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(54) IMPROVED TUBULAR CELLULOSIC FOOD CASING

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This invention relates to improved food casings and more particularly to large fibrous tubular cellulosic food casings that are suitable for stuffing without further moisturization.

Food casings are used throughout the world in the processing of a great variety of meat and other food products, such as sausages of various types, cheese rolls, turkey rolls, and the like. Casings that are most generally used are artificial tubular food casings prepared from regenerated cellulose and other cellulosic materials, that may be of several different types and sizes to accommodate the different categories of food product to be prepared. Tubular food casings are provided in supported or unsupported form with the supported casings, which are commonly referred to as "fibrous casings", being prepared with a fibrous support web embedded in the wall thereof.

A common feature of most processed food products, and particularly meat products, is that the mixture of ingredients of which the food product is made up, commonly called an "emulsion", is stuffed into a casing under pressure, and processing of the food product is carried out while encased in the casing. The food product may also be stored and shipped while encased in the casing, though in many instances, and particularly in the case of small sausage products such as frankfurters, the casing is removed from the food product after the processing procedures are completed.

One category of tubular food casings is commonly referred to as "small food casings", which designation generally refers to those casings employed in the preparation of small size sausage products such as frankfurters. As the name suggests, this type of food casing is small in stuffed diameter, generally having a diameter within the range of from about 15mm to about 40mm, and is most usually supplied as thin-walled tubes of very great length. For convenience in handling, these casings, which may be 20 to 50 meters in length or even longer, are shirred and compressed to produce what is commonly referred to as "shirred casing sticks" of from about 20cm to about 60cm in length. Shirring machines and the products thereof are shown in US Patent Nos. 2,983,949 and 2,984,574 among others.

"Large size food casings" is a common designation for casings that are used in the preparation of generally larger food products, such as salami and bologna sausages, meat loaves, cooked and smoked ham butts and the like, and that are produced in sizes ranging in stuffed diameter from about 50mm to about 160mm or even larger. In general, such casings have a greater wall thickness than "small size casings", and are provided with a fibrous web reinforcement embedded in the wall, though they may be prepared without such supporting medium. In most cases, large size tubular casings are supplied to the food processor in flattened condition, cut to predetermined lengths of from about 2 feet (.6 m) to about 7 feet (2.2 m), but improvements in shirring and packaging techniques and increased use of automatic stuffing equipment is increasing the demand for supplying large size fibrous and unsupported casings in the form of shirred sticks containing up to about 100 feet (30 m) and even more of casing.

In the preparation and use of artificial food casings, particularly small size casings formed of regenerated cellulose, the moisture content of the casings is of extreme importance. When small size cellulosic casings are first formed, it is generally necessary that they be dried to a relatively low water content, usually in the range of about 8% to 12% by weight, to enable shirring operations to be carried out without damage to the casings. To permit ready deshirring of the compressed, shirred casing and prevent tearing and breaking of the casing during stuffing operations, however, shirred casings having an average moisture content of between about 14% and 20% by weight are required. This relatively narrow range of moisture content is important

because excessive breakage of the casing during stuffing has been found to occur at lower moisture contents, and greater moisture content results in excessive plasticity of the casing material and overstuffing.

A number of patents have been issued in recent years dealing with the problem of the moisture content of shirred small size tubular food casings, and suggesting various methods for obtaining the desired moisture level and maintaining it during storage and shipping. For example, in US Patent Nos. 2,181,329 to Hewitt, 3,250,629 to Turbak, and 3,471,305 to Marbach, packaging means are disclosed that will enable a plurality of shirred casing sticks of small size tubular casing to be humidified while packaged; and in US Patent Nos. 3,222,192 to Arnold, 3,616,489 to Voo et al, 3,657,769 to Martinek, 3,809,576 to Marbach et al, and US Patent 3,981,046, various means are disclosed for moisturizing generally small size tubular food casings before or during the shirring operation.

