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Figure 2

(57) Abstract: The invention relates to plant-based simulated poached egg whites, egg yolks, methods of producing thereof and an assembled plant-based simulated poached egg product which can be in a chilled form or in a frozen form, and kits comprising same. In one embodiment, the vegan simulated poached egg yolk comprises water, plant protein, pregelatinized starch, black salt, guar gum, mustard paste, miso, vegetable oil, natural food coloring, lecithin and calcium lactate, and the vegan simulated poached egg white comprises rice flour, black salt, water, soy milk, gum, and gelling agent comprising calcium sulphate and sodium alginate. In another embodiment, the vegan simulated poached egg yolk comprises water, plant protein, pregelatinized starch, black salt, guar gum, mustard paste, miso, vegetable oil and natural food coloring, and the vegan simulated egg white comprises rice flour, black salt, water, tofu, gum, Konnyaku and plant protein.

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VEGAN PLANT-BASED POACHED EGG

FIELD OF THE INVENTION

The present invention is directed to plant-based simulated poached egg whites, poached egg yolks, an assembled plant-based simulated poached egg product which can be in a chilled form or in a frozen form, methods of producing such compositions and kits comprising same.

BACKGROUND OF THE INVENTION

It is well known that some characteristics of natural egg and egg products can cause concern, and otherwise impede the ability for some people to consume food products containing egg. For example, many individuals may be unable to, or would prefer not to consume egg products due to egg allergies, health concerns associated with cholesterol, culinary preferences (such as a Vegetarian or vegan diet), use of antibiotics and hormones during poultry production, and diseases associated with poultry (such as, for example, bird flu). Additionally, the high cost and/or cost fluctuations in the price of eggs and the contamination by salmonella carried by eggs have also been a concern of food manufacturers. In the newer food product group, the nutraceutical and functional food market is one of the fastest-growing food segments. A challenge for those wanting to substitute animal products with, for example, plant-based products is to mimic the characteristics of the animal product while providing a healthier and/or more sustainable simulated version.

In particular, there is a need for simulated egg compositions that will mimic, visually and sensorially, avian eggs, more specifically chicken eggs or their components.

SUMMARY OF THE INVENTION

The present invention is directed to plant-based vegan poached egg white and yolk compositions, simulated vegan poached egg, one of which may be chilled and the other frozen, and methods of producing same.

1. In a first aspect the disclosure provides a plant-based vegan simulated poached egg comprising a vegan simulated poached egg yolk composition and a vegan simulated poached egg white composition, wherein

   a)(i) the vegan simulated poached egg yolk composition comprises the components water, plant protein, pregelatinized starch, black salt, guar gum, mustard paste, miso, vegetable oil, natural food coloring, lecithin and calcium lactate and, optionally, a masking agent and/or a sweetener and/or a natural antimicrobial agent; and

a)(ii) the vegan simulated poached egg white comprises the components rice flour, black salt, water, soy milk, gum, and gelling agent comprising calcium sulphate and sodium alginate; or

b)(i) the vegan simulated poached egg yolk composition comprises the components water, plant protein, pregelatinized starch, black salt, guar gum, mustard paste, miso, vegetable oil and natural food coloring; and

b)(ii) the vegan simulated egg white comprises the components rice flour, black salt, water, tofu, gum, Konnyaku and plant protein.

2. In some embodiments, the plant-based vegan simulated poached egg composition of a) is suitable for freezing, and the plant-based vegan simulated poached egg composition of b) is suitable for chilling.

In some embodiments, the natural food coloring is selected from the group comprising beta-apo-8'-carotenal, beta-carotene and turmeric or any combination thereof. Suitable food coloring also include Fusion Nectarine Orange L-WS, Nat. Carotene Yellow P-WS, and Natural Carotene 1.3% L-WS.

3. In some embodiments, in:

a)(i) the plant protein is selected from the group comprising pea, fava bean, mung bean, chickpea, lentil, lupin, corn and canola protein, preferably pea protein; and

the natural food coloring is selected from the group comprising beta-apo-8'-carotenal, beta-carotene and turmeric or any combination thereof; and

the mustard paste is selected from the group comprising Dijon mustard, English mustard and whole grain mustard, preferably Dijon mustard; and

the vegetable oil is selected from the group comprising canola oil, olive oil, soybean oil and corn oil, preferably canola oil; and in

a)(ii) the gum is selected from the group comprising carrageenan, gellan gum, xanthan gum, locust bean gum, and combinations thereof; or in

b)(i) the plant protein is selected from the group comprising pea, fava bean, mung bean, chickpea, lentil, lupin, corn and canola protein, preferably pea protein; and

the natural food coloring is selected from the group comprising beta-apo-8'-carotenal, beta-carotene and turmeric or any combination thereof; and

the mustard paste is selected from the group comprising Dijon mustard, English mustard and whole grain mustard, preferably Dijon mustard; and

the vegetable oil is selected from the group comprising canola oil, olive oil, soybean oil and corn oil, preferably canola oil; and in

b)(ii) the gum is selected from the group comprising carrageenan, gellan gum, xanthan gum, locust bean gum, and combinations thereof; and

the plant protein is selected from the group fava bean, chickpea, pea, soy, and mung bean proteins, preferably fava bean protein, more preferably fava bean protein concentrate.

4. In some embodiments, in:

a)(i) or b)(i) the plant protein is pea protein, the vegetable oil is canola oil, the pregelatinized starch is potato starch, and the mustard paste is Dijon mustard.

5. In some embodiments, in:

a)(ii) the gum is carrageenan and locust bean gum; or in

b)(ii) the tofu is silken tofu, the gum is carrageenan and the plant protein is fava bean protein.

6. In some embodiments, in:

a)(i) the egg yolk composition comprises plant protein in an amount of 4 -10 wt%, natural food coloring in an amount of 0.5-1.5 wt%, vegetable oil in an amount of about 10-20 wt%, pregelatinized starch in an amount of 1-2 wt%, black salt in an amount of 0.2-0.5 wt%, guar gum in an amount of 0.05-0.3 wt%, mustard paste in an amount of 1-3 wt%, miso in an amount of 1-3.5 wt%, lecithin in an amount of 0.2-0.5 wt%, calcium lactate in an amount of 1-3 wt%, optionally a natural antimicrobial agent in an amount of about 0.2-0.5 wt%, and/or a masking agent in an amount of about 0.2-0.5 wt%, and/or a sweetener in an amount of about 1.0-4.0 wt%, by weight of said poached egg yolk composition, and in

a)(ii) the egg white composition comprises soy milk in an amount of 55-70 wt%, rice flour in an amount of 3-5 wt%, kala namak in an amount of 0.1-1.0 wt%, water in an amount of 15-35 wt%, gelling agents in an amount of 0.5-2.0 wt%, gums in an amount of 0.5-2.0 wt% by weight of said poached egg white composition; or in

b)(i) the egg yolk composition comprises plant protein in an amount of 6 -7 wt%, natural food coloring in an amount of 0.6-1.0 wt%, vegetable oil in an amount of about 20-30 wt%, pregelatinized starch in an amount of 1-2 wt%, black salt in an amount of 0.5-0.6 wt%, guar

gum in an amount of 0.2-0.3 wt%, mustard paste in an amount of 3-4 wt%, miso in an amount of 2-3 wt%, by weight of said poached egg yolk composition, and in

b)(ii) the egg white composition comprises tofu in an amount of 20-30 wt%, plant protein in an amount of 2-5 wt%; rice flour in an amount of 1-6 wt%, kala namak in an amount of 0.1-2 wt%, konnyaku in an amount of 0.05-0.3 wt%, gum in an amount of 0.1-0.8 wt%, by weight of said poached egg white composition.

