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(54) Title: VEGETABLE COATING FOR SELECTED FOOD SUBSTRATES AND SELECTED FOOD SUBSTRATES COATED THEREWITH

(57) Abstract: A coated food substrate including a food substrate with a vegetable coating comprising vegetables which must not be either potato or corn, where the vegetables are in comminuted form and preferably have a particle size in the range of about 50 to 500 μm , and where the comminuted vegetables may be applied as a coating batter which optionally may also include vegetable pieces in the range of about 0.5 to 2 mm in largest cross-section.



VEGETABLE COATING FOR SELECTED FOOD SUBSTRATES AND SELECTED FOOD SUBSTRATES COATED THEREWITH

FIELD

[0001] This disclosure relates to coatings for food substrates, and particularly to vegetable-containing coatings for selected food substrates and the resulting coated substrates.

BACKGROUND

[0002] There is a need to expand the range of natural, healthy prepared foods, including particularly snack foods, by providing new healthy coated food substrates that may serve as snack foods and for other purposes. It is very important to ensure that these new healthy coated food substrates are flavorful and attractive so that they obtain wide acceptance. Coatings within the present teaching meet these needs because they are natural and inherently healthy, because they produce coated substrates that are also natural and have enhanced taste, color and overall appearance, and because they are sure to experience strong consumer acceptance and demand.

SUMMARY

[0003] Embodiments of the invention, together with objects and advantages thereof, may best be understood with reference to the following description. These embodiments comprise new, healthy coatings for food substrates and the enhanced coated food substrates prepared with these coatings. Embodiments also comprise methods for making the coatings.

Vegetables and Vegetable Powders

[0004] The vegetables that may be used in making the vegetable coating include pulses as well as any other vegetables (other than potato and corn) that are either available in powder form or can be reduced to powder form by drying (in air or by freeze-drying) and milling. Currently, the following vegetables are preferred: red beet, parsnip, green pea (*Pisum sativum*), horseradish, broccoli, carrot, sweet potato, spinach, bell pepper, cauliflower, cabbage and pulses. Preferred pulses are beans, lentils, chickpeas, and green peas.

[0005] The vegetables are used in comminuted form. The particle size of the comminuted vegetables should be between about 50 and 500 μm and preferably will be between about 100 and 200 μm . Particle size is currently believed to be critical to ensure proper adhesion of the coating to the substrate.

Coating Composition

[0006] The coating should be applied as a batter containing flours, starches, salts, and sugar. The coating batter may optionally also include rising agents, oils, colors, and anti-caking agents.

[0007] Optionally, vegetable pieces in the range of about 0.5-2 mm in largest cross-section can also be included in the coating composition. When such vegetable pieces are included, they should be present at a level of about 0.1-5.0 percent by weight of the total coating weight and preferably about 0.5- 1.5 percent by weight of the total coating weight. The vegetable pieces may be one or more of red beet, parsnip, green pea (*Pisum sativum*), horseradish, broccoli, carrot, sweet potato, spinach, bell pepper, cauliflower, cabbage and pulses.

[0008] The coating compositions will contain the following ingredients in the noted ranges by weight based on the total weight of the coating:

Ingredient	Broad Range	Preferred Range
vegetable powder	about 10-30%	about 12-20 %
rice flour	about 20-70%	about 15-40 %
sugar	about 5-12%	about 5-10 %
salt	about 1-6%	about 2-3 %
waxy corn starch	about 10-50%	about 15-30 %
waxy potato starch	about 10-50%	about 15-30 %
corn starch	about 10-25%	about 10-20 %
wheat flour	about 15-60%	about 15-40 %
wheat starch	about 10-25%	about 10-20 %
vegetable oil	about 0-1.5%	about 0.1-0.5 %

[0009] The sugar may be in an icing or crystal form. The salt may be in a micro or table form. The waxy corn and waxy potato starch may be native or instant. Either waxy corn or potato starch combinations thereof are used, so long as the total level is in the range of about 15-50% by weight. The cornstarch may be native or instant.

[0010] One vegetable coating batter that has been successfully employed in coating a peanut substrate in a drum coating process is set forth below:

Ingredient	Percent by Weight of Total Composition
parsnip root	15%
rice flour	48.6%
sunflower oil	0.4%
powdered sugar	8%
salt	3%
waxy starch	5%
instant starch	10%
potato starch	10%
TOTAL	100%

Food Substrates and Coating Process

[0011] The food substrate may be a snack substrate such as nuts, treenuts, seeds, chips, rice cakes, popcorn, crackers, tortillas, and extruded snacks, and snack substrates developed in the future. The substrate may also be made of or comprise poultry, beef, pork or fish. Currently, peanuts and tree nuts without shell are preferred substrates.

[0012] Any currently available coating method can be used such as a continuous nut coating process like that provided by a Kuipers nv line or an appropriate horizontal or vertical drum coating process. Batch coating processes may also be used. Once the coating is applied it can be set by baking in an oven or by frying in a deep fat fryer at a temperature of about 150 – 200 °C and preferably at a temperature of about 160-170 °C. Less preferably, the coated food substrate can be fried.