Conventionally, large size casings, which are generally supplied in short lengths of flattened tubing and are quite stiff in the dry state, are adequately softened for stuffing operations by soaking in water, preferably for about an hour. Therefore, the need to supply such casings with a predetermined moisture content has not been found to be necessary, and controlled moisturization by the casing manufacturer has not been warranted. However, the wider use of automatic stuffing equipment for products employing large size tubular food casings, and the increased demand for supplying such casings in shirred form as compared to short, flattened lengths, has aggravated the problems of moisturizing such casings by soaking. Moreover, the need for greater control of all aspects of the manufacture and use of large size food casings has been increasing. For example, the uniformity of dimensions of stuffed food casings and food products processed therein has become an increasingly important commercial requirement, and casing moisture content has been found to be a factor in control of uniformity, as well as in meeting the continuing need to readily and economically stuff the casings without damage or breakage thereof.

Providing shirred casing sticks of small size casings, having uniformly distributed throughout the length thereof the relatively narrow range of moisture content that is required for stuffing operations, has been more economically accomplished by the food casing manufacturer during the manufacture or packaging of the casings, and it is becoming increasingly evident that similar advantages could be realized if means were developed for the casing manufacturer to supply large size casings, both in flattened and shirred forms, that could be readily employed in casing stuffing operations, particularly mechanical stuffing operations, without the need for undue manual handling by the food processor.

Although it has not been found necessary in the past to maintain the moisture content of large size food casings within a relatively narrow range, somewhat higher levels of moisture content are required to afford the desired flexibility of such casings as compared to that required for "small size casings", and the greater amounts of water and increased weight of the casings substantially increases the cost of packaging and shipping. In addition, one of the problems which may be encountered during the handling and processing of such high moisture containing cellulosic food casings involves the growth of molds, fungi, or other microorganisms, since high moisture is one of the necessary factors for inducing such growth on cellulosic casings. It is known, for example, that cellulosic food casings have a critical moisture content level above which the growth of molds or fungi during periods of storage is greatly enhanced. Keeping the moisture content of cellulosic casings below a predetermined level, generally below about 20% by weight of moisture based on the total weight of the casing, is an effective measure that may be taken to control the development of such growth. However, in cases where proper control of moisture content cannot be used to inhibit such growth, it is necessary to provide other means to inhibit the growth of molds or fungi.

Consequently, large size tubular cellulosic food casings, and particularly tubular fibrous casings, that may be readily stuffed without damage or breakage, must be provided with moisture content levels that afford adequate flexibility and also with suitable means for inhibiting the growth of molds and other microorganisms during periods of shipping and extended storage.

The problem of mold growth in food products due to the presence of nutrients that promote the growth of microorganisms and cause food spoilage has been the basis of a number of studies over the years. As a result of these studies, various treatments have been evaluated and recommended, including combinations of sugars and polyhydric alcohols, as inhibitors for preventing the growth of microorganisms that are commonly recognized as being responsible for food spoilage. However, the antimycotic treatment of cellulose food casings has presented problems due to the processing techniques employed in the preparation and stuffing of the casings. Some suggestions for overcoming such problems and achieving antimycotic treatment of casings used for sausage products, such as dry sausages, have been the subject of several recently issued patents. For example, in US Patent No. 3,617,312 to Rose, an anti-mycotic agent is applied to cellulose casings as

a component of a curable, water-insoluble coating, and in US Patent 3,935,320 to Chiu et al, cured, water-insoluble cationic thermosetting resin coatings applied to the surfaces of casings reduce deterioration wrought by enzymatic action.

The additional processing steps required for antimycotic treatment of casing with curable coating compositions adds to the costs and complexity of the casing manufacturing process, and the need still exists for the development of "large size" casings that are suitable for stuffing without further soaking by the food processor, particularly when such casings can be prepared by methods that do not substantially increase the complexity and costs of manufacturing and storage.

According to the present invention there is provided a tubular large size cellulosic food casing having a fibrous web embedded in the wall thereof and having a moisture content of at least 20% by weight of casing, the casing having sufficient moisture content to be readily stuffed with a food emulsion without soaking and having a sufficient amount of antimycotic agent incorporated therein to afford resistance to growth of molds, fungi, and microorganisms during extended periods of storage.

