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METHOD OF PREPARING FREEZE-DEHYDRATED MEAT MIXES

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This invention relates to a method of preparing freeze-dehydrated meat mixes. The meat mixes prepared by the method of this invention may be used in a variety of ways, as, for example, in the preparation of meat loaves, meatballs, hamburger patties, meat sauces for spaghetti, etc.

It is known that meats and other food materials may be preserved by a process known as freeze drying. Heretofore, the preservation of food products by freeze drying has received relatively little commercial application, being limited to products which are especially adapted to this technique, such as shrimps, mushrooms, etc. Some experimental freeze-dehydrated foods have been developed; these have been essentially single component products such as lean beefsteaks, fish sticks, scrambled eggs, shrimp, chicken pieces, and sliced cooked beef. With adequate prefreezing, these rather simple products in their "natural" form present uniform, easily followed freeze-dehydration patterns and when rehydrated, closely resemble their original fresh state. Meat mixes, because of the complexity of their composition and their disintegrated physical form, have not been readily adaptable to freeze-dehydration. The freeze-dehydration of such meat mixes presents special and unusual problems, which up to now have not been solved satisfactorily.

In the preparation of meat loaf mixes for commercial distribution and sale, it is desirable to employ two principal classes of ingredients. One of these is ground fresh meat, and the other may be described as a partially dehydrated food material, such as air-dried vegetables, cereal binders, dried dairy products, and the like. When fresh meat and a partially dried food material are mixed, and then subjected to freeze drying, process difficulties are encountered and the final product has undesirable characteristics. More specifically, unless the mixture is prefrozen, which adds considerably to the expense of the operation, the meat particles become altered at their outer surfaces, a dense tough "skin" being formed around the particles, resulting in a "case-hardening" condition. Not only does this adversely affect the appearance of the product, but it also interferes with subsequent rehydration when the product is being prepared for cooking.

Even when prefreezing is employed, the resulting product does not rehydrate satisfactorily. The vegetable and cereal components of the mix tend to hydrate at a different rate from the meat component. Also, the meat and nonmeat particles are not as closely united as would be desirable, and may tend to separate during the rehydration or cooking of the product. Also, the relatively slow freezing rate that is typical of all commercial freezing procedures sometimes causes a displacement of the natural water in the meat and the soluble materials carried by that water. The chemical denaturation resulting from this translocation of meat constituents is well known, and it is generally accepted that very rapid freezing rates will minimize such undesirable changes.

It is, therefore, a principal object of this invention to provide a method of preparing freeze-dehydrated meat mixes which substantially overcomes the problems described above. More specifically, it is an object of this invention to provide a method which results in a product that rehydrates uniformly and which can be used to

prepare a well-integrated, homogeneous meat loaf, or the like. Still another object is to provide a method of the character described which does not require any pre-freezing step. Yet another objective is to provide a product which will suffer a minimum of undesirable chemical change which results from slow freezing rates. Further objects and advantages will be indicated in the following detailed specification.

While the method of this invention can be applied to meat mixes containing cooked meat, it is preferable to employ ground fresh meat, such as pork, beef, chicken, lamb, veal, or mixtures of such meats. In other words, the meat will be of the type usually employed for preparing meat loaves. The meat will be ground to a sufficiently small size to permit it to be mixed with the other ingredients, although, as will subsequently be described, the initial mixture may be subjected to a further grinding operation.

Fresh vegetables, either raw or cooked, may be included in the mixture. The method is particularly adapted for use with vegetables in a dry form. For example, air-dried celery, beans, peas, etc., can be used. It will also be desirable to incorporate a cereal binder such as bread-crumbs, corn flakes, cornmeal, rice, and the like. This material is also preferably in a dry form. Where eggs or milk are to be incorporated, as may be desirable, it will be preferred to use dried eggs and dried milk.

The vegetable, cereal binders, and dairy products referred to may be described more generally as partially dehydrated food materials. They will not normally be completely dehydrated, but will contain substantially less water than in their natural state. For example, they may contain on the average of from 2% to 20% water by weight. In most preferred formulations, the water content of the non-meat food materials, when considered on a total material basis, will probably average about 5 to 10%. This compares with the much higher water content of fresh meat, which will usually fall within the range of from 40 to 70% by weight, with the average tending to be around 50 to 60%.

The relative proportions of the fresh meat and the partially dehydrated food material are not particularly critical, and proportions will be used similar to those which are presently used in meat loaves and the like. For example, from 30 to 85 parts by weight (dry basis) of ground fresh meat may be combined with from 15 to 70 parts of the partially dehydrated food material. These proportions refer to a water-free reference basis, since the final freeze-dehydrated meat mix will contain all ingredients on a substantially water-free basis. It will be understood, however, that when the fresh meat is first combined with the other food materials that the fresh meat will contain a considerably higher percentage of water than the other materials. This should be taken into consideration in calculating the proportions.

Preferably, at least 50% of the mixture is provided by the meat solids (dry basis) while the mixture contains at least 25% (dry basis) of the partially dehydrated food materials. For example, the fresh meat and partially dehydrated food material may be combined in proportions calculated on a dry basis of from 50 to 75% meat solids, together with 25 to 50% of non-meat solids.

In accordance with the present invention, there is also incorporated in the mixture a quantity of water in addition to the water contained in the fresh meat and partially dehydrated food material. For example, this added quantity of water may range from 10 to 50% of the water already contained in the meat and the food material. Where the meat contains from 40 to 70% water and the non-meat components contain from 2 to 20% water, satisfactory results can usually be obtained