 12 comprising:

i) reconstituting the pellet in a suitable liquid or buffer; wherein said pellet is a cell culture medium, feed, supplement or concentrate; and

ii) culturing the cell in the reconstituted liquid under conditions favorable for the growth of the cell;

optionally wherein the cell is selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell is used for the cultivation of a virus or a viral particle; and/or

optionally wherein the cell culture is used to produce increased amount of a polypeptide, further optionally wherein the polypeptide is a recombinant polypeptide; and/or

wherein the culturing increases product production, increasing cell growth, as compared to a culture with liquid media not made from pellets.

15. A kit comprising:

i) a first container comprising one or more pellets according to claim 12;

ii) instructions for using the pellet.

16. A system comprising a liquid medium reconstituted from a pellet according to claim 12 and a cell;

optionally wherein the cell is selected from the group consisting of eukaryotic, prokaryotic, animal, plant, fungal, algal, insect, yeast, or wherein the cell is used for the cultivation of a virus or a viral particle; and/or

optionally wherein the reconstituted liquid medium is used to cultivate a cell that produces a recombinant polypeptide, a virus, a secreted protein, or a cell either in suspension or an attached cell.