In some embodiments, the lecithin used in the egg yolk composition is selected from the group comprising soy lecithin, rapeseed lecithin, and sunflower lecithin. Preferably, the lecithin is soy lecithin.

7. In some embodiments, in:

a)(i) the egg yolk composition comprises pea protein in an amount of about 8.7 wt%, natural food coloring in an amount of about 1.0 wt%, canola oil in an amount of about 17.1 wt%, pregelatinized potato starch in an amount of about 1.1 wt%, black salt in an amount of about 0.5 wt%, guar gum in an amount of about 0.2 wt%, mustard paste in an amount of about 1.4 wt%, miso in an amount of about 2.5 wt%, soy lecithin in an amount of about 0.5 wt%, calcium lactate in an amount of about 2.9 wt% and, optionally, a natural antimicrobial agent in an amount of about 0.5 wt%, and/or a masking agent in an amount of about 0.5 wt%, and/or sweetener in an amount of about 1.9%, by weight of said poached egg yolk composition, and in

a)(ii) the egg white composition comprises soy milk in an amount of about 60.1 wt%, water in an amount of about 32.5 wt%, rice flour in an amount of about 4.8 wt%, carrageenan in an amount of about 0.5 wt%, gelling agents in an amount of about 1.0 wt%, kala namak in an amount of about 0.6 wt%, locust bean gum in an amount of about 0.5 wt%, by weight of said poached egg white composition; or in

b)(i) the egg yolk composition comprises pea protein in an amount of about 6.19 wt%, orange food coloring in an amount of about 0.61 wt%, canola oil in an amount of about 20.3 wt%, pregelatinized potato starch in an amount of about 1.29 wt%, black salt in an amount of about 0.51 wt%, guar gum in an amount of about 0.25 wt%, mustard paste in an amount of about 3.61 wt%, miso paste in an amount of about 2.71 wt%, by weight of said poached egg yolk composition, and in

b)(ii) the egg white composition comprisesfava bean protein in an amount of about 3 wt%, silken tofu in an amount of about 24.8 wt%, rice flour in an amount of about 4 wt%, carrageenan in an amount of about 0.3 wt%, kala namak in an amount of about 0.8 wt%, konnyaku in an amount of about 0.1 wt%, by weight of said poached egg white composition.

8. In some embodiments, in:

a)(i) the egg yolk composition further comprises a masking agent and/or a sweetener and/or a natural antimicrobial agent, and combinations thereof.

The natural antimicrobial agent is used to extend shelf life of the poached egg, and an example is Kemin's BactoCEASE™ NV1919 which is natural vinegar (acetic acid)-based product for food safety.

The masking agent is used to prevent sensorial detection of certain off-notes and unwanted taste profiles. In plant-based food application, plant protein powders often carry a bitter note due to the nature of the plant protein. An example of a suitable masking agent can be sourced from Mycotechnology's ClearIQ Specialty Flavour A500, a bitter blocker. It contains gum acacia and natural flavours, and is effective in blocking out pea protein's bitter taste in the vegan egg yolk.

The sweetener may be sugar, or selected from the group comprising monk fruit extract, erythritol, sugar, sucralose and acesulfame K. Monk fruit extract and erythritol are the preferred sweeteners, alone or together, to use in the vegan simulated egg yolk application due to their non-caloric nature and its sweetness similarity to that of table sugar.

9. In a second aspect of the disclosure there is provided a method for producing a vegan simulated poached egg yolk composition defined in any one of embodiments 1 to 8 of the first aspect, comprising the steps:

A)(i) combining, until well-mixed, the components defined in step a)(i) of any one of embodiments 1 to 8; and

A)(ii) placing the molds in a freezer for about 50-60 min to obtain a frozen poached egg yolk composition; or

B)(i) combining, until well-mixed, the components defined in step b)(i) of any one of embodiments 1 to 8; and

B)(ii) refrigerating the mixture of step B)(i) in portions in egg yolk molds for about 15 min, and

B)(iii) placing the molds in a freezer for about 50-60 min to obtain a frozen poached egg yolk composition.

10. In a third aspect of the disclosure there is provided a method for producing a vegan simulated poached egg white composition defined in any one of embodiments 1 to 8 of the first aspect, comprising the steps:

A)(i) combining, until well-mixed, the components defined in step a(ii) of any one of embodiments 1 to 8 to form an egg white mixture, and

(ii) heating the egg white mixture of step A)(i) to 90 °C and mix for 10 mins; or

B) (i) combining, until well-mixed, the components defined in step b)(ii) of any one of embodiments 1 to 8 to form an egg white mixture;

ii) heating the egg white mixture of step B)(i) to 80 °C and mix for 30 mins;

iii) cooling the egg white mixture of step B)(ii) to around 40-45 °C.

11. In a fourth aspect of the disclosure there is provided a method of preparing a plant-based vegan simulated poached egg, comprising:

Ai) pouring a portion of egg white mixture obtained in step A)(ii) of the method of the third aspect into a poached egg mold; and

Aii) pressing the frozen egg yolk composition obtained in step A)(iii) of the method of the second aspect immediately into the egg white mixture; and

Aiii) pouring a second portion of egg white mixture obtained in step A)(ii) of the method of the third aspect on top of the frozen egg yolk composition and letting the mixture set for around 15 mins to obtain a set poached egg; and

A(iv) placing the set poached egg into a blast freezer and blast freezing for at least 45 min to produce a frozen plant-based vegan simulated poached egg; or

Bi) pouring a portion of egg white mixture obtained in step B)(iii) of the method of the third aspect into a poached egg mold; and

Bii) pressing the frozen egg yolk obtained in step B)(iii) of the method of the second aspect immediately into the egg white mixture until the yolk is fully surrounded by the egg white mixture; and

Biii) removing the poached egg from the mold once gelation has completed.

12. In a fifth aspect of the disclosure there is provided a plant-based vegan simulated poached egg yolk composition produced by the method of the second aspect.

13. In a sixth aspect of the disclosure there is provided a plant-based vegan simulated poached egg white composition produced by the method of the third aspect.

14. In a seventh aspect of the disclosure there is provided a plant-based vegan simulated poached egg produced by the method of the fourth aspect.

15. In an eighth aspect of the disclosure there is provided a kit or combination comprising:

i) a plant-based vegan simulated poached egg yolk composition of the present invention and a plant-based vegan simulated egg white composition of the present invention, wherein

said egg white and said egg yolk compositions are separated in a container by one or more barriers; or

ii) a plant-based vegan simulated poached egg yolk composition of the present invention; or

iii) a plant-based vegan simulated poached egg white composition of the present invention.

An advantage of the plant-based vegan simulated poached egg defined in a) is that it can be frozen to extend its shelf life and the texture of the frozen poached is not affected after defrosting.

