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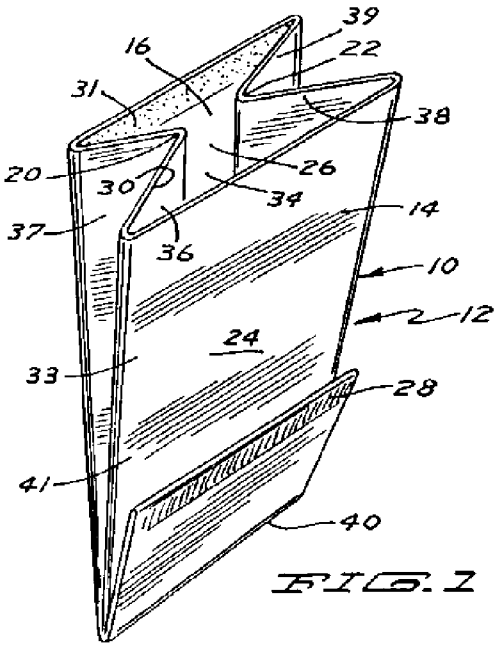


FIG. 1

(57) Abstract: Disclosed are microwave popcorn articles comprising any conventional microwave popcorn bag, and a food charge disposed therein comprising kernel popcorn, edible oil and powdered sugar to provide the finished popped popcorn with sweet glaze coating wherein the sweet glaze coating comprises powdered sugar. Methods of preparing such microwave popcorn articles are disclosed wherein the slurry added to the bag comprises powdered sugar and edible oil and is added preferably after the kernel popcorn has been added to the bag.

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POWDERED SUGAR FOR MICROWAVE POPCORN

RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. provisional application 61/249,553 filed on October 7, 2009, which is hereby incorporated herein in its entirety for all purposes.

FIELD

[0002] The present invention relates to packaged food products and to their methods of preparation. In particular, the present invention relates to microwave popcorn product articles for preparing sweetened popcorn using powdered sugar and to methods for filling such articles.

BACKGROUND

[0003] Popcorn is a highly popular snack food item. In the past, the at-home preparation of popcorn by the consumer involved adding kernel popcorn plus a cooking oil to a covered pot and heating until the popcorn kernels popped to make popcorn. As used herein, "kernel popcorn" refers to unpopped popcorn. The noun "popcorn" or synonymously "popped popcorn" refers herein to popped kernel popcorn. The adjective "popcorn" can refer to either. Once prepared, common, relatively coarse, table salt is a frequently added flavoring or condiment. The resultant salted popped popcorn is a familiar snack food.

[0004] More recently, microwave popcorn products have become extremely popular. At present, in the U.S., over 70 different brands of microwave popcorn products are available. In general, the more popular microwave popcorn products comprise an expandable paper bag containing a charge of kernel popcorn, and optionally fat and/or salt. The microwave popcorn article is adapted to be heated in a microwave oven for three to five minutes to produce the popped popcorn. More recently, improved microwave popcorn articles have been fabricated employing a metallized susceptor which facilitates the heating of the kernel popcorn-fat charge and which, in turn, leads desirably to increases in popcorn volume and decreases in unpopped kernels. Microwave popcorn articles of this type are described in detail in, for example, U.S. Pat. No. 4,450,180 (issued May 22, 1984 to J. D. Watkins and incorporated herein by reference).

[0005] The fat component is generally flavored with artificial butter flavor although microwave popcorn with real butter products are known and commercially available (see US 5,919,505 "Shelf-Stable Butter Containing Microwave Popcorn Article and Method of Preparation" issued Jul. 6, 1999 to Monsalve et al.).

[0006] Sweet popcorn products or "kettle corn" popcorn are well known. Among these, caramel popcorn has long been a popular food item. Such products generally comprise a sweet coating, typically from white sugar and/or small amounts of brown sugar and/or sugar-based syrups such as molasses or black strap sugar syrup to provide a caramel flavor and that can also contain butter and/or other fat(s). Bulk amounts of popcorn are prepared (sometimes admixed with nuts) and the sugar-based coating is applied thereto by manufacturers to make the caramel popcorn. Quantities are provided in suitable consumer packaging such as bags whether or not in cartons or other suitable containers, e.g., plastic tubs. Various amounts of salt are added to provide a merely sweet to a sweet-and-salty flavor. With lesser amounts of coating, the coated popcorn can be free flowing. With more coating, agglomerated pieces or even popcorn balls are made.

