

CLAIMS

WHAT IS CLAIMED IS:

1. An ingredient composition for producing an egg-less food item, the composition comprising a recombinant ovalbumin (rOVA),
wherein the pH of the rOVA when solubilized is between about 3.5 and about 7.0;
wherein the rOVA when present in the egg-less food item in an amount between about 2% and about 15% (w/w); and
wherein the rOVA provides to the egg-less food item at least one egg white characteristic selected from gelling, foaming, whipping, fluffing, binding, springiness, aeration, coating, film forming, emulsification, browning, thickening, texturizing, humectant, clarification, and cohesiveness.
2. The ingredient composition of claim 1, wherein the composition is dried or is a powder.
3. The ingredient composition of claim 1 or claim 2, wherein the composition comprises at least 75% rOVA (w/w of total protein or w/w of total composition).
4. The ingredient composition of claim 3, wherein the powder composition is at least about 80%, at least about 85%, or at least about 90% rOVA (w/w).
5. The ingredient composition of claim 3 or claim 4, wherein the powder is a concentrate.
6. The ingredient composition of any one of claims 2 to 5, wherein the powder composition is an isolate.
7. The ingredient composition of claim 1, wherein the composition is a liquid.
8. The ingredient composition of claim 7, wherein the liquid composition is a concentrate.
9. The ingredient composition of claim 7 or claim 8, wherein the liquid composition comprises at least 50% rOVA (w/w of total protein or w/w of composition).
10. The ingredient composition of claim 7, wherein the liquid the composition comprises at least about 60%, at least about 65%, at least about 75%, at least about 80%, at least about 85%, or at least about 90% rOVA (w/w).
11. The ingredient composition of any one of claims 1 to 3, wherein the rOVA provides an equivalent or an improvement in the characteristic compared to native egg white in a similar food item.
12. The ingredient composition of any one of claims 1 to 11, wherein the rOVA provides a foam capacity of at least 20%, 30%, 40%, or 50% greater than native egg white.
13. The ingredient composition of any one of claims 1 to 12, wherein the rOVA provides a time to foaming that is at least 20%, 30%, 40%, or 50% faster than native egg white.

14. The ingredient composition of claim 12 or claim 13, wherein the pH of the rOVA when solubilized is between about 3.5 and about 4.5.
15. The ingredient composition of any one of claims 1 to 14, wherein the rOVA provides a hardness to the egg-less food composition that is comparable to or greater than native egg white in baked embodiments.
16. The ingredient composition of any one of claims 1 to 15, wherein the rOVA provides a chewiness to the egg-less food composition that is greater than native egg white.
17. The ingredient composition of claim 15 or claim 16, wherein the rOVA provides a springiness comparable to native egg white.
18. The ingredient composition of any one of claims 1 to 17, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
19. The ingredient composition of any one of claims 1 to 18, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
20. The ingredient composition of claim 18 or claim 19, wherein the amino acid sequence of the rOVA lacks an N-terminal methionine.
21. The ingredient composition of claim 20, wherein the rOVA further includes an EAEA amino acid sequence (SEQ ID NO: 75) at its N-terminus.
22. The ingredient composition of any one of claims 1 to 21, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of a chicken OVA and the pH is between about 6.5 and 7.0 when solubilized.
23. The ingredient composition of any one of claims 1 to 21, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of an ostrich OVA and the pH is less than about 6.0 and above about 3.7 when solubilized.
24. The ingredient composition of any one of claims 1 to 21, wherein the pH when solubilized is between about 6 and about 6.8.
25. The ingredient composition of any one of claims 1 to 21, wherein the pH of the rOVA when solubilized is less than about 6.1.
26. The ingredient composition of any one of claims 1 to 25, wherein rOVA is present in the egg-less food item in an amount of less than about 8%.
27. The ingredient composition of any one of claims 1 to 25, wherein rOVA is present in the egg-less food item in an amount of about 7% or less than 7%.
28. The ingredient composition of any one of claims 1 to 27, wherein the rOVA does not contaminate the composition with Salmonella.

