Kasinath et al. (Enzyme and Microbial Technology, volume 32, issue 1, 2 January 2003, pages 167-173) disclose certain aspects of decolourization of synthetic dyes by Irpex lacteus in liquid cultures and packed-bed bioreactor.

Chander et al. (Journal of Industrial Microbiology and Biotechnology, Volume 31, Issue 2, 1 February 2004, Pages 94–97) disclose certain aspects of biodecolourisation of some industrial dyes by white-rot fungi.

Document CN113583882 discloses a certain method for preparing fungal mycelium for use in replacement of proteinaceous meat preparation, comprising carrying out liquid mixed fermentation on the edible fungi and the monascus.

Document JPH1075739 discloses a certain method for producing a mineral-containing mushroom mycelium food material, wherein liquid culture of a mushroom mycelium is performed using a medium comprising a food by-product containing a mineral component.

Summary of the invention

In one aspect, provided herein is a method for the production of a composition comprising an edible fungal mycelium biomass, characterized in that said composition has a stable and homogenous colour, the method comprising the steps of:

(a) providing a growth medium;

(b) providing at least one edible fungal strain that produces mycelium;

(c) cultivating the at least one edible fungal strain in the growth medium until deceleration phase is reached;

(d) supplementing the growth medium with at least one colourant, wherein the supplementing is done in the deceleration phase;

(e) further cultivating the at least one fungal strain in the growth medium supplemented with the at least one colourant; and

(f) harvesting from the growth medium the composition comprising the edible fungal mycelium biomass, characterized in that said composition has the stable and homogenous colour

due to the at least one colourant supplemented in step (d),

wherein supplementing the at least one colourant in the deceleration phase results in a more stable and homogenous colouration of the composition relative to supplementing the at least one colourant at a time point other than the deceleration phase.

In another aspect, provided herein is a composition comprising an edible fungal mycelium biomass, wherein the composition is obtained according to a method comprising the steps of:

(a) providing a growth medium;

(b) providing at least one edible fungal strain that produces a mycelium;

(c) cultivating the at least one edible fungal strain in the growth medium until deceleration phase is reached;

(d) supplementing the growth medium with at least one colourant, wherein the supplementing is done in the deceleration phase;

(e) further cultivating the at least one fungal strain in the growth medium supplemented with the at least one colourant; and

(f) harvesting from the growth medium the composition comprising the edible fungal mycelium biomass, characterized in that said composition has a stable and homogenous colour due to the at least one colourant supplemented in step (d),

wherein supplementing the at least one colourant in the deceleration phase results in a more stable and homogenous colouration of the composition relative to supplementing the at least one colourant at a time point other than the deceleration phase; and

optionally wherein the composition comprises:

at least 15 mg or 30 mg of the at least one colourant per 100 g of the fungal mycelium biomass, and/or

at least 0.01-5 wt. %, 0.1-5 wt. %, 0.1-2.5 wt. %, 0.1-1 wt. %, or 0.1-0.5 wt. % of the at least one colourant.

In another aspect, provided herein is a food product comprising the composition of claim 26, optionally wherein the food product comprises an additive selected from preservatives, antioxidants and acidity regulators, thickeners, stabilisers and emulsifiers, pH regulators and anti-caking agents, flavor enhancers, improving agents, stabilizers, thickening agents, colours, and/or glazing agents and sweeteners, or

wherein the food product is a beverage, optionally a Kombucha, or

wherein the food product is an edible meat substitute product, an edible dairy substitute product or an edible fish analogue or seafood product.

In another aspect, provided herein is a supernatant, obtained according to a method comprising the steps of:

(a) providing a growth medium;

(b) providing at least one edible fungal strain that produces a mycelium;

(c) cultivating the at least one edible fungal strain in the growth medium until deceleration phase is reached;
(d) supplementing the growth medium with at least one colourant, wherein the supplementing is done in the deceleration phase;
(e) further cultivating the at least one fungal strain in the growth medium supplemented with the at least one colourant; and
(f) harvesting from the growth medium the composition comprising the edible fungal mycelium biomass, characterized in that said composition has a stable and homogenous colour due to the at least one colourant supplemented in step (d); and
(g) recovering the supernatant from the composition harvested in step (f),
wherein supplementing the at least one colourant in the deceleration phase results in a more stable and homogenous colouration of the composition relative to supplementing the at least one colourant at a time point other than the deceleration phase, and
optionally wherein the supernatant comprises at least 0.1 wt. % of filamentous fungi.

Desirable are methods of producing the fungal biomass or a composition comprising the fungal biomass characterized in that said biomass or said composition has a particular colour. Particularly desirable are the methods wherein the produced composition is characterized by intense and/or durable colour which is resistant to washing and/or bleaching. Further particularly desirable are methods wherein the degradation of the component that is responsible for the particular colour of the mycelium by said mycelium is avoided.

As apparent to the skilled person, said methods are challenging to implement. The use of mycelium to treat industrial effluents, and thereby e.g., degrade the dyes comprised therein, for example synthetic dyes, is well known in the art. Therefore, one of challenges is to overcome the intrinsic ability of fungal mycelium to degrade a colourant it is exposed to.

Thus, it was an objective technical problem of the present invention to provide improved methods for the production of coloured biomass.

The objective technical problem is solved by the embodiments described herein and as characterized in the claims.

The present inventors have shown that if an additive that gives rise to the colour of the composition is added to the growing (cultured) fungal biomass at a particular time point during its growth/culture or for a