A preferred form of the invention provides a large size tubular cellulosic food casing having a fibrous web embedded in the wall thereof and suitable for stuffing without soaking and comprising a tubular cellulosic food casing that is provided with sufficient moisture and glycerine plasticizer content to permit the food casing to be readily stuffed with a food emulsion and having propylene glycol uniformly dispersed therein in an amount of at least 15% by weight of dry cellulose (plus any coating which may be present) and at least 20% by weight of the liquid components in the casing, said casing having a moisture content of at least 20% by weight of casing. It has been discovered that tubular cellulosic fibrous casings, having the moisture content and propylene glycol content levels herein described, surprisingly are completely suitable for stuffing with mechanical stuffing apparatus without further moisturization by the food processor, and such casing can be readily shipped and stored for extended periods without the growth of molds, fungi, or other microorganisms being encountered.

This preferred form of the invention also provides a method of preparing a tubular cellulosic fibrous food casing that is suitable for stuffing with a food emulsion without soaking comprising the steps of:

(a) providing a large size tubular cellulosic food casing having a fibrous web embedded in the wall thereof and having a glycerine plasticizer uniformly incorporated in the wall thereof;

(b) contacting said tubular casing with water in an amount to impart sufficient extensibility and flexibility characteristics for stuffing with a food emulsion, the amount of water used to contact said casing being sufficient to provide a moisture content of at least 20% by weight of casing; and

(c) contacting said tubular casing with an amount of propylene glycol sufficient to incorporate uniformly therein propylene glycol in an amount of at least 15% by weight of propylene glycol based on the dry cellulose (plus any coating which may be present) and at least 20% by weight of propylene glycol based on the liquid components in said casing.

Preferably, the tubular cellulosic casing is contacted with an amount of an aqueous propylene glycol solution of a concentration that will concurrently provide the desired moisture content for said casing and the desired amount of propylene glycol.

In particular, the invention includes a method for preparing an encased food product which comprises:

(a) providing a large size tubular cellulosic food casing having a fibrous web embedded in the wall thereof and having (1) a moisture content of at least 20% by weight of casing to impart to said casing sufficient extensibility and flexibility for said casing to be stuffed with a foodstuff without the addition of further moisture and (2) an antimycotic agent incorporated therein in an amount sufficient to render said casing, prior to stuffing, resistant to growth of molds, fungi and microorganisms; and

(b) without adding further moisture, stuffing said casing with the foodstuff to form said encased food product.

Reference to the term "moisture content", "propylene glycol content", "glycerine content", "polyol content", as used throughout this specification and in the appended claims with respect to the cellulosic casings of the invention, unless otherwise specified, is intended to refer to, and should be understood as referring to:

"moisture or water content" – the weight % of water or moisture in the casing based on the total weight of all the ingredients in the casing.

"propylene glycol content", "glycerine content", "polyol content" – the weight of polyol in the casing divided by dry weight of cellulose plus surface coating, if any, in the casing, expressed as the weight percent (%).

Further, reference to the term "weight of liquid components in the casing" should be understood as referring to the weight of the liquid ingredients in such casings including water, polyols, and/or other soluble antimycotic agents, but excluding mineral oil and other non-miscible lubricants.

Large size tubular fibrous cellulosic food casings that are suitable for use in the casings of the present invention may be prepared by

any one of the methods well known in the art. The tubular casings are generally flexible, seamless tubing formed of regenerated cellulose, cellulose ethers as the cuprammonium, deacetylation of cellulose acetate, denitration of cellulose nitrate processees and preferably the viscose process. Tubular casings reinforced with fibres such as, for example, rice paper and the like, hemp, rayon, flax, sisal, nylon, polyethylene terephthalate and the like, are most advantageously employed in applications requiring large diameter tubular food casings. Tubular fibrous casings can be made by methods and apparatus described, for example, in US Patent Nos. 2,105,273; 2,144,899; 2,910,380; 3,135,613; and 3,433,663.