29. A baked food product, comprising:
a recombinant ovalbumin (rOVA), wherein the pH of the rOVA when solubilized is between about 3.5 and about 7.0;
at least one fat or oil;
at least one grain starch; and
at least one sweetener;
wherein the rOVA provides the baked food product at least one egg white characteristic selected from binding, springiness, aeration, browning, texturizing, humectant, and cohesiveness,
and the baked food product does not comprise any natural egg white proteins or a natural egg white.
30. The baked food product of claim 29, wherein the rOVA is present at about 2% to 15% in the product (w/w of total protein or w/w of total food product prior to baking).
31. The baked food product of claim 30, wherein the rOVA is present at about 2% to about 5% in the product (w/w).
32. The baked food product of claim 29 or claim 30, further comprises a dairy component or a leavening agent, or a combination thereof.
33. The baked food product of any one of claims 29 to 32, wherein the product is a cake, a bread, a roll, a pastry, a cracker, a muffin, a scone, a bagel, a biscuit, or a cookie.
34. The baked product of claim 33, wherein the baked product has a crumb structure equivalent to or better than a similar baked product made with a natural egg white or a natural whole egg.
35. The baked product of one of claims 29 to 34, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
36. The baked product of any one of claims 29 to 35, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
37. The baked product of any one of claims 29 to 36, wherein the percentage weight loss is lower in a baked product made with rOVA when compared to an equivalent baked product made with whole egg.
38. An emulsified product comprising:
a recombinant ovalbumin (rOVA);
at least one fat or oil;
water;
wherein the rOVA is present in the product at about 2% to 15% (w/w).

39. The emulsified product of claim 38 further comprising an acidifying agent.
40. The emulsified product of claim 38 or claim 39, wherein the product is a salad dressing, a sauce, mayonnaise, a commercial mayonnaise substitute, sandwich spread or a gravy.
41. A food product comprising:
a recombinant ovalbumin (rOVA), wherein the pH of the rOVA when solubilized is between about 3.5 and about 7.0;
at least one sweetener; and
optionally, a consumable liquid;
wherein the rOVA is present in the food product at about 2% to about 15% (w/w) and wherein the rOVA provides foaming, whipping, fluffing or aeration to the food product.
42. The food product of claim 41, wherein rOVA further provides gelation to the food product.
43. The food product of claim 42, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of a chicken OVA and the pH is between about 6.5 and 7.0 when solubilized.
44. The food product of claim 42, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of an ostrich OVA and the pH is less than about 6.0 and above about 3.7 when solubilized.
45. The food product of claims 41-44, wherein the food product is a meringue, a whipped dessert, a whipped topping or a soufflé.
46. The food product of any one of claims 41 to 45, wherein the rOVA provides a foam capacity to the food product of at least 20%, 30%, 40%, or 50% greater than native egg white.
47. The food product of any one of claims 41 to 46, wherein the rOVA provides a time to foaming to the food product that is at least 20%, 30%, 40%, or 50% faster than native egg white.
48. The food product of claim 46 or claim 47, wherein the pH of the rOVA when solubilized is between about 3.5 and about 4.5.
49. The food product of any one of claims 41 to 48, wherein the rOVA is present in the food product at about 5% to about 10% (w/w).
50. The food product of claim 49, wherein the rOVA is present in the food product at about 7% to about 8% (w/w).
51. The food product of claim 46 or claim 47, wherein the rOVA is present in the food product at about 4%, about 7%, or about 12% (w/w).
52. The food product of claim 51, wherein the pH of the rOVA when solubilized is about 6.