[0007] Microwave products for preparing sweetened puffed products are known (see for example US 4,409,250 to Van Hulle et al.). However, sweet microwave puffed products comprising sugars can exhibit scorching or even runaway heating due to the high microwave absorption by sugars and salt and the low browning or burning temperatures of sugar. (For a description of such problems, see, for example US 5,443,858 "Composition For Sweetening Microwave Popcorn; Method And Product" issued August 22, 1995 to Jensen, et al.). In extreme cases, the microwave bag can actually ignite due to the burning sugars. Sugar scorching problems are aggravated by salt, making provision of "sweet and salty" products (i.e., products having a more pronounced salt flavor due to higher levels of salt) especially difficult. The excessive heat can also scorch the popcorn.

[0008] One approach for providing a microwave popcorn product having a sweet or cheese coating that does not scorch or burn during microwave popcorn popping is to separately package the coating from the microwave popcorn for post popping addition thereto (see for example, US 4,904,488 "Uniformly-Colored, Flavored, Microwaveable Popcorn" issued Feb. 27, 1990 to LaBaw et al.).

[0009] Another approach is described in US 5,443,858 "Composition for Sweetening Microwave Popcorn; Method and Product (issued Aug 22, 1995 to Jensen et al.). The '858 teaches a microwave popcorn article including a food charge formulated to include in addition to popcorn ingredients for forming a coating to the popped popcorn. The coating feature ingredients are selected to include a low moisture coarser granulation sugars in combination with selection of a low melting point oil and salt and moisture level control to provide a microwave sweet popcorn product.

[0010] Another technique for providing a sweet microwave popcorn product is to employ in substitution for low temperature burning temperature sugars a sweetening agent that exhibits greater tolerance to higher temperatures such as acetylsulfame K and/or Sucralose. Sucralose was not approved for use in microwave popcorn products in the United States until August 1999 when sucralose was approved for use for all food categories. Soon thereafter, several microwave popcorn manufacturers began marketing sweet or "kettle corn" microwave popcorn products (see for example, published US patent application US 2002/0127306 "Sweet and Salty Microwave Popcorn Compositions; Arrangements and Methods"). Such products generally employ low levels of the intensely sweet sucralose typically dispersed or diluted in small amounts of a heat tolerant powdered carrier or diluent such as a maltodextrin and avoid inclusion of temperature sensitive sugar ingredients. While useful, the sweetened microwave popcorn prepared from such microwave popcorn products lack the quantity of coating or glaze typical of bagged popped caramel popcorn and thus the eating qualities of such heavily coated sweet products. Also, sucralose is a high value, high cost ingredient.

[0011] Thus, there is a continuing need for new and useful microwave popcorn products that can be used to provide sweet popped popcorn having a substantial coating level that minimizes undesirable scorching and fire hazards. There is also a need for such products that can be formulated employing ingredients that may be viewed more favorably by consumers. There is also a need for consumer food products that are low in or free of "artificial" or high potency sweeteners.

[0012] Surprisingly, the above objectives can be realized, and new and improved shelf stable consumer retail products can be provided for the microwave preparation of a sweet popcorn product containing substantial amounts of a sweet coating with minimal scorching problems. The present improvement provides microwave popcorn products comprising a slurry with a combination of ingredients, including powdered sugar, that exhibits improved non-scorch performance.

[0013] Surprisingly, powdered sugar has now been found suitable for use for inclusion into microwave products for the at-home microwave preparation of popcorn having a sweet coating. More surprisingly, such products exhibit minimal scorching during preparation using conventional consumer home microwave oven heating. Even more surprisingly, powdered sugar advantageously modifies rheology of edible oils to allow use of more healthful oils in place of traditional popcorn fats, thereby reducing saturated and trans fat amounts in popcorn food products.

[0014] The present description further provides methods of fabrication microwave popcorn products containing powdered sugar. The methods can comprise separate addition of isomalt in particulate form.

[0015] One generalized composition of popcorn article including isomalt and related method was described in commonly owned U.S. Patent Application 10/408,425 filed April 7, 2003, the contents of which is incorporated herein by reference; another was described in commonly owned U.S. Provisional Patent Application 61/222,898 filed July 2, 2009, the contents of which is also incorporated herein by reference. Still preferable over the known popcorn articles would be an improved light glazing for popcorn exhibiting desirable characteristics, such as those relating to non-scorching and flavor, as well as use of ingredients traditionally favored by consumers.