As is well known in the art, tubular cellulosic casings prepared by any one of the well known methods are generally treated with glycerine, as a humectant and softening or plasticizing agent to provide resistance to drying or cracking of the casing during storage prior to stuffing. The glycerine treatment is usually carried out by passing the casing while still in the gel state through an aqueous glycerine solution, after which the plasticized casing is dried to a predetermined moisture content prior to further processing or winding up on reels for storage. Generally, large size tubular casings will contain 25% to 40% glycerine and have a moisture content of 5% to 10%.

Large size tubular cellulosic fibrous food casings of the invention generally require an average moisture content of at least 20% by weight of casing, to impart the desired flexibility for stuffing. Although the lower limit of casing moisture content is important, there is no critical upper limit and moisture content in excess of that actually required is determined generally by economic considerations. However, casing moisture content greater than about 35% may adversely affect desirable characteristics of the casings for certain applications and should be avoided.

In view of the high moisture content necessary to impart desired flexibility and other stuffing characteristics, antimycotic treatment of the casings is essential to prevent growth of molds, fungi, or other micro-organisms during storage and shipping. Suitable antimycotic agents that have been found to afford at least some degree of protection are polyhydric alcohols that are normally liquid at ambient temperatures, and solutions of normally solid polyols. Exemplary agents are glycerine, triethylene glycol, low molecular weight polyethylene glycols, and sorbitol solutions. Most suitable and especially preferred are propylene glycol and mixtures of propylene glycol with glycerine.

Also suitable are chemical antimycotic agents such as, for example, potassium, sodium, and calcium propionate or sorbate, sorbic acid, propionic acid, and the lower alkyl esters of parahydroxybenzoic acid such as methyl, ethyl, or propyl-parahydroxy-benzoate, preferably in amounts of at least 2.5% by weight of liquid components in the casing.

The quantity of antimycotic agent applied to the casing is important, and generally depends on the moisture content of the casing. Propylene glycol, which is especially preferred and most suitable for use as an antimycotic agent, should be employed in an amount of at least 20% by weight of the liquid components in the casing and at least 15% by weight of dry cellulose, while the upper limit thereof is not critical and is determined mainly by economic considerations. It has been found, however, that it is necessary to use substantially greater amounts of other polyol antimycotic agents for the particular levels of casing moisture content that impart the necessary flexibility and stuffing characteristics to casings of the present invention. The amount of such other polyol antimycotic agents required may be readily determined in accordance with the teaching of the present invention.

Preventing the growth of molds and fungi on cellulose casing will also provide control over the growth of bacteria and yeasts, since it is known that, in general, molds require less moisture for growth than yeasts and bacteria.

Tubular cellulosic fibrous food casings of the present invention may be prepared by applying the essential amounts of water and antimycotic agent to suitable "dried" tubular food casings using any one of a number of methods well known in the art. In general, casings may be treated by spraying, brushing, dipping, slugging, etc. Preferably, the casing should be treated with the desired amounts of moisture and antimycotic agent as flattened casing on storage reels is being made ready for packaging in short, flat lengths thereof, or is being rewound on a reel for advancing through a shirring machine. By proportioning the amounts of water and antimycotic agent, either individually or in combination, to the size of casings to be treated, relatively precise control of the moisture content and antimycotic agent content of the casings of the invention may be attained.

In preparing the tubular cellulosic food casings of the present invention, various other materials or treatments well known in the art can be utilized to impart particular characteristics or properties to the casings provided, of course, that such material or treatment is compatible with and has no adverse effect on the food casings or the use thereof. Among further treatments that may be employed are, by way of illustration, coatings applied to improve peelability of the casings from encased food products such as disclosed in US Patent No. 2,901,358 to Underwood; coatings applied for improving

adhesion to dry sausage products such as disclosed in US Patent No. 3,378,379 to Shiner et al; coatings applied to afford vapor barrier properties such as disclosed in US Patent No. 3,886,979 to Rasmussen, and the like. Moreover, tubular casings of the present invention may be shirred and compressed employing conventional shirring machines and methods as disclosed, for example, in US Patent Nos. 2,984,574 to Matecki, 3,110,058 to Marbach, and 3,397,069 to Urbutis et al.

