

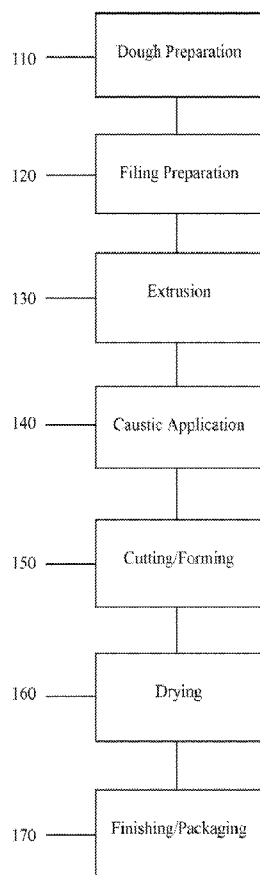


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[Continued on next page]

(54) Title: FOOD PRODUCT WITH CAUSTIC

(57) Abstract: A filled foodstuff including an edible filling; and a crispy baked casing surrounding the edible filling, the baked casing having an outer surface with a porosity less than a porosity of an inner portion of the baked casing, and the baked casing having a dry weight that is about 60 wt% to about 70 wt% of the dry weight of the filled foodstuff.





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## TITLE

Food Product with Caustic

## BACKGROUND OF THE INVENTION

[0001] The present invention relates to filled food products that are prepared with an application of caustic.

## BRIEF SUMMARY OF THE INVENTION.

[0002] According to some embodiments, a filled foodstuff of the present invention includes an edible filling and a crispy baked casing surrounding the filling. In some embodiments, the baked casing has a dry weight that is about 60 wt% to about 70 wt% of the dry weight of the filled foodstuff, or about 65 wt% of the filled foodstuff.

[0003] In some embodiments, the baked casing may have an outer surface with a porosity less than a porosity of an inner portion of the baked casing. In some embodiments, the outer surface of the baked casing includes a smooth, shiny appearance which is not present in the inner portion of the baked casing. In some embodiments, the outer surface of the baked casing includes a sheen-like appearance which is not present in the inner portion of the baked casing.

[0004] According to some embodiments of the present invention, a method for making a filled foodstuff includes assembling a pre-baked filled foodstuff comprising a dough-based casing surrounding a filling; applying caustic solution to the pre-baked filled foodstuff; baking the filled foodstuff; and cooling the filled foodstuff to obtain a filled foodstuff having the edible filling surrounded by the cooked casing. In some embodiments, the cooked casing has a crispy, crunchy texture and a sheen on an outer surface of the cooked casing.

[0005] In some embodiments, the pre-baked filled foodstuff may be assembled by extruding a dough to prepare the dough-based casing. In some embodiments, the dough and filling are coextruded.

[0006] In some embodiments, the caustic solution is sodium hydroxide, such as 1% sodium hydroxide.

## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] The foregoing summary, as well as the following detailed description of certain embodiments of the food product will be better understood when read in

conjunction with the following exemplary embodiments, the appended drawing and the appendices.

**[0008]** Fig. 1 shows a method for preparing a filled foodstuff according to embodiments of the present invention.

**[0009]** Fig. 2 shows a method for preparing a filled foodstuff according to embodiments of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0010]** One embodiment of the present invention relates to a caustic-treated, baked filled foodstuff. In one embodiment, the foodstuff has a dough-based casing and a filling such as a fat-based filling. The foodstuff may be generally prepared by forming dough, adding a filling to form a pre-baked foodstuff, applying caustic to the pre-baked foodstuff, and baking the foodstuff. In some embodiments, application of caustic, such as aqueous sodium hydroxide, to the dough portion of the pre-baked foodstuff results in a final product foodstuff having a casing with multiple textures. In one embodiment, the caustic solution applied to the pre-baked foodstuff may solubilize material proximate the outer surface of the dough-based casing and result in a sheen and/or a crunchy texture on the outer surface or outer portion of the baked foodstuff.

**[0011]** Referring to Figure 1 in detail, the flow chart shows a general process scheme for making a foodstuff, in accordance with an exemplary embodiment of the present invention. As illustrated, a foodstuff may be produced by a method that includes: a) dough preparation 110; b) filling preparation 120; c) extrusion 130; d) caustic application 140; e) cutting and forming 150; f) baking 160; and g) finishing and/or packaging 170.