53. The food product of claim 46 or claim 47, wherein the rOVA is present in the food product at between about 9% and about 10% (w/w).
54. The food product of claim 53, wherein the pH of the rOVA when solubilized is about 7.
55. The food product of claim 41, wherein the product is a beverage.
56. The food product of claim 55, wherein the beverage is a consumable alcohol.
57. The food product of claim 56, wherein the rOVA provides foaming, whipping, fluffing or aeration to the consumable alcohol beverage.
58. The food product of claim 55, wherein the beverage is a coffee drink.
59. The food product of claim 58, wherein the rOVA provides foaming, whipping, fluffing or aeration to the coffee drink.
60. The food product of claim 58 or claim 59, wherein coffee drink lacks a dairy component or comprises a dairy component.
61. The food product of any one of claims 41 to 60, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
62. The food product of any one of claims 41 to 61, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
63. The food product of any one of claims 41 to 62, wherein the rOVA does not contaminate the food product with Salmonella.
64. The food product of any one of claims 41 to 63, wherein the food product is a protein bar, an energy bar, a nutrition bar or a granola bar.
65. The food product of claim 64, wherein the food product comprises between about 4% and about 8% (w/w) rOVA.
66. The food product of claim 64 or claim 65, wherein the bar is baked or is unbaked.
67. A meat-analog food product comprising:
a recombinant ovalbumin (rOVA);
at least one fat or oil; and
a plant-derived protein;
wherein the rOVA is present in the food product between about 2% and about 15% (w/w); and
wherein the rOVA acts as a binding agent or a gelling agent, or a combination thereof.
68. The meat-analog food product of claim 67, wherein the plant protein is an extruded plant protein.
69. The meat-analog food product of claim 67, wherein the plant protein is a non-extruded plant protein.

70. The meat-analog food product of any one of claims 67 to 69, wherein the meat analog food product is selected from a burger, patty, sausage, hot dog, sliced deli meat, jerky, bacon, nugget, a ground meat-like composition, and a formed meat-like composition.
71. The meat-analog food product of any one of claims 67 to 70, wherein the rOVA provides a hardness to the food product that is greater than native egg white.
72. The meat-analog food product of any one of claims 67 to 71, wherein the rOVA provides a chewiness to the food product that is greater than native egg white.
73. The meat-analog food product of claim 71 or claim 72, wherein the rOVA provides a springiness comparable to native egg white.
74. The meat-analog food product of any one of claims 67 to 73, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of a chicken OVA and the pH is between about 6.5 and 7.0 when solubilized.
75. The meat-analog food product of any one of claims 67 to 73, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of an ostrich OVA and the pH is less than about 6.0 and above about 3.7 when solubilized.
76. The meat-analog food product of any one of claims 67 to 73, wherein the rOVA is present in the food product at about 4%, at about 5%, or at about 6% (w/w).
77. The meat-analog food product of any one of claims 67 to 73, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
78. The meat-analog food product of any one of claims 67 to 76, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
79. An egg-white substitute comprising:
a recombinant ovalbumin (rOVA);
at least one fat or oil; and
a polysaccharide or polysaccharide-containing ingredient;
wherein the rOVA is present in the composition at about 2% to 15% (w/w); and
wherein the composition has one or more characteristics selected from hardness, adhesiveness, fracturability, cohesiveness, gumminess, and chewiness, and the one or more characteristics are equivalent to or improved as compared to natural egg white when the egg-white substitute is cooked.
80. The egg-white substitute of claim 79, further comprising a flavoring agent or a coloring agent, or a combination thereof.
81. The egg-white substitute of claim 79 or claim 80, wherein the polysaccharide or polysaccharide-containing ingredient is a starch.