SUMMARY

[0016] In its article aspect, the present microwave popcorn articles essentially comprise a microwave popcorn bag and food charge dispersed therein. The food charge comprises kernel popcorn, powdered sugar, flavor and optionally further comprises fat and/or salt. In one embodiment, the kernel popcorn component essentially comprises about two-thirds of the charge, the remainder being the slurry. The slurry includes about two-thirds powdered sugar and one-third oil.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIGURE 1 is a perspective view of an unsealed partially folded microwave popcorn bag ready for filling.

DETAILED DESCRIPTION

[0018] The discussion herein relates to consumer packaged food items for the microwave preparation of sweet popcorn characterized by sweet coating that is resistant to heat scorching and to their methods of preparation and use. Each of the product components as well as product use and attributes and methods of their preparation are described in detail below.

[0019] Throughout this document, percentages are by weight and temperatures in degrees Centigrade unless otherwise indicated. Each of the US patents and US patent applications referenced herein are herby incorporated by reference.

[0020] The improvement described herein relates to microwave popcorn articles with a powdered sugar ingredient to provide the finished popcorn with a sweet coating and to their methods of preparation. The present microwave popcorn articles essentially comprise a microwave popcorn container such as a bag and a food charge disposed within the bag, said

food charge comprising a quantity of 1) kernel popcorn, 2) a slurry including a powdered sugar ingredient, at least one edible oil, and optionally other flavoring ingredients. Each of these article components as well as methods of filling, product use and attributes are described in detail below.

Microwave Container

[0021] The present microwave popcorn articles essentially comprise a conventional microwave popcorn popping container. Useful microwave containers herein can include any container for microwave popcorn products presently known in the art or developed in the future. Cardboard tubs have also been recently developed for microwave popcorn articles and can be used as the microwave container. Particularly useful herein for the microwave popping container are a wide variety of commercially available microwave bags for microwave popcorn.

[0022] For example, a suitable bag widely used commercially and preferred for use herein is described in U.S. 4,450,180 patent. A generally similar bag is described in U.S. 4,548,826 or in 4,973,810 Microwave method of popping popcorn and package therefor" issued November 27, 1990 to Arne Brauner. Also useful are structures described in US 4,735, 513 and 4,878,765. Generally, the bag therein described comprises and is fabricated from a flexible sheet material having two collateral tubular sections. The sections are parallel longitudinally extending that communicate with each other at the center of the package.

[0023] Referring now to Figure 1, there is shown an embodiment of a microwave popcorn article 10 composed of a microwave bag 12 formed from flexible sheet material such as paper and being of collateral tubular configuration, that is to say, being composed of a pair of parallel longitudinally extending tubes 14 and 16 which communicate with one another along a central longitudinal opening. The two parallel tubes 14 and 16 are separated by longitudinally extending side indentations 20 and 22. When the package comprises a paper bag, the bag can be composed of first and second face panels 24 and 26 respectively and the indentations 20 and 22 comprises gussets. When in a vertically aligned orientation, the bag has a bottom seal 28 and initially an open top or orifice 30 but a sealable seal area 31 that transversely extends the open sealable top. The sealable area can include a heat activated adhesive or a "cold seal" adhesive, as is convenient. After being filled, the top 30 is also sealed conventionally by means of heat or other suitable adhesive to provide a top seal in the top seal area 31.

[0024] The bag material is generally fabricated with multiple plies including an outer ply 33 which is generally paper, a grease-proof or resistant inner ply 34 and microwave susceptor

film member or ply intermediate these inner and outer paper layers. However, in preferred embodiments the microwave susceptor is present only on one major face panel. The microwave susceptor provides supplemental heating for heating the food charge to cause popping of the popcorn.

[0025] While tubes (or chambers, or channels) 14 and 16 can be of equal size, conventionally the susceptor channel 16 is generally slightly smaller. In such a configuration, the gussets include major left gusset face 36, minor left gusset face 37, major right gusset face 38 and minor right gusset face 39. The bag 12 can be provided with a lower transverse fold 40 to define an intermediate portion or pocket 41.

[0026] Although in the present description, a particular description is given to this preferred microwave bag, the present improvement is also useful in connection with, for example, flat bottomed bags, bags with or without a bottom fold, with a straight bottom seal or other more complex bottom seal designs. Also, the present methods can be employed using new and improved microwave popcorn bag designs.