**[0012]** Referring to Figure 2, preparation of a foodstuff of some embodiments of the present invention may begin with dough preparation. In one embodiment, dry ingredients may first be added to dry mixer 204. After mixing, the dry ingredients may be transferred to dry feeder 206. In one embodiment, the dry ingredients are then added to extruder 208. Water may also be added to extruder 208, for example by water pump 210. In one embodiment, the water and dry ingredients combine to form a dough in extruder 208. A filling may be prepared and added to the dough to create a pre-baked foodstuff. In some embodiments, the filling is added to extruder 208, for example by pump 212, and is coextruded with the dough. In some embodiments, the coextruded dough and filling

may be treated with caustic 214. The caustic may be applied to the outer surface of the pre-baked foodstuff, for example by spraying, dipping, waterfall, or bath. Next, the pre-baked foodstuff may be formed into a desired size and shape, such as by crimper 216. The formed foodstuff may then be baked, for example in dryer 218, to form a foodstuff.

**[0013]**     Dough-based portion

**[0014]**     In some embodiments, a dough-based portion may be prepared in a process that includes combining dry ingredients such as flour (e.g., a starch-based flour such as whole wheat flour, enriched flour, corn flour, potato flour, rice flour, oat flour, barley flour, and the like), sugar, cocoa, dough salt, seasonings and/or color with water to form a dough. In some embodiments, the dough-based portion includes no or substantially no leaveners.

**[0015]**     The dry ingredients may be combined with liquids, such as water or oils, to prepare a dough. In some embodiments, the dry ingredients are combined with water in an amount of about 2 wt% to about 20 wt% of the dough.

**[0016]**     In some embodiments, additional ingredients may be included in the dough based on, for example, desired taste, nutrition, texture, and visual appeal of the dough. In some embodiments, doughs may be prepared to achieve a sweet or savory casing. In some embodiments, ingredients which may be incorporated in the dough include whole grains, non-whole grains, flavor and/or texture inclusions, dough salt, fiber, protein, sweeteners, colors, fruits, vegetables, flavors, soy pieces, meat pieces, seeds, nuts and/or other inclusions, and/or additives such as sodium acid pyrophosphate, calcium phosphate monobasic, and/or sodium bicarbonate.

**[0017]**     In addition to the foregoing, the doughs employed in some embodiments of the present invention may include other additives conventionally employed in crackers and cookies. Such additives may include, for example, dairy by-products, enzyme modified milk powder, whey, soluble or insoluble edible fiber, such as inulin or other fructooligosaccharides, resistant starch, oat fiber, corn bran, wheat bran, oat bran, rice bran, and soluble polydextrose, egg or egg by-products, cocoa, peanut butter, vanilla or other flavorings, flour substitutes or bulking agents, such as polydextrose, hollocellulose, microcrystalline cellulose, mixtures thereof, and the like, as well as inclusions or particulates such as nuts, raisins, coconut, flavored chips such as chocolate chips,

butterscotch chips, white chocolate chips, peanut butter chips, caramel chips, and the like in conventional amounts. In some embodiments, an insoluble fiber such as resistant starch or oat fiber may be employed in the dough. In embodiments of the invention, these additives, such as fiber, chocolate chips or other flavor chips, may be employed in amounts up to about 25% by weight, for example from about 10% by weight to about 20% by weight, based upon the weight of the dough.

**[0018]** A source of protein, which is suitable for inclusion in baked goods, may be included in the doughs of the present invention. In one embodiment, the inclusion of protein promotes Maillard browning. The source of protein may include non-fat dry milk solids, dried or powdered eggs, mixtures thereof, and the like. Also, protein concentrates and isolates from various sources, such as rice, soy, and/or dairy, may be included in the dough-based portion. The amount of the proteinaceous source may, for example, range up to about 20 wt%, based upon the weight of the dough.

**[0019]** In some embodiments, dough of the present invention has no or substantially no leaveners. In some embodiments, dough of the present invention may contain a leavening system in an amount of up to about 2.5 wt%, based upon the weight of the dough before baking. Exemplary chemical leavening agents or pH-adjusting agents which may be used include alkaline materials and acidic materials such as sodium bicarbonate, ammonium bicarbonate, calcium acid phosphate, sodium acid pyrophosphate, diammonium phosphate, tartaric acid, mixtures thereof, and the like. The leavening agent may include yeast alone or in combination with chemical leavening agents.

**[0020]** Enzymes conventionally used in cracker production, such as amylases and proteases, may be included in the dough in conventional amounts in embodiments of the present invention.