82. The egg-white substitute of any one of claims 79 to 81, wherein the polysaccharide or polysaccharide-containing ingredient is selected from gellan gum, sodium alginate, and psyllium or any combination thereof.
83. The egg-white substitute of any one of claims 79 to 82, wherein the rOVA provides a hardness to the food product that is greater than native egg white.
84. The egg-white substitute of any one of claims 79 to 83, wherein the rOVA provides a chewiness to the food product that is greater than native egg white.
85. The egg-white substitute of claim 83 or claim 84, wherein the rOVA provides a gumminess and/or springiness comparable to native egg white.
86. The egg-white substitute of any one of claims 79 to 85, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of a chicken OVA and the pH is between about 6.5 and 7.0 when solubilized.
87. The egg-white substitute of any one of claims 79 to 85, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of an ostrich OVA and the pH is less than about 6.0 and above about 3.7 when solubilized.
88. The egg-white substitute of any one of claims 79 to 85, wherein the rOVA is present in the food product between about 10% and about 12% (w/w).
89. The egg-white substitute of any one of claims 79 to 88, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
90. The egg-white substitute of any one of claims 79 to 88, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
91. A powdered ingredient composition comprising a recombinant ovalbumin (rOVA), wherein the pH of the rOVA when solubilized is between about 3.5 and about 7.0, wherein the rOVA is at least 75% w/w of the composition, and wherein the rOVA comprises one or more N-linked glycosylation sites having mannose linked to an N-acetyl glucosamine, and wherein the N-linked glycosylation sites lack galactose.
92. The powdered ingredient composition of claim 91, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
93. The powdered ingredient composition of claim 91 or claim 92, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
94. The powdered ingredient composition of claim any claim 92 or 93, wherein the amino acid sequence of the rOVA lacks an N-terminal methionine.

95. The powdered ingredient composition of any one of claims 91 to 94, wherein the rOVA further includes an EAEA amino acid sequence (SEQ ID NO: 75) at its N-terminus.
96. The powdered composition of any one of claims 91 to 95, wherein the composition comprises at least at least about 80%, at least about 85%, or at least about 90% rOVA (w/w).
97. A liquid composition comprising a recombinant ovalbumin (rOVA), the composition comprising at least 50% rOVA (w/w of total protein or w/w of total composition).
98. The liquid composition of claim 97, wherein the composition comprises at least about 60%, at least about 65%, at least about 75%, at least about 80%, at least about 85%, or at least about 90% rOVA (w/w).
99. The liquid composition of claim 97 or claim 98, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
100. The liquid composition of any one of claims 97 to 99, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
101. The liquid composition of claim 99 or claim 100, wherein the amino acid sequence of the rOVA lacks an N-terminal methionine.
102. The liquid composition of claim 101, wherein the rOVA further includes an EAEA amino acid sequence (SEQ ID NO: 75) at its N-terminus.
103. The liquid composition of any one of claims 97 to 102, wherein the pH of the solubilized rOVA is between about 3.5 and about 7.0;
104. The liquid composition of any one of claims 97 to 103, wherein the pH of the solubilized rOVA is between about 6 and about 6.8.
105. The liquid composition of any one of claims 97 to 104, wherein the pH of the rOVA when solubilized is less than about 6.1.
106. The liquid composition of any one of claims 97 to 105, wherein the rOVA provides to an egg-less food item at least one egg white characteristic selected from gelling, foaming, whipping, fluffing, binding, springiness, aeration, coating, film forming, emulsification, browning, thickening, texturizing, humectant, clarification, and cohesiveness.
107. The liquid composition of claim 106, wherein the rOVA provides an equivalent or an improvement in the characteristic compared to native egg white in a similar egg-less food item.
108. The liquid composition of any one of claims 97 to 107, wherein the rOVA provides to the egg-less food item a foam capacity of at least 20%, 30%, 40%, or 50% greater than native egg white.