In some embodiments, the kit may comprise packaging for storing and/or dispensing said plant-based vegan simulated poached egg composition, and may further include instructions for use of said composition.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a photograph of the vegan simulated poached egg of the invention.

Figure 2 shows another photograph of the vegan simulated poached egg of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a plant based vegan simulated poached egg and a modified version thereof which is more suitable for freezing and longer storage. In particular, the vegan poached egg most closely simulates a poached chicken egg.

Certain terms employed in the specification, examples and appended claims are collected here for convenience.

It must be noted that as used herein and in the appended claims, the singular forms "a", "an", and "the" include plural reference unless the context clearly dictates otherwise.

As used herein, the term "comprising" or "including" is to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more features, integers, steps or components, or groups thereof. However, in context with the present disclosure, the term "comprising" or "including" also includes "consisting of". The variations of the word "comprising", such as

"comprise" and "comprises", and "including", such as "include" and "includes", have correspondingly varied meanings.

The terms "masking agent" and "bitter blocker" may be used interchangeably herein.

Having now generally described the invention, the same will be more readily understood through reference to the following examples which are provided by way of illustration, and are not intended to be limiting of the present invention.

Example 1: vegan simulated poached egg whites

The composition of the plant-based vegan simulated egg white of the invention may take one of two forms, depending on whether the complete simulated poached egg is intended to be suitable for chilling or freezing.

1.1. Plant-based vegan simulated egg white for chilled poached egg

Tofu is cholesterol free, low in saturated fat, and high in protein. On a moisture-free basis, tofu contains about 50% protein and 27% fat, most of which is polyunsaturated fatty acids. Tofu is also a good source of calcium.

In some cases, the plant-based protein used in a plant-based egg formulation can range into the various types and hardness of tofu. It can also be found in soy yoghurt. It is found that silken tofu is the optimum ingredient for this formulation as it allows for a smooth texture reminiscent of avian eggs. Hard tofu may also be used, though it falls short on various parameters. For instance, hard tofu tends to leave a certain residue which does not resemble the mouthfeel of avian egg whites when used in this formulation. The optimal amount of tofu in the vegan poached egg formulation ranges from about 20 to about 30 wt%, preferably about 25 wt%, by weight of said egg white composition.

Rice flour is a thickening agent for the formulation of the plant-based white. Rice flour gives a poached egg a white appearance, prevents liquid separation, and increases the viscosity and elasticity of the plant-based white egg mixture which gives it a similar texture to a chicken egg white. Preferably, white rice flour is used as it contributes to the natural colour of the egg white. The optimal amount of rice flour used in the vegan poached egg white formulation ranges from 1.0 to 6.0 wt%, preferably about 4 wt%, by weight of said egg white composition.

Gum. Carrageenan, gellan gum, xanthan gum, and locust bean gum may be used. Carrageenan is a cell wall hydrocolloid found in certain species of seaweed and is extracted with water under neutral or alkaline conditions at elevated temperatures. There are three main

types of carrageenan: (1) kappa, (2) iota and (3) lambda. Kappa-carrageenan may be best suited for the vegan poached egg white application as it helps to provide gelling, stabilizing and texturizing properties. The optimal amount of carrageenan used in the vegan poached egg white formulation ranges from 0.1% to 0.80 wt%. Alternatively, gellan gum may also be used to provide strength and elasticity to the vegan poached egg white. The native type (high acyl) gellan gum is used because it forms soft elastic transparent gels that can help to not only bind all the ingredients together, but also re-create the springiness and slight elastic characteristic associated with a cooked vegan poached egg white. Other gums such as xanthan gum and locust bean gum may also be used in combination with carrageenan to enhance the gel and breaking strength of the final product. A combination of xanthan gum with carrageenan or locust bean gum with carrageenan may contribute to a synergistic effect which helped reduce the degree of syneresis in the final vegan poached egg white. However, carrageenan is preferred because it provides a more desirable texture, better moisture retention and storage stability. The optimal amount of gum used in the vegan poached egg white formulation ranges from 0.1 to 1.5 wt%, preferably about 0.3 wt%, by weight of said egg white composition.

Konnyaku is made from Konjac, a plant of the genus *Amorphophallus* (taro/yam family). The plant is native to warm subtropical areas of tropical eastern Asia, such as Japan and China. This ingredient is commonly used in Japanese cuisine. It is also a good plant-based alternative for gelatine. Konnyaku is low in calories, rich in dietary fibre and gives a neutral taste. When the gel is set, Konnyaku yields a firm and springy texture, resembling a normal boiled egg white texture. The optimal amount of Konnyaku in the boiled vegan poached egg formulation ranges from about 0.05 to about 0.3 wt%, preferably about 0.1 wt%, by weight of said egg white composition. A combination of konnyaku and a gum such as carrageenan or agar-agar can result in a springier texture than if konnyaku or the gum were used alone.

Black salt, also known as kala namak, consists primarily of sodium chloride and traces of sodium bisulfite and hydrogen sulfide which provides black salt its distinctive taste and smell. The concentration of black salt used in an embodiment of the invention is from about 0.5 to 1.2%, preferably 0.5 to 1 wt%, more preferably about 0.8 wt%, of the egg white composition.

Plant protein is used for protein enrichment. Preferably the type of plant protein used in the vegan poached egg formulation is fava (faba) bean protein. More preferably a fava bean protein concentrate is used which comprises 90% protein on a dry basis. To produce a concentrate, dehulled split fava bean cotyledons of faba beans (*Vicia faba*) are mechanically milled and processed. The protein undergoes proprietary physical treatment that provides a cleaner flavour profile, which enables high inclusion rate with no flavour impact. An example

of a fava bean concentrate can be sourced from YANTAI T.FULL BIOTECH CO. LTD. Alternatives include chickpea, pea, soy, mung bean proteins, but the fava bean protein is preferred because it confers best sensory textural attributes and possesses great solubility which facilitates use in high moisture applications. The recommended dosage of plant protein (such as fava bean protein concentrate) in the vegan poached egg white composition ranges from about 2 to about 5 wt%, preferably from 3-4 wt%, by weight of said egg white composition. Meanwhile, another fava bean concentrate, with a protein concentration of 60%, marketed as VITESSENCE™ Pulse CT 3602 Protein - 37401G00 by Ingredion Incorporated may be incorporated into the vegan poached egg white.

Water is also added to thin the entire egg mixture, not only to make up volume, but so that the mixture will exhibit a shear thinning behaviour when force is applied, like a real beaten egg would behave when beaten or stirred for a certain period of time. The above ingredients provide binding, emulsifying, leavening and thickening properties to the mixture, in addition to taste and flavour similar to eggs. Water also serves as the main medium for gums to swell and gel and to make the composition up to 100 wt%. The optimal amount of water in the vegan poached egg formulation ranges from about 55 to about 76 wt%, by weight of said egg white composition.

In some embodiments, the plant-based vegan simulated poached egg white composition of the invention is formulated as shown in Table 1.