**[0021]** The doughs of the present invention may include antimicrobials or preservatives, such as calcium propionate, potassium sorbate, sorbic acid, and the like. Exemplary amounts may range up to about 1% by weight of the dough, to assure microbial shelf-stability. In some embodiments, the dough of the present invention has a low water activity and therefore does not include or require preservatives.

**[0022]** Emulsifiers may be included in effective, emulsifying amounts in the doughs of the present invention. Exemplary emulsifiers which may be used include, mono- and di-glycerides, polyoxyethylene sorbitan fatty acid esters, lecithin, stearyl lactylates, and mixtures thereof. Exemplary of the polyoxyethylene sorbitan fatty acid esters which may be used are water-soluble polysorbates such as polyoxyethylene (20) sorbitan monostearate (polysorbate 60), polyoxyethylene (20) sorbitan monooleate (polysorbate 80), and mixtures thereof. Examples of natural lecithins which may be used include those derived from plants such as soybean, rapeseed, sunflower, or corn, and those derived from animal sources such as egg yolk. Soybean-oil-derived lecithins are preferred. Exemplary of the stearyl lactylates are alkali and alkaline stearyl lactylates such as sodium stearyl lactylate, calcium stearyl lactylate, DATEM and mixtures thereof. Exemplary amounts of the emulsifier which may be used range up to about 3% by weight of the dough.

**[0023]** In some embodiments, a dough is admixed with one or more processing aids before baking. In some embodiments, processing aids may improve the consistency of the dough for forming, for example, a casing or outer layer of the foodstuff. For example, oil may be admixed to the dough as a processing aid. In addition to providing physical benefits to processing, oil may contribute improved taste to the finished product. Oils useful in the present methods and products may include high oleic canola oil, soybean oil, safflower oil, and/or solid fats such as shortening.

**[0024]** Exemplary formulations are included in the example section.

**[0025]** Any suitable additional ingredients may be included in the dough as desired. Examples of such additional ingredients include, but are not limited to, fibers, proteins, cheese, flavors, fruits, veggies, soy pieces, meat pieces, seeds, nuts, specialty whole grains such as quinoa or other inclusions, and combinations thereof.

**[0026]** Once all ingredients are incorporated, the dough may be formed into the dough-based portion by, for example, sheeting or dough extrusion or any other known method, as discussed herein. In some embodiments, the dough-based portion exhibits desirable strength characteristics such as elasticity and/or viscosity.

**[0027]**     Filling

**[0028]**     Foodstuffs of the present invention may include a filling. In some embodiments, the filling is fat-based. In some embodiments, the filling is not a fat-based filling. In some embodiments, any edible filling, including commercially available fillings, may be employed in the present invention. The filling may be savory or sweet. In some embodiments, the filling may be a cheese-type filling or a nut butter filling. In some embodiments, a suitable filling is bake-stable. In some embodiments, a suitable filling includes a composition and/or method of making a composition as disclosed in U.S. Patent Application Publication No. 2010/0209588. Exemplary formulations are included in the example section.

**[0029]**     Assembling

**[0030]**     A foodstuff of the present invention may include a dough-based portion, such as a casing, and a filling. Multiple variations of combinations of dough-based portion(s) and filling(s) are possible. The dough-based portion and the filling portion may be combined in the form of a casing and filling respectively. The foodstuff of the present invention may also be in the form of a sandwich, an enclosed pocket, a layer of exposed filling on the dough-based portion, or any other suitable combination of a dough-based portion and a filling.

**[0031]**     In some embodiments, an assembled foodstuff includes a filling in an amount of about 10 wt% to about 55 wt% of the assembled foodstuff; about 15 wt% to about 50 wt% of the assembled foodstuff; about 20 wt% to about 45 wt% of the assembled foodstuff; about 25 wt% to about 40 wt% of the assembled foodstuff; or about 30 wt% to about 40 wt% of the assembled foodstuff. In some embodiments, an assembled foodstuff includes dough-based portion or baked casing in an amount of about 45 wt% to about 90 wt% of the assembled foodstuff; about 50 wt% to about 85 wt% of the assembled foodstuff; about 55 wt% to about 80 wt% of the assembled foodstuff; about 60 wt% to about 75 wt% of the assembled foodstuff; or about 60 wt% to about 70 wt% of the assembled foodstuff.