[0027] Since introduction, microwave popcorn bags have undergone continued development generally directed towards cost reduction, especially of the expensive microwave susceptor component. Also, improvements continue to be made (see for example USSN 09/943,637 "EASILY EXPANDABLE, NONTRAPPING, FLEXIBLE PAPER, MICROWAVE PACKAGE" filed 08/31/2001by Monforton) to improve popping performance or to facilitate commercial manufacturing at lower cost or at higher packaging line speeds.

[0028] While particular attention is given to microwave bags herein as the preferred microwave container, the skilled artisan will appreciate that the present article is broadly useful when used with a variety of packaging and disposable microwave containers.

Popcorn

[0029] The present article 10 further includes a food charge disposed within the bag. The food charge essentially includes a quantity of kernel popcorn and a slurry, the slurry including powdered sugar, an edible oil, and optionally other ingredients such as flavorings. The food charge can comprise from about 30 to 150g in a microwave bag for example. For single serve products, the food charge can be smaller and can comprise about 30 to 100g. For regular sized products, the food charge can comprise about 50 to 150 g, preferably about 100 to 130g.

[0030] Conventionally, microwave popcorn food charge formulations are expressed based upon the weight of the entire kernel popcorn and food charge. This convention is followed

herein. Broadly, the popcorn can range from about 30 to 90% of the food charge for a commercial product; in some embodiments other percentages may be used. Typically, about 15 to 100g of kernel popcorn is added to the bag, preferably about 50 to 70g/bag for regular sized products and about 25 to 40g/bag for "single portion" sized products. In general practice, the amount of kernel popcorn is set and the other ingredients are varied to provide variations such as full fat, reduced or low fat, and/or salted or low salt embodiments.

[0031] Generally, microwave popcorn is dried to moisture contents ranging from about 10% to 18%, preferably about 12% to 16% and for best results about 14% to insure sufficient moisture for popping of a high fraction of kernels while minimizing moisture that might cause or promote bacterial growth during the long term distribution and storage characteristic of shelf stable packaged products.

[0032] Conventional kernel popcorn varieties can be used and are preferred for use herein. Also useful herein are relatively larger kernel popcorn varieties for providing "Jumbo Pop" products as well as "mushroom" sized popcorn which is commonly used for ready-to-eat popcorn snack products. Useful are those larger varieties having a kernel count up to 60 kernels per 10g, preferably less than 55, which are commercially available.

[0033] In certain variations, the popcorn can be infused with materials, e.g., flavor or colors, intended to provide popcorn products of enhanced visual or flavor appeal. In other variations, the popcorn can be bred to provide natural color and/or flavor variations.

[0034] Additionally, all or a portion of the microwave popcorn can be substituted with expandable or microwave puffable pellets such as are descried in the '250 patent to Van Hulle. Also useful herein are those products described in US 5,102,679 "Half products for microwave puffing of expanded food product" issued April 7, 1992 to Whelan. See also US 6,083,552 "Microwaveable Popcorn Product And Method" issued July 4, 2000 to Kershman et al. In certain variations comprising a blend of kernel popcorn and puffable pellets, weight ratio of the kernel popcorn to puffable pellets can range from about 10:1 to about 1:10, preferably about1:4 to about 4:1 and for best results about 1:3 to about 3:1.

Powdered Sugar as Glaze Forming Ingredient

[0035] The microwave food charge additionally comprises powdered sugar as a glaze forming ingredient. In practice it has been found that, conventionally, sugar used in combination with microwave popcorn results in significant problems with burning. Small particle sizes have been reported to be transparent to microwaves; in practice it is found that use of powdered sugar, with its smaller particle size than granulated sugar, in a microwave

popcorn formulation does not produce any of the burning problems conventionally experienced.

Example 1

[0036] In one embodiment using a small amount of non-popcorn ingredients, a food charge of 4.8 grams of slurry mixed with 81.2 grams of popcorn is used, with a slurry formula of:

55.12% Soybean oil 20-3099

40.83% C and H powdered sugar

1.91% Vanilla cream flavor

1.07% Yellow color dispersion 20-1581

[0037] All of the ingredients together are a food charge of 86 grams with the following distribution of popcorn and main slurry ingredients:

Popcorn	94.4%
Soybean oil 20-3099	3.1%
C and H powdered sugar	2.3%
Vanilla cream flavor	0.1%
Yellow color dispersion 20-1581	0.1%

[0038] This formulation is found not to result in microwave burning problems. Increasing amounts of such slurry formulations likewise do not exhibit burning.