Table 1: Composition for chilled plant-based vegan poached egg white

Ingredient	Composition Percentage (wt%)
Silken tofu	20-30
Rice flour	1-6
gum	0.1-0.8
Konnyaku (Konjac)	0.05-0.3
Black salt	0.1-2.0
plant protein	2-5
Water	to 100
Total	100

According to a specific embodiment of the invention, the vegan poached egg white composition is formulated as shown in Table 2.

Table 2: Composition for chilled plant-based vegan poached egg white

Ingredient	Composition Percentage (wt%)
Silken tofu	24.8
Rice flour	4.0
Carrageenan	0.3
Konnyaku (Konjac)	0.1
Black salt	0.8
Fava bean protein 90%	3.0
Water	67.0
Total	100

The vegan poached egg white composition may be produced according to a method comprising the following steps:

(i) combine, until well-mixed, all the components listed in Table 1 or 2;

(ii) heat up the mixture of (i) to 80-90 °C and mix for 10-30 mins; and

(iii) cool the mixture to around 40-45 °C to obtain the poached egg white composition.

Preferably, in step ii) the mixture is heated to about 80 °C and mixed for about 30 mins.

1.2. Plant-based vegan simulated egg white for frozen poached egg

Soy milk is a common substitute for animal milk, unsurprisingly due to its naturally high protein content, lactose free, and cholesterol free characteristics. Generally, soy milk can contain up to 8.89% of protein concentration, similar to that of animal-derived milk. Soy milk also has significantly lower amounts of saturated fats (typically around 0.2 to 1.3 g per 100 mL) compared to animal milk. Additionally, its polyunsaturated fatty acids content trumps that of animal milk, ranging around 0.8 to 3 g per 100 mL against 0.003 g to 0.2 g per 100 mL. In some cases, the plant-based milk used in a plant-based egg formulation can range into the various protein content and viscosity. It is found that soy milk is the optimum ingredient for this formulation as it allows for a smooth texture reminiscent of avian eggs when mixed with appropriate gums and starches. The optimal amount of soy milk in the vegan poached egg

formulation ranges from about 55 to about 70 wt%, preferably from 55-65 wt%, more preferably about 60 wt%, by weight of said egg white composition.

Rice flour used in the vegan poached egg white formulation ranges from 1.0% to 6.0 wt%, preferably about 4 wt%, by weight of said egg white composition.

Gum. Carrageenan and locust bean gum may be used. The optimal amount of carrageenan used in the vegan poached egg white formulation ranges from 0.5% to 2.0 wt%, preferably about 0.5 to 1.0 wt%, by weight of said egg white composition. Alternatively, locust bean gum may also be used. A combination of carrageenan and locust bean gum may contribute to a synergistic effect which helped reduce the degree of syneresis in the final vegan poached egg white. An advantageous effect was observed when equal amounts of carrageenan and locust bean gum were used.

Black salt, also known as kala namak, is used in an embodiment of the invention from about 0.1 to 1.2 wt%, preferably 0.5 to 1 wt%, more preferably about 0.6 wt%, by weight of the said egg white composition.

Gelling agents such as calcium sulphate in combination with sodium alginate may also be used. These gelling agents allow the plant-based white to be frozen then thawed without compromise to its texture and gel strength by forming a cross-linked hydrogel which improves the structural integrity inside the plant-based white, thereby permitting freezing of the whole poached egg to significantly lengthen an otherwise short shelf life. It also provides some resistance to indirect heat. The concentration of gelling agents used in an embodiment of the invention is from about 0.5 to 2.0%, preferably about 1 wt%, by weight of the said egg white composition.

According to some embodiments of the invention, the vegan poached egg white composition is formulated as shown in Table 3.

Table 3: Composition for frozen plant-based vegan poached egg white

Ingredient	Composition Percentage (wt%)
Soy milk	55-70
Rice flour	3-5
gum	0.5-2.0

Black salt	0.1-1.0
Gelling agent (calcium sulphate and sodium alginate),	0.5-2.0
Water	to 100
Total	100

According to another specific embodiment of the invention, the vegan poached egg white composition is formulated as shown in Table 4.

Table 4: Composition for frozen plant-based vegan poached egg white

Ingredient	Composition Percentage (wt%)
Soy milk	60.1
Rice flour	4.8
Carrageenan	0.5
Locust bean gum	0.5
Black salt	0.6
Gelling agent (calcium sulphate and sodium alginate),	1.0
Water	32.5
Total	100

The vegan poached egg white composition formulated as shown in Table 3 or 4 is advantageous for producing a vegan poached egg that can be frozen.

The vegan poached egg white composition may be produced according to a method comprising the following steps:

(j) combine, until well-mixed, all the components listed in Table 3 or 4;

(ii) heat up the mixture of (i) to 80-90 °C and mix for 10-30 mins.

Preferably, in step (ii) the mixture is heated to 90 °C and mixed for about 10 min.

Example 2: Poached egg yolks

The composition of the plant-based vegan simulated egg yolk of the invention may take one of two forms, depending on whether the complete simulated poached egg is intended to be suitable for chilling or freezing.

2.1. Plant-based vegan simulated egg yolk for chilled poached egg

Plant protein. Plant protein could also be sourced from fava bean, mung bean, pea, chickpea, lentil, lupin, corn, or canola. However, pea protein isolate was found to be most ideal because of its relatively cleaner taste and stability after heat treatment.

Preferably the plant protein used in the vegan egg yolk formulation is pea protein. More preferably a pea protein isolate is used which comprises 85% protein on a dry basis. Apart from protein enrichment, pea protein isolate is used to achieve good and stable emulsion and improve the structure of final product in a cost-effective way. An example of a pea protein isolate is marketed by Louis Dreyfus Company Asia Pte Limited.

The recommended amount of plant protein isolate in the vegan egg yolk formulation ranges from about 6.0 to about 7.0 wt%, preferably from 6-7 wt%, preferably about 6.19 wt%, by weight of vegan egg yolk composition

Miso is used in the composition of the plant-based yolk as a fermentation agent and source of vitamins and minerals. It is a natural source of probiotics, vitamin B1, vitamin B2, vitamin B3, vitamin B5 and vitamin B9, as well as vitamins K and E. Miso also confers a yellow hue to the egg yolk and includes a slight umami taste which helps to recreate the umami compound of a chicken egg yolk. The concentration of miso (in paste form) used in an embodiment of the invention ranges from about 2.0 to 3.0 wt%, preferably 2-3 wt%, more preferably about 2.71 wt%, by weight of the yolk composition.

Vegetable oil such as canola oil, olive oil, soybean oil and corn oil may be used in the yolk composition. Preferably, the vegetable oil is canola oil. Canola oil is a liquid oil derived from the canola plant, having close to a neutral taste and a texture ideal to recreate the mouthfeel of a chicken yolk, without any off-tastes. Canola oil has high levels of tocopherols, low levels of saturated fatty acids and high levels of unsaturated fats, which position it as a health-promoting component of the diet. The amount of vegetable oil used in an embodiment of the invention is from about 20-30 wt%, preferably from 15-25 wt%, more preferably about 20.3 wt%, by weight of the yolk composition.