This invention will become more clear when considered together with the following examples which are set forth as being merely illustrative of the invention and which are not intended, in any manner, to be limitative thereof.

Example 1

A quantity of tubular fibrous cellulosic casing prepared using conventional methods and coated internally with an easy peel coating as disclosed in US Patent No. 2,901,358 to Underwood was used in preparing the casing samples of this Example. The casing had an average dry flat width of about 6.1 inches (155mm) and a recommended stuffing diameter of 4.59 inches (117mm).

The casing was treated with an aqueous propylene glycol solution by brushing the solution on the outside surface of flattened casing that was then fed to a standard shirring machine. Three lengths of shirred casing, each containing about 200 feet of casing, were prepared. Each shirred length of casing was retained in an elastic sheathing material and then packaged in a polyethylene lined carton. The casing samples were determined to have a moisture content of 21.8% based on the weight of casing and 40.9% based on the weight of dry cellulose, and to have a propylene glycol content of 18.8% based on the weight of dry cellulose and 20.7% based on the weight of liquid components.

Each of the lengths of shirred casing was stuffed without soaking on stuffing apparatus such as disclosed in US Patent No. 4,017,941. A bologna type meat emulsion was used to make 60-inch sausage logs that were processed using conventional methods. The bologna sausages produced had substantially uniform stuffed diameters and no casing damage or breakage occurred during the stuffing of any of the casing samples.

Example 2

In this Example storage tests illustrate the effectiveness of various proportions of mold growth inhibitory agents used to treat large size tubular cellulosic casings having various levels of moisture content.

A group of tubular casing samples were prepared with the following proportion of ingredients.

Regenerated cellulose	72.5 parts by weight
Glycerine	22 parts by weight
Moisture	variable
Mold growth inhibitors	variable

#8 size fibrous casings, which have a recommended stuffed diameter of about 4.79 inches, were used in the storage tests of this Example.

Casing samples were prepared by adding various amounts of water and mold growth inhibitors by brushing aqueous solutions thereof over the surface of the casings in the following proportions:

A first set of casing samples contained moisture levels of about 20%, 25%, 35% and 45% by weight of casing with varying propylene glycol levels. Samples at each moisture level contained propylene glycol in amounts of about 10%, 15%, 20%, 30% and 40% by weight of liquid components in the casing.

A second set of casing samples contained casing moisture levels of about 25%, 30% and 37.5% by weight of casing with varying potassium sorbate levels. Samples at each moisture level contained 0.5%, 1.25%, and 2.5% by weight of potassium sorbate based on the weight of liquid components.

A third set of casing samples contained casing moisture levels of 25%, 30% and 37.5% by weight of casing with varying sodium benzoate levels. Samples at each moisture level contained 0.05% and 0.1% by weight of sodium benzoate based on the weight of liquid components.

Also prepared, for control purposes, were casing samples having moisture content levels of 21.0%, 26.2%, 37.2%, and 59.2%, to which no mold growth inhibitors were added.

Where possible, 50 foot lengths of the moisturized and mold inhibitor treated casings were shirred and compressed to about 1 foot in length, and thus retained in an elastic sheathing material. In those instances where greater amounts of moisture and mold growth inhibitors were used, flattened casing samples 5 feet in flattened length, were prepared.

A mixture containing thirty-one different mold spores in a 1% sodium citrate solution was prepared using conventional aseptic procedures with a concentration of about 1 to 5 million mold spores per milliliter of solution. Among the mold cultures included in the mixture were *Aspergillus niger* (ATCC #1004), *Chaetonium globosum* (ATCC #16021), *Memnoniella echinata* (ATCC #11973), *Myrothecium verrucaria* (ATCC #9095), *Trichoderma viride* (ATCC #26921), and *Whetzelinia sclerotiorum* (ATCC #18657), all of which were purchased from American Type Culture Collection, Rockville, Maryland. Also included were mold spores of nine unknown cultures that were isolated from mold contamination found on various cellulosic food casings, and mold spores of sixteen unknown cultures that were isolated as naturally occurring air borne contaminants obtained

from within casing manufacturing sites.