Example 2

[0039] A second embodiment using significantly more slurry and using olive oil in place of soybean oil, produces a crispy, sweet, glaze-like product with no burning. This embodiment includes 41 grams of slurry mixed with 65 grams of popcorn, with a slurry formula of:

64.50% CandH powdered sugar

34.83% Bella extra virgin olive oil

0.67% Yellow color dispersion 20-1581

[0040] All of the ingredients together are a food charge of 106 grams with the following distribution of popcorn and main slurry ingredients:

Popcorn	61.3%
Bella extra virgin olive oil	13.5%
C and H powdered sugar	24.9%
Yellow Color dispersion 20-1581	0.3%

[0041] In this formulation, it is evident that the powdered sugar, with a large surface area, effectively increases the viscosity of the olive oil to the point that it does not readily flow at

room temperature. This is an advantage for a popcorn product sold for home preparation, as the more solid a food charge is, the less difficult it is to package, transport and store the product.

Optional Minor Ingredients

[0042] The present food charges can comprise a variety of ingredients to improve the taste, appearance and/or nutritional properties of the finished sweet coated popped popcorn herein.

Method of Preparation

[0043] Broadly, the present methods of preparation include the steps of adding the food charge to an at least partially open microwave popping container to form a filled container and sealing the filled container to provide a finished sweet coating microwave popcorn article product.

[0044] In one variation, the food charge is formed in a single composite mass such as a toroid or ring and the composite mass charged to an open microwave popcorn bag or other container prior to final sealing. (See for example U.S. 4,450,180, issued May 22, 1984).

[0045] In another variation one or more ingredients are added separately to the open microwave bag. For example, microwave bags having an unsealed open end and a folded lower portion are advanced to a first kernel popcorn filling station. While being maintained in an open position, the loose kernel popcorn is charged to the desired channel in desired amounts to form partially filled bags containing kernel popcorn. The kernel popcorn is added first to facilitate more even distribution of the balance of ingredients over the popcorn to thereby provide a finished popcorn having a more even distribution of the coating ingredients. In those variation that include puffable pellets other than or in admixture with kernel popcorn, the puffable pellets or popcorn–and-pellet mixtures are likewise first added to the microwave popcorn bag.

[0046] Thereafter, the partially filled bags are advanced to a second filling station at which a slurry is added to the bag. Typically, the slurry is added in the form of a vertically dispensed pencil jet (i.e., a confined stream) of the slurry. (See, for example, U.S. 4,604,854 entitled "Machine For Forming, Filling and Sealing Bags," issued August 12, 1986 to D. W. Andreas). The slurry contains the fat ingredient(s), is typically heated to melt a solid fat to liquid or fluid form, and optionally includes flavors, colors, etc. For those embodiments comprising salt in flour form, the slurry can include all or a portion of the flour salt. At the same station, a separate quantity of optional particulate or dry ingredients, e.g., salt in coarse form and/or calcium, isomalt, flavors, colors, is in some embodiments added to the open partially filled microwave popcorn bag (See, for example, Fig 1 line 70). If added, the slurry

addition and particulate or dry ingredient addition can be practiced sequentially (in either order) or simultaneously. Simultaneous addition or parallel addition is preferred since this technique allows for high packaging line processing speeds thereby increasing efficiency compared to sequential addition in a two station filling method.

[0047] Single station filling methods are also known that involve applying the fat/salt slurry as a spray onto the kernel popcorn as the kernel popcorn falls into the bag. (See, for example WO 95/01105 entitled "Reduced Fat Microwave Popcorn and Method of Preparation" published January 12, 1995, or, equivalently, U.S. 5,690,979 issued November 25, 1997; or U.S. 5,171,950 "Flexible Pouch and Paper Bag Combination For Use In The Microwave Popping of Popcorn" issued December 5, 1992 to Brauner et al.) which is incorporated herein by reference. Such single station filling techniques are especially useful for the preparation of low fat microwave popcorn products. In this variation, any optional particulate or dry ingredients can be added to the popcorn filling funnel along with the popcorn, e.g., after the popcorn has been charged to the bag.