Pregelatinized starch may be used for the purpose of providing the ropiness appearance that is observed in chicken egg yolks. Pre-gel starch is starch that is pre-cooked and dried making the starch cold-water-soluble. A preferred starch is potato starch. Sticky water obtained from natto (from fermented soybeans) might be used as an alternative because

of its functional qualities, but the presence of peptides has been shown to result in a bitter taste. The optimal amount of pregelatinized starch used in the vegan yolk formulation ranges from about 1.0 wt% to 2.0 wt%, preferably from 1-2 wt%, more preferably about 1.29 wt%, by weight of said egg yolk composition.

Black salt, in an embodiment of the invention is present in an amount from about 0.5 to 0.6 wt%, preferably 0.5 to 0.6 wt%, more preferably about 0.51 wt%, by weight of the yolk composition.

Guar gum is readily soluble in cold water, and forms a high viscosity solution at low concentrations that can suspend the protein powders and thus provide a smooth texture. The concentration of guar gum used in an embodiment of the invention is from about 0.2 to 0.3%, preferably 0.2 to 0.3 wt%, more preferably about 0.25 wt%, by weight of the yolk composition.

Mustard paste is selected from the group comprising Dijon mustard, English mustard and whole grain mustard, preferably Dijon mustard. Mustard contains isothiocyanates to contribute "sulfury" character. Mustard is also a source of calcium, iron, selenium, and phosphorus. It is a condiment made from the seeds of a mustard plant, water, vinegar, lemon juice, and often other flavorings and spices. It is used to conceal the mild beany off-taste from the plant protein. The concentration of mustard paste used in an embodiment of the invention is from about 1.0 to 4.0%, preferably 1.4 to 3.7 wt%, more preferably about 3.61 wt%, by weight of the yolk composition.

Water is added to make up volume and also to thin the entire egg yolk mixture so that the mixture will exhibit a shear thinning behaviour when force is applied, like a real egg yolk would behave when beaten or stirred for a certain period of time. The optimal amount of water in the formulation ranges from about 60.0 to about 70.0 wt%, preferably from 60-65 wt%, by weight of said vegan egg yolk composition.

Natural Food Coloring may be used to enhance the color of the vegan egg yolk. The coloring may be provided by beta-apo-8'-carotenal, beta carotene or turmeric powder or any combination thereof. An example of a suitable food coloring product can be sourced from Sensient Technologies Corp (China) Ltd where the product is marketed as Fusion Nectarine Orange L-WS. It is a water-soluble liquid which contains a combination of glycerol, demineralised water, corn oil, medium chain triglyceride (MCT) oil, quillaia extract, alpha-tocopherol, sunflower lecithin, beta-apo-8'-carotenal and ascorbyl palmitate. Another example of natural food coloring is also sourced from Sensient Technologies Corp (China) Ltd., and marketed as Nat. Carotene Yellow P-WS. It contains a combination of maltodextrin, gum

acacia, vegetable oil, sorbitol syrup, natural beta carotene, citric acid, ascorbic acid, tocopherol. Yet another option for egg food coloring is sourced from Sensient Technologies Corp (China) Ltd where the product is marketed as Natural Carotene 1.3% L-WS. It is a water-soluble liquid, which contains a combination of glycerol, demineralised water, acacia gum, sunflower oil, MCT oil, beta-carotene from Blakeslea trispora, citric acid, ascorbic acid and tocopherol-rich extract. Beta carotene may be included in the yolk at about 0.6-0.7 wt%, preferably from 0.6-0.7 wt%, and turmeric may be included in the yolk composition at about 0.8-1.0 wt%, preferably from 0.8-0.9 wt%. The recommended amount of the natural food coloring in the vegan egg yolk composition ranges from about 0.5 to about 1.5 wt%, preferably from 0.6-1 wt%, more preferably about 0.61 wt%, by weight of said egg yolk composition.

According to some embodiments of the invention, the vegan poached egg yolk composition is formulated as shown in Table 5.

Table 5: Composition for chilled plant-based vegan poached egg yolk

Ingredient	**Composition Percentage (wt%)**
Plant protein	6-7
Miso	2-3
Guar gum	0.2-0.3
vegetable oil	20-30
Color	0.6-1
Black salt	0.5-0.6
Pregelatinized potato starch	1-2
Mustard paste	1-4
Water	to 100
Total	100

According to a specific embodiment of the invention, the vegan poached egg yolk composition is formulated as shown in Table 6.

Table 6: Composition for chilled plant-based vegan poached egg yolk

Ingredient	Composition Percentage (wt%)
Pea protein	6.19
Miso	2.71
Guar gum	0.25
Canola oil	20.3
Fusion Nectarine Orange L-WS	0.61
Black salt	0.51
Pregelatinized potato starch	1.29
Mustard paste	3.61
water	64.53
Total	100

The vegan poached egg yolk composition shown in Table 5 or 6 is advantageous for producing a vegan poached egg that can be chilled.

The vegan poached egg yolk composition may be produced according to a method comprising the following steps:

i) combine, until well-mixed, all the components defined Table 5 or 6;

ii) place the molds in a freezer for about 50-60 min to obtain a frozen poached egg yolk composition.

2.2. Plant-based vegan simulated egg yolk for frozen poached egg

Plant protein. Similar proteins to those described for the chilled poached egg yolk composition may be used for the frozen poached egg. However, pea protein was found to be most ideal because of its relatively cleaner taste and stability after heat treatment. Preferably the plant protein used in the vegan egg yolk formulation is pea protein. More preferably a pea protein isolate is used which comprises 85% protein on a dry basis. An example of a pea protein isolate is marketed as LDC (Loius Dreyfus Company) Pea Protein Isolate.

The recommended amount of plant protein isolate in the vegan egg yolk formulation ranges from about 4.0 to about 10.0 wt%, preferably from 7-10 wt%, more preferably about 8.7 wt%, by weight of vegan egg yolk composition.

Miso is used in the composition as described in Example 2.1. The concentration of miso (in paste form) used in an embodiment of the invention ranges from about 1.0 to 3.5 wt%, preferably 1-3 wt%, more preferably about 2.5 wt%, by weight of the yolk composition.

Vegetable oil such as canola oil, olive oil, soybean oil and corn oil may be used in the yolk composition. Preferably, the vegetable oil is canola oil. The amount of vegetable oil used in an embodiment of the invention is from about 10-20 wt%, preferably from 15-20 wt%, more preferably about 17.1 wt%, by weight of the yolk composition.

Pregelatinized starch is used in the composition as described in Example 2.1. Preferably pregelatinized potato starch is used. The optimal amount of pregelatinized starch used in the vegan yolk formulation ranges from about 1.0 wt% to 2.0 wt%, preferably from 1-2 wt%, more preferably about 1.1 wt%, by weight of said egg yolk composition.

Black salt, in an embodiment of the invention is present in an amount from about 0.2 to 0.5 wt%, preferably 0.2 to 0.5 wt%, more preferably about 0.5 wt%, by weight of the yolk composition.

Guar gum is readily soluble in cold water, and forms a high viscosity solution at low concentrations that can suspend the protein powders and thus provide a smooth texture. The concentration of guar gum used in an embodiment of the invention is from about 0.05 to 0.3%, preferably 0.1 to 0.3 wt%, more preferably about 0.2 wt%, by weight of the yolk composition.

Mustard paste is used in an embodiment of the invention in an amount from about 1.0 to 3.0%, preferably 1.0 to 2 wt%, more preferably about 1.4 wt%, by weight of the yolk composition.