109. The liquid composition of any one of claims 97 to 108, wherein the rOVA provides to the egg-less food item a time to foaming that is at least 20%, 30%, 40%, or 50% faster than native egg white.
110. The liquid composition of any one of claims 106 to 109, wherein the pH of the rOVA when solubilized is between about 3.5 and about 4.5.
111. The liquid composition of any one of claims 106 to 110, wherein the rOVA is present in the egg-less food item at about 5% to about 10% (w/w).
112. The liquid composition of claim 111, wherein the rOVA is present in the egg-less food item at about 7% to about 8% (w/w).
113. The liquid composition of any one of claims 106 to 109, wherein the rOVA is present the egg-less food item at about 4%, about 7%, or about 12% (w/w).
114. The liquid composition of claim 113, wherein the pH of the rOVA when solubilized is about 6.
115. The liquid composition of any one of claims 97 to 114, wherein the rOVA provides to the egg-less food item a hardness that is greater than native egg white.
116. The liquid composition of any one of claims 97 to 115, wherein the rOVA provides to the egg-less food item a chewiness that is greater than native egg white.
117. The liquid composition of claim 115 or claim 116, wherein the rOVA provides to the egg-less food item a springiness comparable to native egg white.
118. The liquid composition of any one of claims 97 to 117, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of a chicken OVA and the pH is between about 6.5 and 7.0 when solubilized.
119. The liquid composition of any one of claims 97 to 117, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of an ostrich OVA and the pH is less than about 6.0 and above about 3.7 when solubilized.
120. The liquid composition of any one of claims 97 to 119, wherein the rOVA does not contaminate the egg-less food item with Salmonella.
121. A dry or powdered composition comprising a recombinant ovalbumin (rOVA), the composition comprising at least 50% rOVA (w/w of total protein or w/w of total composition).
122. The dry or powdered composition of claim 121, the composition comprising at least about 60%, at least about 65%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, or at least about 95% rOVA (w/w).
123. The dry or powdered composition of claim 121 or claim 122, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.

124. The dry or powdered composition of any one of claims 121 to 123, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.

125. The dry or powdered composition of claim 123 or claim 124, wherein the amino acid sequence of the rOVA lacks an N-terminal methionine.

126. The dry or powdered composition of claim 125, wherein the rOVA further includes an EAEA amino acid sequence (SEQ ID NO: 75) at its N-terminus.

127. The dry or powdered composition of any one of claims 121 to 126, wherein the rOVA provides to an egg-less food item at least one egg white characteristic selected from gelling, foaming, whipping, fluffing, binding, springiness, aeration, coating, film forming, emulsification, browning, thickening, texturizing, humectant, clarification, and cohesiveness.

128. The dry or powdered composition of claim 127, wherein the rOVA provides an equivalent or an improvement in the characteristic compared to native egg white in a similar egg-less food item.

129. The dry or powdered composition of any one of claims 121 to 128, wherein the rOVA provides to the egg-less food item a foam capacity of at least 20%, 30%, 40%, or 50% greater than native egg white.

130. The dry or powdered composition of any one of claims 121 to 129, wherein the rOVA provides to the egg-less food item a time to foaming that is at least 20%, 30%, 40%, or 50% faster than native egg white.

131. The dry or powdered composition of any one of claims 121 to 129, wherein the pH of the rOVA when solubilized is between about 3.5 and about 4.5.

132. The dry or powdered composition of any one of claims 121 to 129, wherein the rOVA is present in the egg-less food at about 4%, about 7%, or about 12% (w/w).

133. The food product of claim 132, wherein the pH of the rOVA when solubilized is about 6

134. The dry or powdered composition of any one of claims 121 to 133, wherein the rOVA provides to the egg-less food item a hardness that is greater than native egg white.

135. The dry or powdered composition of any one of claims 121 to 134, wherein the rOVA provides to the egg-less food item a chewiness that is greater than native egg white.

136. The dry or powdered composition of claim 134 or claim 135, wherein the rOVA provides to the egg-less food item a springiness comparable to native egg white.

137. The dry or powdered composition of any one of claims 121 to 136, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of a chicken OVA and the pH is between about 6.5 and 7.0 when solubilized.