[0048] The bags now containing both kernel popcorn and slurry and other ingredients are then advanced to a sealing station where the bags are provided with a top seal to complete the closure of the bag. The sealed popcorn bags are advanced to subsequent finish packaging operations that complete the folding of the bags, providing the bags with an overwrap, and inserting appropriate numbers of the bags into cartons, etc.

[0049] The term slurry is used herein as is common in the microwave popcorn art to refer to any coating applied to the kernel popcorn. The term "slurry" as used generally herein thus includes fat alone; fat and a lesser portion of salt in flour form; fat, flour salt, flavors and/or color or sweetener(s); fat, a portion of the flour salt and a portion of the calcium ingredient; and fat and substantially all of the calcium ingredient as well as any other variation or combination of ingredients used as an addition to the kernel popcorn herein.

[0050] The slurry can additionally optionally comprise minor amounts of other materials employed to make the microwave popcorn more aesthetically or nutritionally or organoleptically appealing. Such adjuvant ingredients can include, for example, limited amounts of sugar(s), micro fortification levels of minerals, vitamins, colorants, preservatives and flavors. If present, each of these constituents can comprise from about 0.01 to about 2% by weight of the fat slurry.

[0051] Especially popular for use herein is a butter flavor. The flavors can be either in liquid, fat soluble forms and/or in dry powder forms such as a liquid oil absorbed onto a

particulate carrier, e.g., gum arabic, starch, silicon dioxide, or dehydrated cheese solids or in the form of an oil suspension.

[0052] The fat slurry is prepared simply by admixing the fat (in a fluid or melted state) together with any optional ingredients with salt and blending the mixture to form a stable dispersion or slurry. The fat or slurry, while still fluid (70° to 130°F; 21° to 55°C), is then sprayed into the microwave popcorn bag as described in detail below.

[0053] The slurry application step can be practiced by employing an applicator for spraying the fat slurry (e.g., commercially available from Hibar Systems Limited, Ontario, Canada) that is supplied by a slurry supply means. The slurry supply means can conveniently include a conventional positive displacement reciprocating metering pump having a piston and a pressurized slurry inlet. The pump precisely pumps metered amounts of the fat slurry to the applicator at closely controllable time intervals.

[0054] If the slurry viscosity is too high, the slurry becomes unpumpable. The concentrations of salt and calcium ingredients are selected such that the slurry has a viscosity of less than 10,000 cps, preferably less than about 1,000 cps, and, for best results, less than 300 cps.

[0055] The slurry can be added at temperatures ranging from about 15.5° to 65.5°C (60° to 150°F), preferably about 38° to 54.4°C (100° to 130°F).

[0056] While a pencil jet spray is preferred for use herein, equivalents thereof in terms of dispensing the slurry can also be used. For example, a multiplicity of very fine jet streams, (e.g., 3-12), or a sparge can be used to achieve the desired dispersion hereunder. Also, other spray types, (e.g., a cone spray, a mist spray, or a fan spray) are useful herein. However, great care must be taken in selecting such useful alternatives so as to avoid getting slurry in the bag seal area. In other embodiments, the spray can be gas assisted, e.g., air, steam, or inert gas.

[0057] In preferred embodiments, the bag 12 has a microwave chamber (i.e., wherein one major face panel has an intermediate microwave susceptor layer between the inner and outer bag layers) and, for cost considerations, a microwave susceptor-free chamber. In the preferred practice, the kernel popcorn, fat slurry and particulate(s) are charged to the microwave channel. Conventionally, the microwave channel is the lesser channel (i.e., being formed by the smaller major face 24) and the greater channel is the microwave free channel. Such a configuration minimizes the amount of relatively expensive microwave susceptor

material required while nonetheless providing the needed expansion volume upon microwave popping.

[0058] In the preferred form, the popcorn charging and slurry addition are practiced at separate stations and as separate steps. However, in other embodiments, the kernel popcorn and slurry addition can be practiced in a single station concurrently. Apparatus and techniques for such concurrent filling of the popcorn and slurry are described in commonly assigned U.S. 5,690,979 (issued Nov. 25, 1997) entitled "Method Of Preparing Reduced Fat Microwave Popcorn."