Lecithin is a food additive used as an emulsifier when added to food and, advantageously, also has uses as an antioxidant and flavour protector. Alternatives include lecithin from sunflower and rapeseed, but soy lecithin is preferred as it offers similar health benefits to other types of lecithin and is more easily accessible. In some embodiments, the vegan yolk composition comprises lecithin in a range of about 0.2 – 0.5 wt%, preferably about 0.5 wt%, by weight of said vegan egg yolk composition.

Natural Food Coloring may be selected from those described in Example 2.1. The recommended amount of the natural food coloring in the vegan egg yolk composition ranges

from about 0.5 to about 1.5 wt%, preferably from 0.5-1.5 wt%, more preferably about 1.0 wt%, by weight of said egg yolk composition.

Water is added for the same reasons described in Example 2.1. The optimal amount of water in the formulation ranges from about 60 to about 75 wt%, preferably from 60 - 75 wt%, by weight of said vegan egg yolk composition.

Calcium lactate is a fat-soluble agent that reacts with sodium alginate to form a skin or membrane around a food item that is submerged in the sodium alginate solution. Other sources of calcium were used in place of calcium lactate for spherification of the vegan egg yolk, but they demonstrated inferior performance. Calcium chloride gave an unpleasant bitter taste. Calcium gluconate performed poorly in terms of gelation kinetics (20 times and 4 times slower than calcium chloride and calcium lactate, respectively). Calcium lactate had a rate of gelation that was similar to calcium chloride without adversely affecting the organoleptic properties of the vegan egg yolk. The concentration of calcium lactate used in the invention for spherification is about 1 to 4 wt%, preferably about 1.5-3.0 wt%, more preferably about 2.9 wt%, by weight of said vegan egg yolk composition.

Masking agent is often used in the food industry to prevent sensorial detection of certain off-notes and unwanted taste profiles. In plant-based food application, plant protein powders often carry a bitter note due to the nature of the plant protein. An example of a suitable masking agent can be sourced from Mycotechnology's ClearIQ Specialty Flavour A500, a bitter blocker. It contains gum acacia and natural flavours, and is effective in blocking out pea protein's bitter taste in the vegan egg yolk. The optimal amount of masking agent used in the vegan simulated egg yolk formulation ranges from 0.2% to 0.5% wt%, preferably about 0.5% by weight of said simulated egg yolk composition.

Sweeteners can be used to elevate a food product's taste by activating sensory neurons, which can promote an appetite for said food product. In the context of simulated vegan egg yolk, sweeteners can improve the sensory and flavour profile. Examples of sweeteners suitable for such applications are monk fruit extract, erythritol, sugar, sucralose, and acesulfame K. Monk fruit extract and erythritol are the preferred sweeteners to use in the vegan simulated egg yolk application due to its non-caloric nature and its sweetness similarity to that of table sugar. The optimal amount of sweetener to be used in a vegan simulated egg yolk formulation ranges from 1.0% to 4.0% wt%, preferably about 1.9% by weight of said simulated egg yolk composition.

Natural antimicrobial agents allow for extended shelf life in the vegan simulated egg yolk by inhibiting microbial growth in the product. An example would be Kemin's BactoCEASE™ NV1919 which is an acetic acid-based antimicrobial dry powder. It comprises white distilled vinegar, sodium bicarbonate (for pH), silicon dioxide (anti-caking), and sunflower oil. The optimal amount of natural antimicrobial agent to be used in a vegan simulated egg yolk formulation ranges from 0.2% to 0.5 wt%, preferably about 0.5% by weight of said simulated egg yolk composition.

According to some embodiments of the invention, the vegan poached egg yolk composition is formulated as shown in Table 7.

Table 7: Composition for frozen plant-based vegan poached egg yolk

Ingredient	Composition Percentage (wt%)
Plant protein	4-10
Miso	1.0-3.5
Guar gum	0.05-0.3
vegetable oil	10-20
Natural Food Coloring	0.5-1.5
lecithin	0.2-0.5
Natural antimicrobial agent	0.2-0.5
Masking agent	0.2-0.5
sweetener	1.0-4.0
Calcium lactate	1-4
Black salt	0.2-0.5
Pregelatinized potato starch	1.0-2.0
Mustard paste	1.0-3.0
water	60-75
Total	100

According to another specific embodiment of the invention, the vegan poached egg yolk composition is formulated as shown in Table 8.

Table 8: Composition for frozen plant-based vegan poached egg yolk

Ingredient	Composition Percentage (wt%)
Pea protein	8.7
Water	61.2
Miso	2.5
Guar gum	0.2
Canola oil	17.1
Nat. Carotene Yellow P-WS	1.0
Soy lecithin	0.5
BactoCEASETM NV1919	0.5
Clear IQ Specialty Flavour A500	0.5
Monk fruit extract	1.9
Calcium lactate	2.9
Black salt	0.5
Pregelatinized potato starch	1.1
Mustard paste	1.4
Total	100

The vegan poached egg yolk composition shown in Table 7 or 8 is advantageous for producing a vegan poached egg that can be frozen.

The vegan poached egg yolk composition may be produced according to a method comprising the following steps:

i) combine, until well-mixed, all the components plant protein, water, miso, guar gum, canola oil, color, black salt, mustard paste and pregelatinized starch;

ii) place the molds in a freezer for about 50-60 min to obtain a frozen poached egg yolk composition.

Example 3: Assembly of plant-based vegan poached eggs

3.1. Assembly of chilled plant-based vegan simulated poached egg

The method may comprise the following steps:

i) Pouring a portion of egg white mixture obtained by the method described in Example 1.1 into a poached egg mold;

ii) Pressing a frozen egg yolk obtained by the method of Example 2.1 immediately into the egg white in the mold until the yolk is fully surrounded by the liquid white mixture;

iii) Taking out a poached egg from the mold once the gelation process has completed.

Preferably, the assembled chilled poached egg comprises egg white and egg yolk components in the proportions shown in Tables 2 and 4.

3.2. Assembly of frozen plant-based vegan simulated poached egg

A vegan frozen poached egg may be prepared using the egg white and egg yolk compositions described in Examples 1.2 and 2.2. Specifically, the poached egg may be prepared by a method comprising the following steps:

(i) pouring a first portion of egg white mixture obtained by the method described in Example 1.2 into a poached egg mold;

(ii) pressing a frozen egg yolk composition obtained by the method described in Example 2.2 immediately into the egg white mixture in the mold;

(iii) pouring a second portion of egg white composition on top of the frozen egg yolk composition and letting the mixture set for around 15 mins to obtain a set poached egg; and

(iv) placing the set poached egg into a blast freezer and blast freeze for at least 45 min.

Preferably, the assembled frozen poached egg comprises egg white and egg yolk components in the proportions shown in Tables 4 and 8.

Photographs of obtained poached eggs are shown in Figures 1 and 2.

