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2,698,801

METHOD OF PRODUCING SKINLESS
FRANKFURTERS

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The present invention relates in general to processes for the manufacture of linked meat products such as skinless frankfurts, or the like, and more particularly to an improvement in the linking step of such processes.

The manufacture of skinless frankfurts, sausages, and the like, wherein the product is processed or treated while enclosed in temporary, shape-retaining members such as water-insoluble sausage casings, and thereafter removed from the casings for further treatment or sale, has been gradually mechanized over the past few years. Machines have been designed to stuff the product into the casings, to twist the casings and to apply the necessary ties between the individual links, and to strip the casings, as by the use of air jets, from the product after processing. The casing-stripping machines, of practical necessity, are designed to operate on a relatively long segment of casing covering a plurality of links rather than on the individual links themselves. This means that the tie strings between the links of product must be removed prior to introduction of the links into the casing-splitting machine, and that the casing between the links must not be severed as a result of such removal. Means have heretofore been proposed for straightening out the twists in the casing at each end of the individual links once the ties have been removed, e. g., by applying tension to the string of links. However, the removal of the tie strings, because of the necessity of retaining the casing intact, has remained essentially a hand operation, and as such has constituted a bottleneck in the otherwise mechanized processes.

It is therefore an object of this invention to provide a method which overcomes the necessity for hand removal of the casing ties.

It is a further object of the invention to provide a method for the preparation of linked meat products wherein the step of removing the ties between the links is eliminated.

Another object of the invention is to provide an improved method for linking meat products in temporary casings.

Additional objects, if not specifically set forth herein, will be readily apparent to one skilled in the art from the following detailed description of the invention.

It has now been found that the problem of tie string removal, which has heretofore hindered the rapid manufacture of linked meat products, can be overcome and obviated entirely by replacing the conventional cotton tie strings with a particular type of string capable of being substantially weakened upon exposure to the cooking conditions employed in the processing of the linked products.

More specifically it has now been found that, when links of frankfurts or the like enclosed in water-insoluble casings are separated by tie strings composed essentially of carboxymethylated cellulose, the links will be retained in the desired shape throughout the cooking operation, while the tie strings are either completely disintegrated at the end of such operation or are so weakened as to be readily broken when the casing is fed into a casing-splitting machine.

The method of preparing the carboxymethylated cellulose string does not form a part of the present invention and is not set forth herein in detail since it is described in the literature and the product may be obtained commercially. Essentially the product is an ordinary cotton string having up to three carboxymethyl groups introduced therein. The preferred degree of carboxymethylation of

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the string is one carboxymethyl group per three glucose units. One method of carboxymethylation and the degree thereof, as determined by the copper method, are described in Textile Research Journal, vol. 17, page 558 (1947). However, it is considered within the scope of the present invention to use any carboxymethylated cellulose string. In general, the treated string should have about 90 per cent of the original tensile strength of the untreated string. A treated string requiring 8.4 to 8.9 pounds pull to break has proven very satisfactory in use on commercial air-jet, casing-opening machines.

The string ties used in linking processes must be capable of forming a nonslipping knot. Since the tie generally used is merely a looping and crossing of the string, it is essential that the string have very little resiliency in the sense of springiness or the like. The string must also be of about the same surface characteristics or feel as untreated cotton string. These characteristics are of prime importance when the string is to be applied between the individual links of a string of frankfurts or the like due to the danger of the strings untying when the links are handled preliminary to cooking. Many other types of water-soluble strings are known, as for example, strings produced from fibrous alginic acid and strings made of polyvinyl alcohol resins. With regard to strings of this type, reference is made to the copending application of Dean E. Rueckert, Serial No. 170,949, filed June 28, 1950, wherein such polyvinyl alcohol and alginate strings are disclosed. The present application represents an improvement over the method disclosed in said earlier-filed application in that it has been found that the strings of the present invention are not so slippery and possess less spring than strings made from polyvinyl alcohol and alginate. String such as disclosed in application Serial No. 170,949 functions very well as ties for roasts or the like, but tends to slip when applied to the casing between small individual links in a chain of frankfurts or similar linked product.

The string used for ties in a linking process such as the manufacture of skinless frankfurts must possess considerable tensile strength initially, i. e., about 8.0-9.0 pounds, in order to prevent breakage of the ties and the consequent unwinding of the casing between the links. The string should preferably be nontoxic, although it may be seen that this is not essential when it is considered that the product is completely enclosed in a continuous water-insoluble casing and will hence not come into direct contact with the fluid in which the string dissolves.

The string used must also meet two requirements with respect to its ease of solubility. Firstly, it must retain its strength and identity for a sufficient period of time to permit the product within the casings to "set up" or become self-sustaining in the shape defined by the tied casing. Secondly, it must be either completely disintegrated or substantially so by the end of the normal cooking period in order to obviate the necessity of severing the strings by hand.