**[0032]**     A filling may be added to the dough in any suitable manner. In some embodiments, the dough is sheeted or extruded. In some embodiments, the dough is sheeted between conventional, counter-rotating sheeting rolls. In some embodiments, the



sheeting rolls may be chilled. The dough may be sheeted by a straight sheeting process by gradually reducing the dough sheet thickness. In some embodiments, the dough may be extruded. In some embodiments, the dough may be prepared in an extruder, such as a twin screw extruder, and/or may be co-extruded with the filling. In some embodiments, the dough may be prepared in a cooker extruder, a high pressure extruder, and/or a direct expansion extruder.

[0033] In some embodiments, a filling is deposited on a layer of dough. In some embodiments, a filling is sandwiched between two layers of dough. In some embodiments, the filling is exposed on the edges of the foodstuff. In some embodiments, the filling is completely enclosed within the dough. In some embodiments, the dough is crimped to partially or completely enclose the filling.

[0034] In some embodiments, the filling and dough can be co-extruded at low pressure and shear conditions. In some embodiments, the filling and dough may be co-extruded in a weight percent ratio of filling to dough of about 10 wt%:90 wt% to about 50 wt%:50 wt%; about 25 wt%:75wt% to about 40 wt%:60 wt%; or about 35 wt%:65 wt%.

[0035] In some embodiments, the assembled foodstuff can be cut and/or crimped before baking. The assembled foodstuff may be cut into any desirable size and shape. In some embodiments, the assembled foodstuff may be cut into squares or pillows, such as 1 inch by 1 inch, or sticks, such as 1 inch by 2 inch. Assembled foodstuff may include designs and/or patterned edges such as scalloped edges, or a sin wave design.

[0036] Caustic

[0037] In some embodiments, a caustic solution is applied to a foodstuff. The caustic solution may be applied to the foodstuff after assembling and before baking. In some embodiments, the caustic solution is applied to the foodstuff after baking and before drying. In some embodiments, caustic is applied to the foodstuff after baking in an extruder and before crimping/forming the foodstuff. In other embodiments, caustic is applied to the foodstuff after baking in an extruder and after crimping/forming the foodstuff.

[0038] Caustic solution may be applied by any suitable method. In some embodiments, the caustic solution is applied to the foodstuff by submersing the foodstuff

in a bath of caustic solution. In some embodiments, the foodstuff is submersed in caustic solution for about 0.5 seconds to about 3 seconds. In some embodiments, the caustic solution is at a temperature of about 185°F to about 205°F. The caustic solution may also be sprayed or poured onto the foodstuff. In some embodiments, caustic solution may be applied to the foodstuff while tumbling the foodstuff. In some embodiments, caustic solution may penetrate the foodstuff to a depth of about 1 mm to about 5 mm from the surface.

**[0039]** In some embodiments, the caustic solution may be a 0.5% to 1.5% aqueous caustic solution and preferably about a 1% aqueous caustic solution. A suitable caustic may include sodium hydroxide. In some embodiments, the caustic solution is applied at room temperature, at temperature of about 180°F to about 200°F, or at a temperature of about 190°F. In some embodiments, a 0.5 wt% to 2 wt% brine solution and water may be used in place of the caustic solution.

**[0040]** In some embodiments, the application of caustic solution to the foodstuff before baking results in the outer surface of the dough-based portion of the baked foodstuff having a sheen, or a shiny appearance. The caustic solution may solubilize the surface and denature proteins and gelatinize starches on the surface to provide a smooth and crunchy outer surface or outer portion of the dough-based portion of the baked foodstuff. For example, a foodstuff having an outer surface of the dough-based portion treated with caustic, as described herein, may result in a baked foodstuff having an outer surface of the dough-based portion with a higher sheen and a crispier crunchier texture than a foodstuff prepared without an application of caustic to the outer surface of the dough-based portion of the foodstuff before baking.

**[0041]** In some embodiments, the dough-based portion of the baked foodstuff includes an outer portion and an inner portion. The outer portion may be a portion substantially defined by the effects of the caustic treatment. For example, the outer portion of the baked dough-based portion may correspond to a penetration depth of the caustic treatment. In one embodiment, the outer portion of the baked dough-based portion has a porosity which is lower than the porosity of the inner portion of the baked dough-based portion. The porosity of the outer portion of the baked dough-based portion may be about 25% of the porosity of the inner portion of the baked dough-based portion.