Claims

1. A plant-based vegan simulated poached egg comprising a vegan simulated poached egg yolk composition and a vegan simulated poached egg white composition, wherein

a)(i) the vegan simulated poached egg yolk composition comprises the components water, plant protein, pregelatinized starch, black salt, guar gum, mustard paste, miso, vegetable oil, natural food coloring, lecithin and calcium lactate and, optionally, a masking agent and/or a sweetener and/or a natural antimicrobial agent; and

a)(ii) the vegan simulated poached egg white comprises the components rice flour, black salt, water, soy milk, gum, and gelling agent comprising calcium sulphate and sodium alginate; or

b)(i) the vegan simulated poached egg yolk composition comprises the components water, plant protein, pregelatinized starch, black salt, guar gum, mustard paste, miso, vegetable oil and natural food coloring; and

b)(ii) the vegan simulated egg white comprises the components rice flour, black salt, water, tofu, gum, Konnyaku and plant protein.

2. The plant-based vegan simulated poached egg of claim 1, wherein the plant-based vegan simulated poached egg composition of a) is suitable for freezing, and the plant-based vegan simulated poached egg composition of b) is suitable for chilling.

3. The plant-based vegan simulated poached egg of claim 1 or 2, wherein in:

a)(i) the plant protein is selected from the group comprising pea, fava bean, mung bean, chickpea, lentil, lupin, corn and canola protein, preferably pea protein;

the natural food coloring is selected from the group comprising beta-apo-8'-carotenal, beta-carotene and turmeric or any combination thereof;

the mustard paste is selected from the group comprising Dijon mustard, English mustard and whole grain mustard, preferably Dijon mustard;

the vegetable oil is selected from the group comprising canola oil, olive oil, soybean oil and corn oil, preferably canola oil; and

a)(ii) the gum is selected from the group comprising carrageenan, gellan gum, xanthan gum, locust bean gum, and combinations thereof; or

b)(i) the plant protein is selected from the group comprising pea, fava bean, mung bean, chickpea, lentil, lupin, corn and canola protein, preferably pea protein;

the natural food coloring is selected from the group comprising beta-apo-8'-carotenal, beta-carotene and turmeric or any combination thereof;

the mustard paste is selected from the group comprising Dijon mustard, English mustard and whole grain mustard, preferably Dijon mustard; and

the vegetable oil is selected from the group comprising canola oil, olive oil, soybean oil and corn oil, preferably canola oil; and

b)(ii) the gum is selected from the group comprising carrageenan, gellan gum, xanthan gum, locust bean gum, and combinations thereof;

the plant protein is selected from the group fava bean, chickpea, soy, pea and mung bean proteins.

4. The plant-based vegan simulated poached egg of any one of claims 1 to 3, wherein in:

a)(i) or b)(i) the plant protein is pea protein, the vegetable oil is canola oil, the pregelatinized starch is potato starch, and the mustard paste is Dijon mustard.

5. The plant-based vegan simulated poached egg of any one of claims 1 to 4, wherein in:

a)(ii) the gum is carrageenan and locust bean gum; or

b)(ii) the tofu is silken tofu, the gum is carrageenan and the plant protein is fava bean protein.

6. The plant-based vegan simulated poached egg of any one of claims 1 to 5, wherein in:

a)(i) the egg yolk composition comprises plant protein in an amount of 4 -10 wt%, natural food coloring in an amount of 0.5-1.5 wt%, vegetable oil in an amount of about 10-20 wt%, pregelatinized starch in an amount of 1-2 wt%, black salt in an amount of 0.2-0.5 wt%, guar gum in an amount of 0.05-0.3 wt%, mustard paste in an amount of 1-3 wt%, miso in an amount of 1-3.5 wt%, lecithin in an amount of 0.2-0.5 wt%, calcium lactate in an amount of 1-3 wt%, optionally a natural antimicrobial agent in an amount of about 0.2-0.5 wt%, and/or a masking agent in an amount of about 0.2-0.5 wt%, and/or a sweetener in an amount of about 1.0-4.0 wt%, by weight of said poached egg yolk composition, and in

a)(ii) the egg white composition comprises soy milk in an amount of 55-70 wt%, rice flour in an amount of 3-5 wt%, kala namak in an amount of 0.1-1.0 wt%, water in an amount of 15-35 wt%, gelling agents in an amount of 0.5-2.0 wt%, gums in an amount of 0.5-2.0 wt% by weight of said poached egg white composition; or

b)(i) the egg yolk composition comprises plant protein in an amount of 6 -7 wt%, natural food coloring in an amount of 0.6-1.0 wt%, vegetable oil in an amount of about 20-30 wt%, pregelatinized starch in an amount of 1-2 wt%, black salt in an amount of 0.5-0.6 wt%, guar gum in an amount of 0.2-0.3 wt%, mustard paste in an amount of 3-4 wt%, miso in an amount of 2-3 wt%, by weight of said poached egg yolk composition, and in

b)(ii) the egg white composition comprises tofu in an amount of 20-30 wt%, plant protein in an amount of 2-5 wt%; rice flour in an amount of 1-6 wt%, kala namak in an amount of 0.1-2 wt%, konnyaku in an amount of 0.05-0.3 wt%, gum in an amount of 0.1-0.8 wt%, by weight of said poached egg white composition.

7. The plant-based vegan simulated poached egg of claim 6, wherein in:

a)(i) the egg yolk composition comprises pea protein in an amount of about 8.7 wt%, natural food coloring in an amount of about 1.0 wt%, canola oil in an amount of about 17.1 wt%, pregelatinized potato starch in an amount of about 1.1 wt%, black salt in an amount of about 0.5 wt%, guar gum in an amount of about 0.2 wt%, mustard paste in an amount of about 1.4 wt%, miso in an amount of about 2.5 wt%, soy lecithin in an amount of about 0.5 wt%, calcium lactate in an amount of about 2.9 wt% and, optionally, a natural antimicrobial agent in an amount of about 0.5 wt%, and/or a masking agent in an amount of about 0.5 wt%, and/or sweetener in an amount of about 1.9%, by weight of said poached egg yolk composition, and in

a)(ii) the egg white composition comprises soy milk in an amount of about 60.1 wt%, water in an amount of about 32.5 wt%, rice flour in an amount of about 4.8 wt%, carrageenan in an amount of about 0.5 wt%, gelling agents in an amount of about 1.0 wt%, kala namak in an amount of about 0.6 wt%, locust bean gum in an amount of about 0.5 wt%, by weight of said poached egg white composition; or

b)(i) the egg yolk composition comprises pea protein in an amount of about 6.19 wt%, orange food coloring in an amount of about 0.61 wt%, canola oil in an amount of about 20.3 wt%, pregelatinized potato starch in an amount of about 1.29 wt%, black salt in an amount of about 0.51 wt%, guar gum in an amount of about 0.25 wt%, mustard paste in an amount of about 3.61 wt%, miso paste in an amount of about 2.71 wt%, by weight of said poached egg yolk composition, and in

b)(ii) the egg white composition comprisesfava bean protein in an amount of about 3 wt%, silken tofu in an amount of about 24.8 wt%, rice flour in an amount of about 4 wt%, carrageenan in an amount of about 0.3 wt%, kala namak in an amount of about 0.8 wt%,

konnyaku in an amount of about 0.1 wt%, by weight of said poached egg white composition.

8. The plant-based vegan simulated poached egg of any one of claims 1 to 7, wherein in:

a)(i) the egg yolk composition further comprises a masking agent and/or a sweetener and/or a natural antimicrobial agent.

