[0004] Accordingly, there exists a need in the art for allergen compositions that can prevent and/or treat allergies, and methods for making allergen compositions to prevent and/or treat allergies

SUMMARY

[0005] The disclosure is directed, at least in part, to a method for producing a substantially aerobic organism free mixed allergen composition. For example, this disclosure provides a method for producing a substantially aerobic organism free mixed allergen composition comprising: providing a mixed allergen composition comprising 6 or more allergens, *e.g.,* 6 to 20 allergens, and a bulking agent, wherein the mixed allergen composition comprises at least 6% fat content; milling the mixed allergen composition in a conical mill to obtain a milled composition with substantially consistent particle size; and applying microwaves or radio frequency interference to the milled composition so that the milled composition is heated to at least 190°F for at least 30 minutes, thereby to obtain the substantially aerobic organism free mixed allergen composition. In certain examples, the mixed allergen composition comprises at least 12% fat content.

[0005a] In one aspect, the present disclosure refers to a method of making a substantially aerobic organism free mixed allergen composition, comprising:

providing a mixed allergen composition comprising 6 to 20 allergens and a bulking agent, wherein the mixed allergen composition comprises at least 6% fat content;

milling the mixed allergen composition in a conical mill to obtain a milled composition with substantially consistent particle size; and

applying microwaves or radio frequency interference to the milled composition so that the milled composition is heated to at least 87.8°C (190°F) for at least 30 minutes,

thereby to obtain the substantially aerobic organism free mixed allergen composition.

WHAT IS CLAIMED IS:

1. A method of making a substantially aerobic organism free mixed allergen composition, comprising:

providing a mixed allergen composition comprising 6 to 20 allergens and a bulking agent, wherein the mixed allergen composition comprises at least 6% fat content;

milling the mixed allergen composition in a conical mill to obtain a milled composition with substantially consistent particle size; and

applying microwaves or radio frequency interference to the milled composition so that the milled composition is heated to at least 87.8°C (190°F) for at least 30 minutes,

thereby to obtain the substantially aerobic organism free mixed allergen composition.

2. The method of claim 1, wherein the mixed allergen composition comprises at least 12% fat content.

3. The method of claims 1 or 2, wherein milling the mixed allergen composition comprises using a rotor speed of about 9000 RPM.

4. The method of any one of claims 1-3, wherein milling the mixed allergen composition comprises passing the mixed allergen composition through a screen with an opening size of about 0.838 mm (0.033 inches).

5. The method of any one of claims 1-4, wherein milling the mixed allergen composition comprises applying a vacuum suction through the conical mill.

6. The method of any one of claims 1-5, further comprising wetting the milled composition to a moisture content of 6% to 9% prior to applying microwaves or radio frequency interference to the milled mixed allergen composition.

7. The method of claim 6, wherein the milled composition is wetted to a moisture content of about 9% prior to applying microwaves or radio frequency interference to the milled mixed allergen composition.

8. The method of any one of claims 1-7, further comprising wetting the milled composition to a water activity of 0.65 to 0.8 prior to applying microwaves or radio frequency interference to the milled mixed allergen composition.

9. The method of claim 8, wherein the milled composition is wetted to a water activity of 0.75 to 0.8 prior to applying microwaves or radio frequency interference to the milled mixed allergen composition.

10. The method of any one of claims 1-9, wherein the milled composition is heated to at least 93.3°C (200°F) for at least 60 minutes.

11. The method of claim 10, wherein the milled composition is heated to at least 110.0°C (230°F) for at least 60 minutes.

12. The method of any one of claims 1-11, wherein the milled composition is heated to no more than 121.1°C (250°F).

13. The method of any one of claims 1-12, wherein the milled composition is heated for no more than 360 minutes.

14. The method of any one of claims 1-13, wherein the milled composition is heated in a microwave blender.

15. The method of claim 14, wherein the microwave blender includes a 75,000 watt microwave transmitter.

16. The method of any one of claims 1-15, further comprising pressurizing the milled composition to at least 206.8 kPa (30 psi) for at least 30 minutes.

17. The method of claim 16, wherein applying microwaves or radio frequency interference to the milled composition and pressurizing the milled composition are conducted simultaneously.

18. The method of any one of claims 1-17, wherein the substantially aerobic organism free mixed allergen composition has fewer than 4.5, 4, 3.5, 3, 2.5, 2, or 1.5 log CFU/g total aerobic organisms.

19. The method of any one of claims 1-18, wherein the substantially aerobic organism free mixed allergen composition has at least 0.5, 1, 1.5, 2, 2.5, 3, 3.5, or 4 log CFU/g fewer total aerobic organisms than a mixed allergen composition that has not been prepared by said method.

20. The method of any one of claims 1-19, wherein the substantially aerobic organism free mixed allergen composition has fewer than 1 log CFU/g total coliforms.

21. The method of any one of claims 1-20, wherein the substantially aerobic organism free mixed allergen composition has a substantially similar protein structure as the mixed allergen composition as measured by SDS-PAGE.

22. The method of any one of claims 1-21, wherein the substantially aerobic organism free mixed allergen composition has a substantially similar allergen effect as the mixed allergen composition as measured by immune response in a patient.

23. The method of any one of claims 1-22, wherein the bulking agent comprises a sugar.

24. The method of any one of claims 1-23, wherein the mixed allergen composition comprises equal parts by protein mass of: at least one nut flour, wherein each nut flour is selected from the group consisting of peanut flour, almond flour, walnut flour, cashew flour, hazelnut flour, pecan flour and pistachio flour; at least one fish powder, wherein each fish powder is selected from the group consisting of cod powder and salmon powder; wheat; and powdered hen's egg or egg white.

25. The method of claim 24, wherein the mixed allergen composition further comprises at least one additional allergen component each selected from the group consisting of oat flour, sesame seed flour, and shrimp flour.

26. The method of claims 24 or 25, wherein the mixed allergen composition further comprises soy.

27. The method of any one of claims 24-26, wherein the mixed allergen composition further comprises vitamin D.

28. The method of any one of claims 24-27, wherein the mixed allergen composition comprises:

30 mg by protein weight shrimp powder;
30 mg by protein weight almond powder;
30 mg by protein weight wheat;
30 mg by protein weight cod powder; and
30 mg by protein weight powdered hen's egg.