[0059] If high levels of salt and calcium ingredients are desired in the finished products, addition of the total quantity of each of these materials to the slurry will cause the slurry viscosity to be excessively high. That is, while the slurry may be able to carry all of the salt or all of the calcium ingredient, or half of each, the slurry cannot carry all of both. Thus, either all of the salt or all of the calcium ingredient or a portion of each (e.g., 50:50 or 70:30) must be added as dry particulates in a third filling station. Useful herein for practicing this step are particulate metered feeding equipment that are commercially available such as are used for filling salt or sugar packets.

[0060] The present methods further essentially include a conventional finish step of sealing the open end of the microwave popcorn bag after the bag has been filled with the quantity of popcorn kernels, the fat slurry and an optional quantity of particulates.

Product Use

[0061] The microwave popcorn products prepared as described can be used in a conventional manner for the at-home preparation of a sweet coated popcorn by microwave heating. Upon microwave heating of the sealed microwave popcorn article in a conventional home microwave oven, the resultant popped popcorn in the form of free flowing of individual substantially unagglomerated popped popcorn kernels exhibits excellent organoleptic attributes notwithstanding the sweet coating and with minimal scorching or browning.

Claims

1. A microwave popcorn article comprising a microwave popcorn bag, and a food charge disposed therein comprising kernel popcorn, a sweetener having a particle size sufficiently small to have minimal reaction to microwave heating, and an edible oil.
2. The microwave popcorn article of claim 1 wherein the sweetener and the edible oil are present in a ratio of about two to one.
3. The microwave popcorn article of claim 1 wherein the edible oil comprises vegetable oil.
4. The microwave popcorn article of claim 1 wherein the edible oil comprises soybean oil.
5. The microwave popcorn article of claim 1 wherein the edible oil comprises olive oil.
6. The microwave popcorn article of claim 1 wherein the kernel popcorn comprises about 10% to 18% moisture.
7. The microwave popcorn article of claim 6 wherein the kernel popcorn comprises about 12% to 16% moisture.
8. The microwave popcorn article of claim 7 wherein the kernel popcorn comprises about 14% moisture.
9. The microwave popcorn article of claim 1 wherein the sweetener comprises from 3% to 30% of the food charge.
10. The microwave popcorn article of claim 9 wherein the sweetener comprises from 20% to 30 % of the food charge.
11. The microwave popcorn article of claim 10 wherein the sweetener comprises about 25% of the food charge.
12. The microwave popcorn article any one of claims 1-11 wherein the sweetener is powdered sugar.

