[22] The method according to any one of [15] to [21] above, wherein the algae are microalgae belonging to *Chlorella* sp..

[23] The method according to any one of [15] to [22] above, wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation or a resin solid acid catalyst obtained by introducing a sulfo group into a phenol resin for sulfonation.

[24] The method according to any one of [15] to [23] above, wherein step (1) is carried out at 70°C to 150°C.

[25] The method according to any one of [15] to [24] above, wherein step (1) is carried out for 2 hours to 24 hours.

[26] The method according to any one of [15] to [25] above, wherein step (1) is carried out under pressure.

[0018a] A method for producing a composition for culturing animal cells, comprising the following steps:

(1) mixing algae with a solid acid catalyst and heating the mixture to obtain an algae extract; and

(2) adding the algae extract to animal cell culturing medium and adjusting the concentration of the algae extract,

wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation.

[0018b] A recycling culture method for algae and animal cells, comprising:

(i) culturing algae using a waste medium obtained from culturing animal cells (first waste medium);

(ii) collecting the algae and mixing and heating with a solid acid catalyst to obtain an algae extract;

(iii) adding the algae extract to a waste medium obtained from culturing the algae of step (i) (second waste medium) and adjusting the concentration of the algae extract to produce a composition for culturing animal cells; and

(iv) using the composition for culturing animal cells, for culturing of animal cells,

wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation.

[0018c] A method for producing an algae extract for use in preparation of a composition for culturing animal cells, comprising:

(1) mixing algae with a solid acid catalyst and heating the mixture to obtain an algae extract,

wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation.

[ADVANTAGEOUS EFFECTS OF INVENTION]

[0019]

According to the method of the invention, nutrients necessary for cell culturing can be easily and economically extracted from microalgae, and it is thereby possible to provide a novel cell culturing system that reduces environmental load.

BRIEF DESCRIPTION OF DRAWINGS

[0020]

Fig. 1 shows relative viable cell counts of primary bovine myoblasts cultured using glucose/serum-containing and -free DMEM.

Fig. 2 shows relative viable cell counts of primary bovine myoblasts cultured using glucose/serum-free DMEM with addition of algae extract obtained under different extraction conditions.

Fig. 3 shows relative viable cell counts of primary bovine myoblasts cultured using glucose/serum-free DMEM with addition of algae extract obtained under different extraction conditions.

Fig. 4 shows microscope images of primary bovine myoblasts cultured in different media.

Fig. 5 shows microscope images of primary bovine myoblasts cultured in different media.

Fig. 6 shows relative viable cell counts of primary bovine myoblasts cultured using glucose/serum-free DMEM with addition of algae extract obtained under different extraction conditions.

Fig. 7A shows animal muscle cell cultures obtained using solid acid-treated algae (*Chlorococcum*) extract (photomicrographs).

CLAIMS

[Claim 1]

A method for producing a composition for culturing animal cells, comprising the following steps:

(1) mixing algae with a solid acid catalyst and heating the mixture to obtain an algae extract; and

(2) adding the algae extract to animal cell culturing medium and adjusting the concentration of the algae extract,

wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation.

[Claim 2]

The method according to claim 1, wherein the animal cell culturing medium is substantially free of serum and/or added factors for serum-free culture.

[Claim 3]

The method according to claim 1 or 2, wherein the animal cell culturing medium is substantially free of glucose.

[Claim 4]

The method according to any one of claims 1 to 3, wherein the animal cell culturing medium is substantially free of one or more amino acids selected from the group consisting of L-glutamine, L-arginine, L-cystine, glycine, L-histidine, L-isoleucine, L-leucine, L-lysine, L-methionine, L-phenylalanine, L-serine, L-threonine, L-tryptophan, L-tyrosine and L-valine.

[Claim 5]

The method according to any one of claims 1 to 4, wherein the animal cell culturing medium is substantially free of vitamins.

[Claim 6]

The method according to any one of claims 1 to 5, wherein the animal cell culturing medium is an inorganic salt medium.

[Claim 7]

The method according to any one of claims 1 to 6, wherein the algae are microalgae.

[Claim 8]

The method according to any one of claims 1 to 7, wherein the algae are microalgae belonging to *Chlorella* sp..

[Claim 9]

The method according to any one of claims 1 to 7, wherein the algae are microalgae belonging to the order *Chlorococcales*.

[Claim 10]

The method according to any one of claims 1 to 9, wherein step (1) is carried out at 60°C to 200°C.

[Claim 11]

The method according to any one of claims 1 to 10, wherein step (1) is carried out for 2 hours to 24 hours.

[Claim 12]

A composition for culturing animal cells which is obtained by the method according to any one of claims 1 to 11.

[Claim 13]

A method for culturing animal cells, using a composition for culturing animal cells which is obtained by the method according to any one of claims 1 to 11.

[Claim 14]

A recycling culture method for algae and animal cells, comprising:

(i) culturing algae using a waste medium obtained from culturing animal cells (first waste medium);

(ii) collecting the algae and mixing and heating with a solid acid catalyst to obtain an algae extract;

(iii) adding the algae extract to a waste medium obtained from culturing the algae of step (i) (second waste medium) and adjusting the concentration of the algae extract to produce a composition for culturing animal cells; and

(iv) using the composition for culturing animal cells, for culturing of animal cells,

wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation.

[Claim 15]

A method for producing an algae extract for use in preparation of a composition for culturing animal cells, comprising:

(1) mixing algae with a solid acid catalyst and heating the mixture to obtain an algae extract,

wherein the solid acid catalyst is a woody solid acid catalyst obtained by introducing a sulfo group into a carbide derived from a wood-based raw material for sulfonation.