The solution was employed as an inoculant in evaluating the mold growth resistance of the various casing samples of this Example.

All inoculations of casing samples were done by brushing several milliliters of the mold spore containing solution over a 3 inch by 6 inch area of exposed casing surface. The inoculated casing samples were then packaged in sealed polyethylene bags and stored at room temperature for extended periods of time.

After 10 weeks of aging, mold growth was visually observed on the control samples without mold growth inhibitor having moisture contents of 26.2% (55% by weight based on dry cellulose) and more. The growth of mold was also observed on casing samples with moisture contents of about 35% and 45% having propylene glycol contents of 10% and 15% based on liquid components (8.2% and 13% respectively based on the dry cellulose); on casing samples with 25% and more moisture content containing 0.5% and 1.25% potassium sorbate; and on casing samples with 30% and more moisture content containing 0.05% and 0.1% sodium benzoate. After more than 30 weeks of storage, casing samples containing at least 20% propylene glycol based on the liquid content of the casing and at least 18% based on the dry cellulose exhibited no mold growth, regardless of the casing moisture content. Casing samples containing 2.5% of potassium sorbate were similarly free from mold growth at all moisture content levels.

Example 3

A culture dish mold growth test was used to illustrate mold growth inhibition by various polyhydric alcohols (polyols).

A conventional potato-dextrose agar solution was used as the base media into which was incorporated various proportions of polyols. The agar and polyol component solutions were sterilized using well known procedures and tartaric acid was added to combined solutions to obtain a pH of about 3.5 in the final agar media. The mold culture of Example 3 was used as the inoculant in this Example.

Test solutions were prepared with glycerine, propylene glycol, d-Sorbitol, triethylene glycol, Carbowax 300 (low molecular weight polyethylene glycol), and 25%/75%, 35%/65%, 45%/55% mixtures of propylene glycol/glycerine. "CARBOWAX" is a registered Trade Mark. The test solutions were prepared in polyol concentrations of 5%, 7.5%, 10%, 12.5%, 15%, 17.5%, 20%, 22.5%, 25%, 30%, 40%, 50%, and 60% by weight.

The inoculated test solutions were stored in covered dishes for seven days at ambient temperature and were then visually observed for any growth of mold. Propylene glycol was found to inhibit mold growth in concentrations of 15% or greater, whereas none of the other polyol materials exhibited mold growth inhibition at less than 30% concentration. The mixtures of propylene glycol and glycerine were also substantially better mold growth inhibitors than the other polyols tested, including glycerine by itself. The 25%/75% mixture of propylene glycol and glycerine inhibited the growth of mold in test solution concentrations of 25% and greater, and the 35%/65% and 45%/55% mixtures of propylene glycol and glycerine inhibited mold growth in test solution concentrations of 22.5% and greater.

WHAT WE CLAIM IS:–

1. A tubular large size cellulosic food casing having a vibrous web embedded in the wall thereof, and having a moisture content of at least 20% by weight of casing, the casing having sufficient moisture content to be readily stuffed with a food emulsion without soaking and having a sufficient amount of antimycotic agent incorporated therein to afford resistance to growth of molds, fungi, and microorganisms during extended periods of storage.
2. A tubular casing as claimed in Claim 1, wherein said antimycotic agent is a polyhydric alcohol.
3. A tubular casing as claimed in Claim 1 or 2, wherein said antimycotic agent is present in said casing in an amount of at least 15% by weight of dry cellulose (plus any coating present) and at least 20% by weight of the liquid components in said casing.
4. A tubular casing as claimed in Claim 1 wherein said antimycotic agent is potassium propionate, sodium propionate, calcium propionate, potassium sorbate, sodium sorbate, calcium sorbate, sorbic acid, propionic acid, or a lower alkyl ester of parahydroxybenzoic acid.
5. A tubular casing as claimed in Claim 4, wherein said antimycotic agent is present in said casing in an amount of at least 2.5% by weight of liquid components.
6. A tubular casing as claimed in Claim 1, wherein the antimycotic agent is potassium sorbate.
7. A large size tubular cellulosic food casing having a fibrous web embedded in the wall thereof, and suitable for stuffing without soaking and comprising a tubular cellulosic food casing that is provided with sufficient moisture and glycerine plasticizer content to permit the food casing to be readily stuffed with a food emulsion and having propylene glycol uniformly dispersed therein in an amount of at least 15% by weight of dry cellulose (plus any coating which may be present) and at least 20% by weight of the liquid components in said casing, said casing having a moisture content of at least 20% by weight of casing.
8. A tubular casing as claimed in Claim 7 having a moisture content up to 35% by