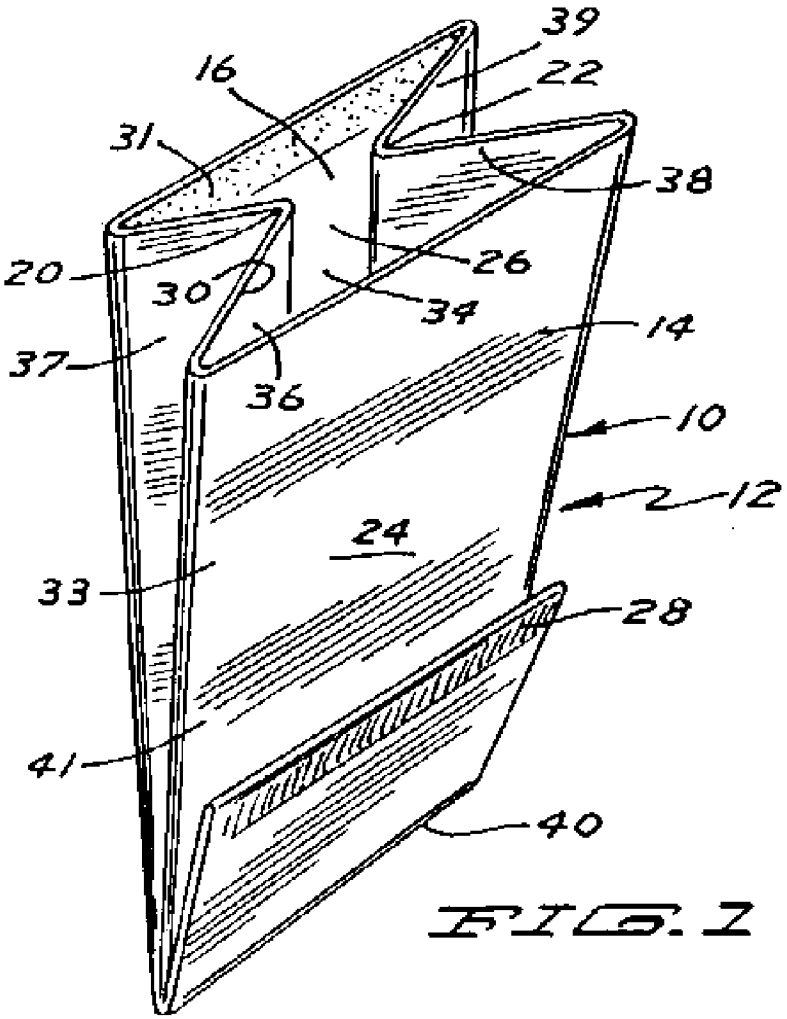


FIG. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 10/51564

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A23L 1/025; A23L 1/22 (2010.01)
USPC - 426/107
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- A23L 1/025; A23L 1/22 (2010.01);
USPC- 426/107

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC- 426/618, 241, 242, 93, 309;
Patents and NPL

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWest (US Pat, PgPub, EPO, JPO: classification, keyword), GoogleScholar; search terms: popcorn, popping corn, microwave, sugar, sweetener, isomalt, sucralose, sucrose, particle, granule, powder, sieve, mesh, edible, vegetable, soy, soybean, canola, olive, oil, moisture, size, small, heat, react, food, charge, high, amount, concentration

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 4,751,090 A (BELLESON et al.) 14 June 1988 (14.06.1988), col 2, 4-8	1-4, 12/(1-4) ---------- 5-11, 12/(5-11)
Y	US 2003/0099747 A1 (EINI et al.) 29 May 2003 (29.05.2003), para [0018], [0058], [0120], [0193], [0195]	5, 12/(5)
Y	US 2008/0038411 A1 (JENSEN et al.) 14 February 2008 (14.02.2008), para [0011], [0072], [0076], [0120]	6-8, 12/(6-8)
Y	US 2002/0044581 A1 (JENSEN et al.) 30 May 2002 (30.05.2002), para [0046], [0048].	9-11, 12/(9-11)
A	US 2007/0254073 A1 (JENSEN et al.) 01 November 2007 (01.11.2007), entire document	1-11, 12/(1-4), 12(5-11)
A	US 2006/0078655 A1 (PLANK et al.) 13 April 2006 (13.04.2006), entire document	1-11, 12/(1-4), 12(5-11)
A	US 2004/0197441 A1 (TEOH) 07 October 2004 (07.10.2004), entire document	1-11, 12/(1-4), 12(5-11)
A	US 2004/0185149 A1 (PROSISE et al.) 23 September 2004 (23.09.2004), entire document	1-11, 12/(1-4), 12(5-11)
A	US 2003/0124228 A1 (GOTO et al.) 03 July 2003 (03.07.2003), entire document	1-11, 12/(1-4), 12(5-11)
A	US 2003/0099747 A1 (EINI et al.) 29 May 2003 (29.05.2003), entire document	1-11, 12/(1-4), 12(5-11)
A	US 2003/0049360 A1 (ZIETFLOW et al.) 13 March 2003 (13.03.2003), entire document	1-11, 12/(1-4), 12(5-11)

☒ 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
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"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
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 November 2010 (04.11.2010)	19 NOV 2010
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 10/51564

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/0127306 A1 (SCHMIDT et al.) 12 September 2002 (12.09.2002), entire document	1-11, 12/(1-4), 12(5-11)
A	US 6,013,291 A (GLASS et al.) 11 January 2000 (11.01.2000), entire document	1-11, 12/(1-4), 12(5-11)
A	US 5,759,599 A (WAMPLER et al.) 02 June 1998 (02.06.1998), entire document	1-11, 12/(1-4), 12(5-11)
A	US 5,064,669 A (TAN et al.) 12 November 1991 (12.11.1991), entire document	1-11, 12/(1-4), 12(5-11)
A	US 5,443,858 A (JENSEN et al.) 22 August 1995 (22.08.1995), entire document	1-11, 12/(1-4), 12(5-11)
A	US 4,751,090 A (BELLESON et al.) 14 June 1988 (14.06.1988), entire document	1-11, 12/(1-4), 12(5-11)
A	US 3,989,853 A (FORKNER) 02 November 1976 (02.11.1976), entire document	1-11, 12/(1-4), 12(5-11)
A	US 3,851,574 A (KATZ et al.) 03 December 1974 (03.12.1974), entire document	1-11, 12/(1-4), 12(5-11)