9. A method for producing a vegan simulated poached egg yolk composition defined in any one of claims 1 to 8, comprising the steps:

A)(i) combining, until well-mixed, the components defined in a)(i) of any one of claims 1 to 8; and

A)(ii) placing the molds in a freezer for about 50-60 min to obtain a frozen poached egg yolk composition; or

B)(i) combining, until well-mixed, the components defined in b)(i) of any one of claims 1 to 8; and

B)(ii) refrigerating the mixture of step B)(i) in portions in egg yolk molds for about 15 min, and

B)(iii) placing the molds in a freezer for about 50-60 min to obtain a frozen poached egg yolk composition.

10. A method for producing a vegan simulated poached egg white composition defined in any one of claims 1 to 8, comprising the steps:

A)(i) combining, until well-mixed, the components defined in a)(ii) of any one of claims 1 to 8 to form an egg white mixture, and

(ii) heating the egg white mixture of step A)(i) to 90 °C and mix for 10 mins; or

B) (i) combining, until well-mixed, the components defined in b)(ii) of any one of claims 1 to 8 to form an egg white mixture;

ii) heating the egg white mixture of step B)(i) to 80 °C and mix for 30 mins; and

iii) cooling the egg white mixture of step B)(ii) to around 40-45 °C.

11. A method of preparing a plant-based vegan simulated poached egg, comprising:

Ai) pouring a portion of egg white mixture obtained in step A)(ii) of the method of claim 10 into a poached egg mold; and

Aii) pressing the frozen egg yolk composition obtained in step A)(iii) of the method of claim 9 immediately into the egg white mixture; and

Aiii) pouring a second portion of egg white mixture obtained in step A)(ii) of the method of claim 10 on top of the frozen egg yolk composition and letting the mixture set for around 15 mins to obtain a set poached egg; and

A(iv) placing the set poached egg into a blast freezer and blast freezing for at least 45 min to produce a frozen plant-based vegan simulated poached egg; or

Bi) pouring a portion of egg white mixture obtained in step B)(iii) of the method of claim 10 into a poached egg mold; and

Bii) pressing the frozen egg yolk obtained in step B)(iii) of the method of claim 9 immediately into the egg white mixture until the yolk is fully surrounded by the egg white mixture; and

Biii) removing the poached egg from the mold once gelation has completed.

12. A plant-based vegan simulated poached egg yolk composition produced by the method of claim 9.

13. A plant-based vegan simulated poached egg white composition produced by the method of claim 10.

14. A plant-based vegan simulated poached egg produced by the method of claim 11.

15. A kit or combination comprising:

i) a plant-based vegan simulated poached egg yolk composition defined in any one of claims 1 to 8 or 12 and a plant-based vegan simulated egg white composition defined in any one of claims 1 to 8 or 13, wherein said egg white and said egg yolk compositions are separated in a container by one or more barriers; or

ii) a plant-based vegan simulated poached egg yolk composition defined in any one of claims 1 to 8 or 12; or

iii) a plant-based vegan simulated poached egg white composition defined in any one of claims 1 to 8 or 13.

FIGURES

Figure 1

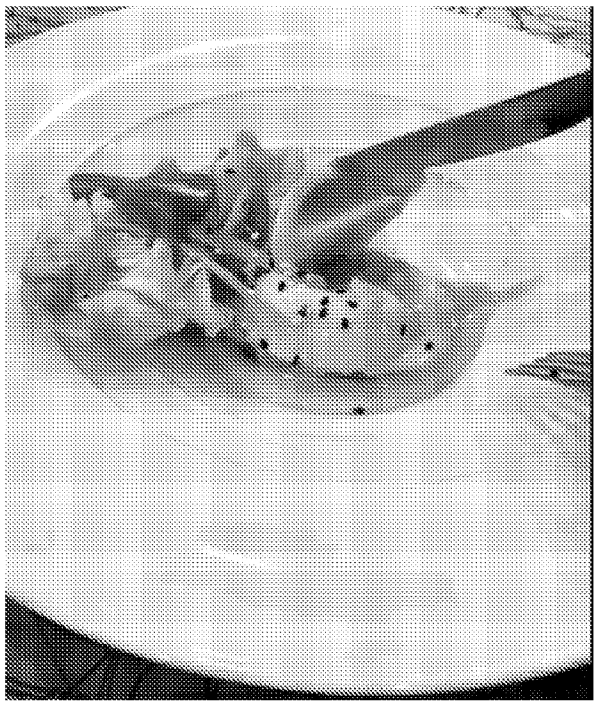
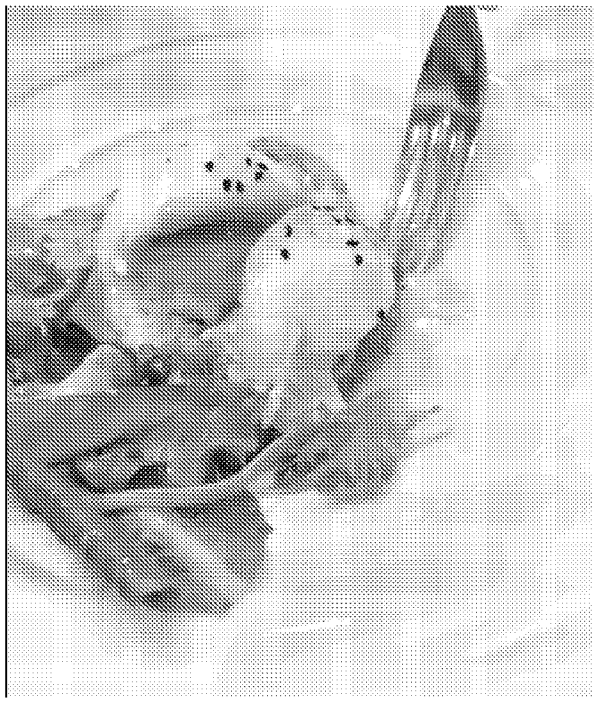


Figure 2



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG2024/050057

A. CLASSIFICATION OF SUBJECT MATTER

A23L 15/00 (2016.01)

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

FAMPAT, internet; plant-based, vegan, egg, egg yolk, egg white, plant protein, pregelatinized starch, black salt, guar gum, mustard, miso, vegetable oil, calcium sulphate, rice flour, soy milk, Konnyaku and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2022/124988 A1 (FLOAT FOODS PTE LTD) 16 June 2022 Examples 1, 4, 8 and 10, Tables 2, 7 and 12	1-9, 12 and 15
A	WO 2019/038794 A1 (UNIVERSITÀ DEGLI STUDI DI UDINE) 28 February 2019 Page 4 lines 17-18, Examples: albumen-like phase (A) example 7, yolk-like phase (B) example 1	10, 11, 13 and 14
A	US 2019/0364948 A1 (TETRICK, J. ET AL.) 5 December 2019 Paragraph [0098]	-
A	WO 2022/271082 A1 (FLOAT FOODS PTE LTD) 29 December 2022 Page 15 lines 23-24	-
A	US 2013/0052304 A1 (LI WEILI) 28 February 2013 Paragraphs [0019] and [0038]	-

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

*Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.

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