In carrying out the present invention, for example in the manufacture of skinless frankfurts, the ground frankfurts meat is fed to a conventional stuffing machine which extrudes the meat under pressure into a long, flexible, water-insoluble casing made from natural animal intestines or from synthetic materials such as regenerated cellulose or other film-forming organic material. The casing is then formed into links by any suitable and conventional apparatus. The links are then tied off at each end with the carboxymethylated cellulose string. The linked product is then smoked in the usual manner known to the art. Upon removal from the smoke, the links are immersed in a fluid bath, preferably water, and cooked in such bath at a temperature of about 170° F. for a period of about fifteen minutes. Upon removal from the bath, the carboxymethylated strings will be weakened to the point where the tension applied to the links as they are fed through a conventional casing-stripping machine will easily snap those strings which still retain their original position about the casings intermediate the links of product. Preferably, the strings are snapped by the use of air jets, as illustrated in the patent to Golden et al., No. 2,434,316. Thus, no hand or machine operation is necessary for removal of the tie strings, and an entire step

heretofore considered essential in the manufacture of linked, skinless meat products is completely eliminated.

It has been found desirable to use nonaqueous lubricants in place of the water conventionally used in the tying machines. Lubricants such as ethyl alcohol, monoacetin (alone or in alcohol solution), a 33 per cent solution of monoglyceride in alcohol, or a silicone polymer (Dow Corning 2103) as a 33 per cent mixture in toluene, have proven very satisfactory in preventing premature weakening of the carboxymethylated cellulose strings.

Obviously, many modifications and variations of the invention hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A method for the manufacture of skinless meat products which comprises: enclosing a comminuted meat product within a water-insoluble, flexible casing; forming said casing-enclosed product into a plurality of individual links; separating said links by carboxymethylated cellulose ties; thereafter heating said links to cook the product and to substantially weaken said ties; and removing said product from said casing.

2. A method for the manufacture of skinless meat products which comprises: applying carboxymethylated cellulose ties at spaced intervals along a flexible, water-insoluble casing enclosing a comminuted meat product; heating said casing-enclosed product to cooking temperatures whereby said carboxymethylated cellulose ties are substantially weakened; removing said weakened ties from said casing by air pressure; and thereafter separating said cooked product from said water-insoluble casing.

3. A method for the manufacture of skinless meat products which comprises: stuffing a comminuted meat product into a long, water-insoluble, flexible casing; subdividing said product within said casing into a plurality of links; tying the casing between said individual links with a water-soluble carboxymethylated cellulose string; cooking said subdivided product in said casing by immersion in a hot fluid bath whereby said product becomes self-sustaining and said string is substantially weakened and thereafter removing said string and said casing from said cooked products.

4. A method for the manufacture of skinless meat products which comprises: enclosing a comminuted meat product within a water-insoluble, flexible casing; subdividing said product within said casing to form a plurality of individual links; applying ties to the exterior of said casing between said links, said ties comprising a carboxymethylated cellulose string; cooking the linked product in a fluid bath whereby said ties are substantially

weakened; removing said weakened ties from said casing from said links.

5. In the manufacture of skinless meat products wherein a comminuted meat product is formed into links within a water-insoluble, flexible casing, the step comprising: applying ties of carboxymethylated cellulose string to the exterior of said casing between the individual links.

6. In the manufacture of skinless meat products wherein a comminuted meat product is formed into links within a temporary, water-insoluble, flexible casing, the steps comprising: tying the casing between said links with a carboxymethylated cellulose string; immersing said tied links in a heated bath for a sufficient period of time to cook said product and to substantially weaken said string around said casing; and thereafter removing said weakened string and said casing from said cooked product.

7. In a process of producing skinless frankfurters, the steps comprising encasing a relatively long mass of prepared meat within an artificial casing, tightly winding water-solubilized cotton tie strings about the casing at spaced intervals along the length thereof to separate the meat into individual sections and thus convert the elongated filled casing into a chain of links, then subjecting the chain of links to smoking and heating to cure and at least partially cook the meat while retaining in link form within the casing, then subjecting the chain to moisture to dissolve the tie strings, and then deskinning the chain to remove the casing and produce a series of individual skinless frankfurters.

8. In a process of producing skinless frankfurters, the steps comprising encasing a relatively long mass of prepared meat within an artificial casing, tightly winding water-soluble carboxymethylated cotton tie strings about the casing at spaced intervals along the length thereof to separate the meat into individual sections and thus convert the elongated filled casing into a chain of links, then subjecting the chain of links to smoking and heating to cure and at least partially cook the meat while retained in link form within the casing, then subjecting the chain to moisture to dissolve the tie strings, and then deskinning the chain to remove the casing and produce a series of individual skinless frankfurters.

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