[0013] Vegetable coatings as described above, when applied to substrates as taught herein, will adhere well to the substrates. And, the resulting coated substrates will be natural and inherently healthy, and will have greatly enhanced taste, color and overall appearance. These new coated substrates will experience strong consumer acceptance and demand.

[0014] The use of any examples or exemplary language provided herein is intended to better illuminate the invention and does not pose a limitation on its scope. It should be understood that

the illustrated embodiments are exemplary only, and should not be taken as limiting the scope of the invention. Recitation of ranges of values herein are intended to serve as a shorthand method of referring individually to each separate value falling within the range, and each separate value is incorporated into the specification as if it were individually recited herein.

WHAT IS CLAIMED IS:

1. A coated food substrate comprising:
a food substrate; and
a vegetable coating including a vegetable in comminuted form, where the vegetable is neither potato nor corn.
2. The coated food substrate of claim 1 in which the vegetable in comminuted form is chosen from the group consisting of red beet, parsnip, green pea (*Pisum sativum*), horseradish, broccoli, carrot, sweet potato, spinach, bell pepper, cauliflower, cabbage and pulses.
3. The coated food substrate of claim 1 in which the vegetable in comminuted form is a pulse chosen from the group consisting of beans, lentils, chickpeas, and green peas.
4. The coated food substrate of claim 1 in which the particle size of the vegetable in comminuted form is in the range of about 50 to 500 μm .
5. The coated food substrate of claim 1 in which the particle size of the vegetable in comminuted form is in the range of about 100 to 200 μm .
6. The coated food substrate of claim 1 in which the vegetable coating batter is in the form of batter containing flours, starches, salts, and sugars.
7. The coated food substrate of claim 6 in which the coating batter also includes one or more of rising agents, oils, colors, and anti-caking agents.
8. The coated food substrate of claim 6 in which the vegetable coating batter composition includes vegetable pieces in the range of about 0.5-2 mm in their largest cross-section.
9. The coated food composition of claim 8 in which the vegetable pieces are present at a level of about 0.1-5.0 percent by weight of the total vegetable coating batter.
10. The coated food composition of claim 8 in which the vegetable pieces are present at a level of about 0.5-1.5 percent by weight of the vegetable coating batter.

11. The coated food composition of claim 8 in which the vegetable pieces are chosen from the group consisting of red beet, parsnip, green pea (*Pisum sativum*), horseradish, broccoli, carrot, sweet potato, spinach, bell pepper, cauliflower, cabbage and pulses
12. The coated food substrate of claim 1 in which the substrate is chosen from the group consisting of nuts, treenuts, seeds, chips, rice cakes, popcorn, crackers, tortillas, and extruded snacks, and snack substrates developed in the future.
13. The coated food substrate of claim 1 in which the substrate is chosen from the group consisting of poultry, beef, pork or fish.
14. The coated food substrate of claim 1 in which the substrate is chosen from the group consisting of peanuts and tree nuts without shell.
15. The coated food substrate of claim 1 in which the vegetable coating is in the form of a batter applied to the substrate in a continuous or batch coating process which is set by baking in an oven or by frying in a deep fat fryer.
16. A coated food substrate comprising:
a food substrate; and
a batter applied to the substrate comprising

vegetable powder	about 10-30%
rice flour	about 20-70%
sugar	about 5-12%
salt	about 1-6%
waxy corn starch	about 10-50%
waxy potato starch	about 10-50%
corn starch	about 10-25%
wheat flour	about 15-60%
wheat starch	about 10-25%
vegetable oil	about 0-1.5%

17. The coated food substrate of claim 16 in which the batter comprises

vegetable powder	about 12-20%
rice flour	about 15-40 %
sugar	about 5-10 %
salt	about 2-3 %
waxy corn starch	about 15-30 %
waxy potato starch	about 15-30 %
corn starch	about 10-20 %
wheat flour	about 15-40 %
wheat starch	about 10-20 %
vegetable oil	about 0.1-0.5 %

18. The coated food substrate of claim 16 including either waxy corn or potato starch combinations thereof are used, so long as the total level is in the range of about 15-50% by weight.

19. A coated food substrate comprising:
a food substrate; and:

parsnip root	15%
rice flour	48.6%
sunflower oil	0.4%
powdered sugar	8%
salt	3%
waxy starch	5%
instant starch	10%
potato starch	10%

INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A23L 33/20; A23L 19/00; A23L 19/10 (2017.01)

CPC - A23L 33/20; A23L 19/00; A23L 19/01; A23L 19/09; A23L 19/10 (2017.08)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

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)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2015/0264971 A1 (PROTEUS INDUSTRIES INC) 24 September 2015 (24.09.2015) entire document	1-3, 12-15 ----- 4-6, 8-11
Y	US 2015/0257417 A1 (EMSLAND-STÄRKE GMBH) 17 September 2015 (17.09.2015) entire document	4, 5
Y	WO 2012/175930 A1 (CRISP SENSATION HOLDING S A) 27 December 2012 (27.12.2012) entire document	6, 8-11

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

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