138. The dry or powdered composition of any one of claims 121 to 136, wherein the rOVA provides improved gelation when the rOVA comprises an amino acid sequence of an ostrich OVA and the pH is less than about 6.0 and above about 3.7 when solubilized.
139. A method of making a food product comprising:
providing a recombinant ovalbumin (rOVA) at a pH when solubilized of between about 3.5 and about 7.0;
combining the rOVA in an amount between 2% and 15% (w/w) with one or more consumable ingredients to form a food product,
wherein the rOVA provides at least one egg white characteristic to the food product selected from gelling, foaming, whipping, fluffing, binding, springiness, aeration, coating, film forming, emulsification, browning, thickening, texturizing, humectant, clarification and cohesiveness.
140. A method of producing an ingredient composition, the method comprising:
expressing a recombinant ovalbumin (rOVA) in a microbial cell, wherein the rOVA is secreted by the microbial cell into a liquid media;
harvesting the liquid media containing secreted rOVA;
performing a separation step at a pH of about 3.5;
solubilizing the rOVA at a pH of about 12;
adjusting the final pH of the rOVA to between about 3.5 and about 7.0 to generate the ingredient composition.
141. The method of claim 140, wherein the separation step comprises ion exchange chromatography or ammonium sulfate precipitation.
142. The method of claim 141, wherein the ion exchange chromatography is cation exchange chromatography or anion exchange chromatography, or a combination thereof.
143. The method of any one of claims 140 to 142, wherein the method further comprises a filtration step following the solubilizing step.
144. The method of any one of claims 140 to 143, wherein the microbial cell is a fungal cell.
145. The method of claim 144, wherein the fungal cell is a *Pichia* sp.
146. The method of claim 144 or claim 145, wherein the microbial cell expresses a recombinant helper factor; wherein the helper factor enhances the level of expression or accumulation of rOVA.
147. The method of any one of claims 140 to 146, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
148. The method of any one of claims 140 to 147, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.

149. The method of claim 147 or claim 148, wherein the amino acid sequence of the secreted rOVA lacks an N-terminal methionine.
150. The method of any one of claims 140 to 149, wherein the secreted rOVA further includes an EAEA amino acid sequence (SEQ ID NO: 75) at its N-terminus.
151. An egg-less food product comprising a recombinant ovalbumin (rOVA) in an amount of between about 15% and about 25% (w/w of total protein or w/w of food product).
152. The egg-less food product of claim 151, comprising the rOVA in an amount of up to about 23% (w/w).
153. Use of a recombinant ovalbumin (rOVA) as an ingredient in making a baked product.
154. Use of a recombinant ovalbumin (rOVA) as an ingredient in making an egg-less food product.
155. Use of a recombinant ovalbumin (rOVA) as an ingredient in making a meat-analog food product.
156. Use of a recombinant ovalbumin (rOVA) as an ingredient in making an egg-white substitute.
157. Use of a recombinant ovalbumin (rOVA) as a substitute egg-wash for a baked product; wherein the substitute egg-wash provides film formation equivalent to or better than an egg-wash comprising a natural egg white or a natural whole egg.
158. The use of any one of claims 153 to 157, wherein the rOVA comprises an amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 1 or an amino acid sequence with at least 70% identity to SEQ ID NO: 2 or SEQ ID NO: 1.
159. The use of any one of claims 153 to 157, wherein the rOVA comprises an amino acid sequence of a duck OVA, an ostrich OVA, or a chicken OVA.
160. The use of any one of claims 153 to 158, wherein the rOVA is present in the egg-wash in an amount between 8% and 9% (w/w).
161. A large-scale production of a recombinant ovalbumin (rOVA), wherein the large-scale production comprises an at least 1-liter liquid culture of microbial cells expressing the rOVA.
162. The large-scale production of the rOVA of claim 161, wherein the large-scale production comprises an at least 10-liter liquid culture of microbial cells expressing the rOVA.
163. The large-scale production of the rOVA of claim 162, wherein the large-scale production comprises an at least 100-liter liquid culture of microbial cells expressing the rOVA.
164. The large-scale production of the rOVA of claim 162, wherein the large-scale production comprises an at least 1,000-liter liquid culture of microbial cells expressing the rOVA.
165. The large-scale production of the rOVA of claim 162, wherein the large-scale production comprises an at least 10,000-liter liquid culture of microbial cells expressing the rOVA.

166. The large-scale production of the rOVA of claim 162, wherein the large-scale production comprises an at least 100,000-liter liquid culture of microbial cells expressing the rOVA.

167. The large-scale production of the rOVA of claim 162, wherein the large-scale production comprises about a 200,000-liter liquid culture of microbial cells expressing the rOVA.