In some embodiments, the porosity of the outer portion of the baked dough-based portion is less than about 25% of the porosity of the inner portion of the baking dough-based portion. In some embodiments, the porosity of the outer portion of the baked dough-based portion is about 10% to about 35% of the porosity of the inner portion of the baked dough-based portion. In some embodiments, the porosity of the outer portion of the baked dough-based portion is about 15% to about 30% of the porosity of inner portion of the baked dough-based portion. In some embodiments, the porosity of the outer portion of the baked dough-based portion is about 20% to about 25% of the porosity of the inner portion of the baked dough-based portion. In one embodiment, the porosity of the inner portion of the baked dough-based portion is substantially uniform across the inner portion of the baked dough-based portion. In one embodiment, the porosity of the outer portion of the baked dough-based portion is substantially uniform across the outer portion of the baked dough-based portion. In some embodiments, the outer portion of the baked dough-based portion has a thickness of about 1 mm, or less than about 1 mm. In some embodiments, the outer portion of the baked dough-based portion has a thickness of about 1 mm to about 5 mm.

**[0042]**     Baking

**[0043]**     Assembled foodstuff of the present invention may be baked using any suitable oven or conventional method. In some embodiments, assembled foodstuffs are baked at a temperature of about 200°F to about 350°F, about 220°F to about 300°F; or about 220°F. In some embodiments, the assembled foodstuffs are baked for about 2 to about 30 minutes, about 3 minutes to about 20 minutes, or about 10 minutes.

**[0044]**     During baking, the foodstuff may puff up, develop an air pocket between the fat-based portion and a layer of the dough-based portion, and/or develop blistering and layering of the dough-based portion. In some embodiments, layering in the dough-based portion of the baked foodstuff simulates laminated products, even though the dough-based portion was formed by sheeting or extrusion.

**[0045]**     In some embodiments, the foodstuffs are baked to produce a foodstuff having a moisture content of about 1% to about 5%; about 1% to about 4%; or about 2% to about 3%.

[0046] In some embodiments, after baking, the foodstuff may be dried and/or additional oil and/or salt/seasoning may be applied. Drying may be conducted by any suitable method, including convection or dielectric dryer.

[0047] The following examples, wherein all parts, percentages, and ratios are by weight, and all temperatures are in °F unless indicated to the contrary, illustrate the present invention:

[0048] Examples

[0049] Example 1:

[0050] A savory filled snack may be prepared according to the following formulation:

| Ingredient                      | % Total Product |
|---------------------------------|-----------------|
| <b>Casing</b>                   |                 |
| Climax flour                    | 32.49           |
| Rice flour                      | 25.99           |
| Gran Sugar #1                   | 5.85            |
| Dough salt                      | 0.65            |
| Color – IFC K2                  | 0.01            |
| <b>Filling</b>                  |                 |
| KFIC Cheezytang                 | 9.45            |
| Lactose                         | 6.82            |
| High Oleic Canola Oil           | 6.30            |
| Palm Oil – Non-hydro shortening | 5.25            |
| Corn starch                     | 1.75            |
| Calcium sulfate                 | 1.75            |
| Flavor – cream powder           | 1.40            |
| Calcium stearate                | 1.22            |
| Dough salt                      | 0.52            |
| Citric acid                     | 0.17            |
| Monosodium glutamate            | 0.14            |
| Lecithin                        | 0.10            |
| Cheese flavor                   | 0.05            |
| Purac powder                    | 0.03            |
| Color – Annatto                 | 0.01            |
| Paprika - Oleoresin             | 0.01            |

[0051] The listed casing ingredients are combined with water to prepare a dough. The dough contains water in an amount of about 2 wt% to about 20 wt% of the dough.

**[0052]**    Example 2:**[0053]**    A sweet filled snack may be prepared according to the following formulation:

| <b>Ingredient</b>    | <b>% Total Product</b> |
|----------------------|------------------------|
| <b>Casing</b>        |                        |
| Rice flour           | 26.00                  |
| Climax flour         | 24.70                  |
| Gran Sugar #1        | 7.80                   |
| Cocoa                | 5.85                   |
| Dough salt           | 0.65                   |
| <b>Filling</b>       |                        |
| Powder sugar         | 22.45                  |
| Vegetable shortening | 12.52                  |
| Flavor – vanillin    | 0.02                   |
| Soy lecithin         | 0.01                   |