weight of casing.

9. A tubular casing as claimed in Claims 7 or 8, wherein a continuous length of said tubular casing is shirred and compressed into a shortened length thereof.

10. A tubular casing as claimed in any one of Claims 7 to 9, having a coating adhered to a surface thereof.

11. A method of preparing a tubular cellulosic food casing that is suitable for stuffing with a food emulsion without soaking comprising the steps of:

(a) providing a large size tubular cellulosic food casing having a fibrous web embedded in the wall thereof and having a glycerine plasticizer uniformly incorporated in the wall thereof,

(b) contacting said tubular casing with water in an amount to impart sufficient extensibility and flexibility characteristics for stuffing with a food emulsion, the amount of water used to contact said casing being sufficient to provide a moisture content of at least 20% by weight of casing, and

(c) contacting said tubular casing with an amount of propylene glycol sufficient to incorporate uniformly therein propylene glycol in an amount of at least 15% by weight of propylene glycol based on the dry cellulose (plus any coating which may be present) and at least 20% by weight of propylene glycol based on the liquid components in said casing.

12. A method as claimed in Claim 11 wherein said tubular casing is concurrently contacted with water and propylene glycol by contacting said casing with an aqueous solution of propylene glycol.

13. A method as claimed in Claim 11 or 12 wherein said tubular casing is treated while in flattened condition.

14. A method for preparing an encased food product which comprises:

(a) providing a large size tubular cellulosic food casing having a fibrous web embedded in the wall thereof and having (1) a moisture content of at least 20% by weight of casing to impart to said casing sufficient extensibility and flexibility for said casing to be stuffed with a foodstuff without the addition of further moisture, and (2) an antimycotic agent incorporated therein in an amount sufficient to render said casing, prior to stuffing, resistant to growth of molds, fungi and micro-organisms; and

(b) without adding further moisture, stuffing said casing with the foodstuff to form said encased food product.

15. A method as claimed in Claim 14, wherein the steps for adjusting the moisture content and incorporating antimycotic agent into said casing are performed concurrently by treating said casing with an aqueous solution of said antimycotic agent.

16. A method as claimed in Claim 14 or 15, wherein the step of adjusting the moisture content is performed with said casing in a flattened condition.

17. A method as claimed in any one of Claims 14 to 16 wherein said antimycotic agent comprises a polyhydric alcohol.

18. A method as claimed in any one of Claims 14 to 16 wherein said antimycotic agent is selected from propylene glycol, potassium propionate, sodium propionate, calcium propionate, potassium sorbate, sodium sorbate, calcium sorbate, sorbic acid, propionic acid and lower alkyl esters of parahydroxy-benzoic acid.

19. A method as claimed in any one of Claims 14 to 16, wherein said antimycotic agent comprises potassium sorbate.

20. A method as claimed in any one of Claims 14 to 16, wherein said antimycotic agent comprises propylene glycol.

21. A method as claimed in Claim 20, wherein said propylene glycol in said casing amounts to at least 20% by weight of the liquid components in said casing.

22. A tubular casing as claimed in Claim 7 and substantially as hereinbefore described with reference to any one of the Examples.

23. A method as claimed in Claim 11 and substantially as hereinbefore described with reference to any one of the Examples.

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