**[0054]**    The listed casing ingredients are combined with water to prepare a dough. The dough contains water in an amount of about 2 wt% to about 20 wt% of the dough.**[0055]**    Example 3:**[0056]**    A filled snack may be prepared according to the following method. Dry ingredients for the casing may first be mixed in a dry mixer. After mixing, the dry ingredients can be added to the dry feeder. The dry ingredients can then be fed to an extruder, such as a twin screw extruder. The dry ingredients may be fed at a rate of between about 195 lb/hr to about 390 lb/hr, or about 290 lb/hr. Water may also be pumped into the twin screw extruder at a rate of between about 5.0 lb/hr to about 32.0 lb/hr, or about 15.0 lb/hr. The water and dry ingredients may be combined in the extruder to form a dough.**[0057]**    The extruder may be a cooker extruder, having several temperature zones. For example, Zone 1 may be about 200°F to about 400°F, or about 300°F; Zone 2 may be about 200°F to about 400°F, or about 325°F; Zone 3 may be about 100°F to about 300°F, or about 200°F; and Zone 4 may be about 100°F to about 200°F, or about 150°F.**[0058]**    The extruder may be fitted with a die, such as a triple extruder die. The extruder die may have a pressure of about 400 psi to about 1200 psi, or about 800 psi. Prepared filling may be fed to the extruder die, and the dough and filling may be coextruded such that the dough surrounds the filling.

[0059] Optionally, compressed air may also be fed into the extruder die. Compressed air may be connected to the die and regulated to about 2 psi to about 20 psi. The air may be injected between the filler nozzle and the casing annulus, and may stretch the dough out to thin the dough wall in order to achieve a desired texture or increase the piece size.

[0060] The coextruded rope may contain up to 55 wt% filling (with the remainder comprising dough); or about 35 wt% filling and 65 wt% dough.

[0061] The coextruded rope may then be sprayed with caustic solution. The caustic solution may be sprayed in an amount of up to about 40 wt%. Optionally, a 0.5% to 2% brine solution or water may be used in place of the caustic solution.

[0062] The coextruded and caustic-treated rope may then be crimped to form individual filled pieces. The pieces may proceed to a dryer, such as a three zone dryer. Each of the zones may have a temperature of about 220°F to about 300°F, or about 250°F. Residence time in the dryer may be from about 3 minutes to about 20 minutes, or about 10 minutes. The baked pieces may then be seasoned, cooled, and/or packaged.

[0063] It will be appreciated by those skilled in the art that changes could be made to the exemplary embodiments shown and described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the exemplary embodiments shown and described, but it is intended to cover modifications within the spirit and scope of the present invention as defined by the claims. For example, specific features of the exemplary embodiments may or may not be part of the claimed invention and features of the disclosed embodiments may be combined.

[0064] It is to be understood that at least some of the figures and descriptions of the invention have been simplified to focus on elements that are relevant for a clear understanding of the invention, while eliminating, for purposes of clarity, other elements that those of ordinary skill in the art will appreciate may also comprise a portion of the invention. However, because such elements are well known in the art, and because they do not necessarily facilitate a better understanding of the invention, a description of such elements is not provided herein.

[0065] The claims directed to the method of the present invention should not be limited to the performance of their steps in the order written except where expressly

stated, and one skilled in the art can readily appreciate that the steps may be varied and still remain within the spirit and scope of the present invention.

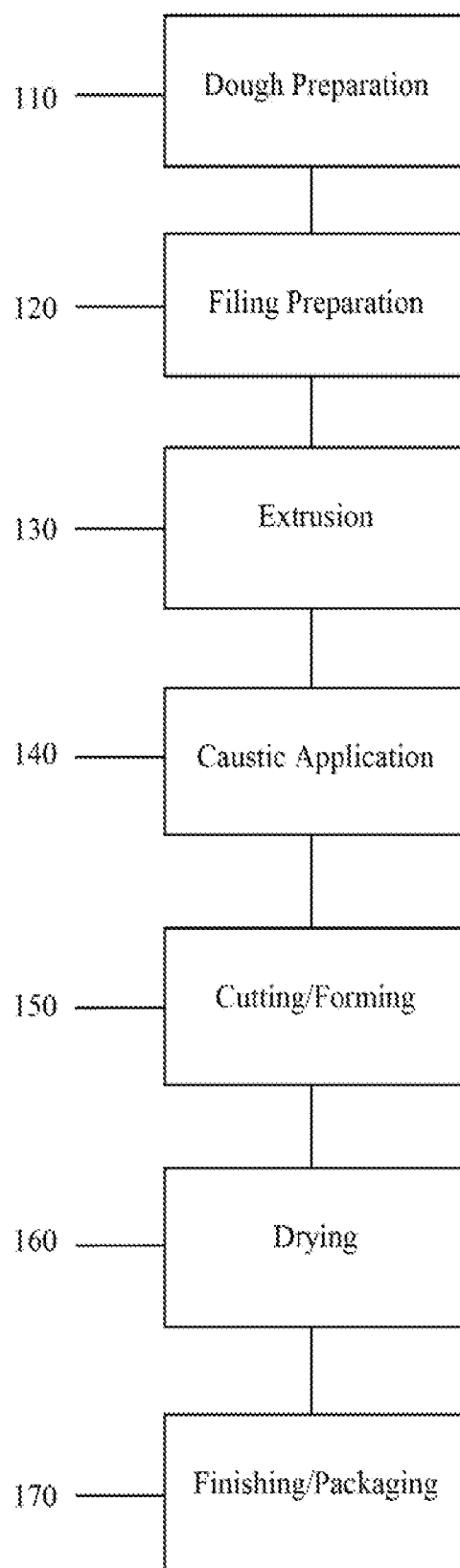
## CLAIMS

We claim:

1. A filled foodstuff comprising  
an edible filling; and  
a crispy baked casing surrounding the edible filling,  
the baked casing having an outer surface with a porosity less than a porosity of an inner portion of the baked casing, and  
the baked casing having a dry weight that is about 60 wt% to about 70 wt% of the dry weight of the filled foodstuff.
2. The filled foodstuff of claim 1, wherein the outer surface of the baked casing includes a smooth, shiny appearance which is not present in the inner portion of the baked casing.
3. The filled foodstuff of claim 1, wherein the outer surface of the baked casing includes a sheen-like appearance which is not present in the inner portion of the baked casing.
4. The filled foodstuff of claim 1, wherein the baked casing comprises about 65 wt% of the weight of the filled foodstuff.
5. A method for making a filled foodstuff having an edible filling and a crispy cooked casing, comprising:
  - (a) assembling a filled foodstuff comprising a dough-based casing surrounding a filling;
  - (b) applying caustic solution to the filled foodstuff;
  - (c) baking the filled foodstuff;
  - (d) cooling the filled foodstuff to obtain a filled foodstuff having the edible filling surrounded by the cooked casing, the cooked casing having a crispy, crunchy texture and having a sheen on an outer surface of the cooked casing.
6. The method of claim 5, wherein the caustic solution comprises sodium hydroxide.
7. The method of claim 6, wherein the caustic solution comprises about 1% sodium hydroxide.
8. The method of claim 5, wherein the caustic is applied by spraying.

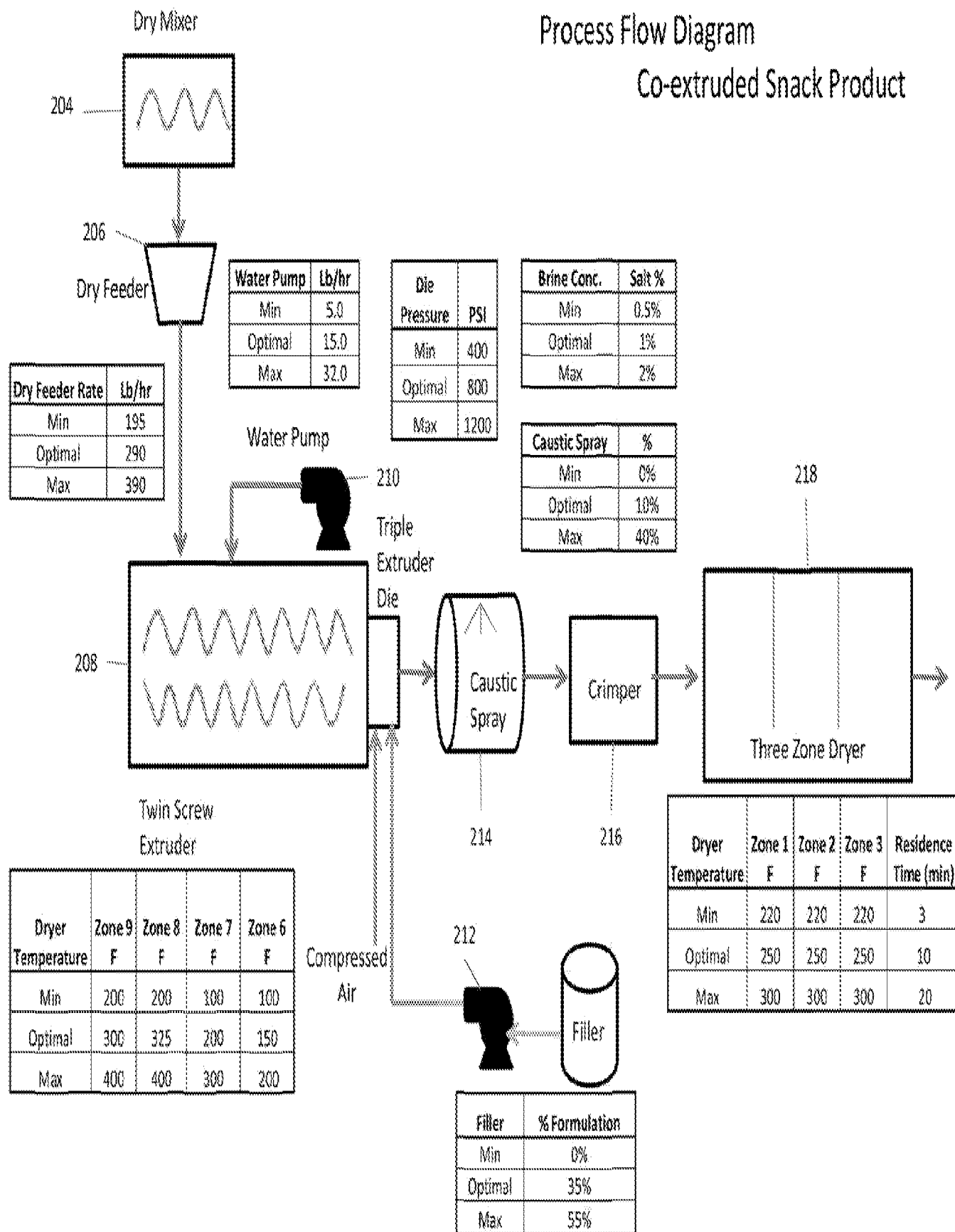


9. The method of claim 5, wherein the assembling a filled foodstuff comprises extruding a dough to prepare the dough-based casing.
10. The method of claim 5, wherein the assembling a filled foodstuff comprises co-extruding the dough-based casing and the filling.
11. The method of claim 5, wherein the cooked casing comprises about 60 wt% to about 70 wt% of the weight of the filled foodstuff.
12. The method of claim 1, further comprising drying the filled foodstuff after applying the caustic solution.



## Process Flow Diagram

## Co-extruded Snack Product



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2012/035983

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A23G 3/54 (2012.01)

USPC - 426/283

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)

IPC(8) - A21D 13/00, 08; A23G 3/54; A23P 1/12 (2012.01)

USPC - 426/94, 138, 275, 283

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)

PatBase, Google Patents, Google, ProQuest

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                             | Relevant to claim No. |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Y         | US 2009/0220654 A1 (KINO et al) 03 September 2009 (03.09.2009) entire document                                                                                                                                                                                                 | 1-12                  |
| Y         | US 5,124,161 A (VAN LENDERICH et al) 23 June 1992 (23.06.1992) entire document                                                                                                                                                                                                 | 1-4, 12               |
| Y         | US 2006/0057269 A1 (TIEFENBACHER) 16 March 2006 (16.03.2006) entire document                                                                                                                                                                                                   | 1-4, 12               |
| Y         | US 2007/0059413 A1 (HARTMANN) 15 March 2007 (15.03.2007) entire document                                                                                                                                                                                                       | 2, 3, 5-11            |
| Y         | US 4,759,939 A (KELLER et al) 26 July 1988 (26.07.1988) entire document                                                                                                                                                                                                        | 5-12                  |
| A         | Paramount Chemicals & Plastics, Inc. Caustic Soda--Commercial Grade, Product Specification. 2007. retrieved on July 11 2012. retrieved at <a href="http://www.paramountchemicals.com/CausticS.asp">http://www.paramountchemicals.com/CausticS.asp</a> 4 pages. entire document | 1-12                  |
| A         | US 6,267,998 B1 (BAUMAN et al) 31 July 2001 (31.07.2001) entire document                                                                                                                                                                                                       | 1-12                  |
| A         | US 2002/0039612 A1 (GAMBINO et al) 04 April 2002 (04.04.2002) entire document                                                                                                                                                                                                  | 1-12                  |
| A         | US 2009/0081335 A1 (ORTIZ et al) 26 March 2009 (26.03.2009) entire document                                                                                                                                                                                                    | 1-12                  |

☐ Further documents are listed in the continuation of Box C.


\* 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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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

28 June 2012

Date of mailing of the international search report

20 JUL 2012

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