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AGGLOMERATED FOOD PRODUCT AND METHOD FOR MAKING THE SAME

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This invention relates to a method of treating and combining two or more water-soluble, water-absorptive or water-dispersible food solids to provide a novel, granular, agglomerated food product having advantageous physical and physical-chemical properties. For example, my end product is in a granular state in which the constituents are united in the form of small agglomerates or clusters; it has a marked resistance to deterioration by atmospheric moisture; and it readily dissolves or disperses in water without forming lumps or hard gels.

The invention, as will be apparent, relates not only to a method for preparing the agglomerates but also to a product produced by that method, i.e., to a solid, granular, agglomerated, food product having properties such as those noted above.

The invention also has application to the production of nonfood products of a composite character, wherein the components are water-soluble, water-absorptive or water-dispersible.

This application is a continuation-in-part of my co-pending application Serial No. 712,649, filed February 3, 1958, entitled "Food Product and the Like," now abandoned.

There is an increasing trade demand for prepared dry, granular free flowing food mixes which can be added to hot or cold water, milk, or other liquids, or combined in some cases with other food ingredients, to produce quickly a food product which is ready for consumption. A wide variety of food mixtures may be prepared by this invention. The granular clusters of this invention pour easily; they contain enough internal moisture that they do not form a dust; they are remarkably resistant to atmospheric moisture; and they dissolve very quickly, even with no agitation, in cold water.

I have discovered that it is possible to produce a variety of water-soluble and/or water-dispersible food products by forming a mixture of two or more water-soluble, water-absorptive or water-dispersible food solids in the presence of an aqueous or hydrophilic, tacky bonding agent derived from the other ingredients by solution in water or other dispersing liquid mixing until a granular mass of agglomerates or clusters are formed, each of which contains all of the ingredients in the mix; and then subjecting the mass to heat and a tumbling action whereby to remove surface moisture without overheating, and to thereby provide a dry, free-flowing, readily dispersible granular product.

In more detail, an initially slightly tacky, moist granular mass is formed which is then subjected to a low temperature thermal conditioning treatment. In this thermal conditioning treatment the granules are subjected to heat, preferably radiant heat, while being tumbled to expose fresh surfaces to the action of the heat. This thermal conditioning step removes most but not all of the moisture. The phrase "thermal conditioning step" is used advisedly because this important step is not a mere drying step. Surface moisture is evaporated but some of the surface moisture migrates into the body of the granules and is held absorptively and/or adsorptively and/or as water of crystallization in such a way that a friable product results. In this friable product any lumps are easily broken up into small granules.

It may be stated that the moisture content of the gran-

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ules is sufficiently low that the product is seemingly dry, friable, and can be poured easily, yet the moisture content (virtually all of which is present as internal moisture) is sufficient to render the product quickly soluble and non-dusting. Too much moisture impairs the desired free flowing qualities and too little moisture renders the granules too hard and too slow to dissolve in water. Generally a total moisture content of about 1 to 6 percent based on the weight of product is preferred. This moisture, which I will call internal or bound moisture, aids to disperse the product, and also serves with the soluble ingredients as a binder to hold together small particles of the several ingredients in the form of clusters or agglomerates, each cluster or agglomerate containing all of the components of the mixture.

Glycerine or other hydrophilic liquids may replace all or part of the water in the bonding agent.

By this means a granular product is obtained which has several advantageous properties. Thus, each granule is a cluster of small particles or crystals of the several food ingredients which are bonded together by the tacky binding agent formed by internal water and the water-soluble ingredients. The granular mixture is free-flowing, yet it does not readily form a dust, nor does it pick up moisture readily from the air. The properties adapt this material to high speed packaging machines and also to use in dispensing machines where small unit quantities are dispensed. The product is also readily soluble or dispersible in water, either in hot or in cold, depending upon the specific ingredients.

The initial blending and mixing operation of the ingredients of my invention may be carried out in several ways, such as the following:

Example 1

Solid food ingredient A and an aqueous solution or dispersion of solid food ingredient B are mixed, as by adding A first to a blender and then adding the aqueous solution or dispersion of B. The proportion will be such that after thorough blending, a moist and tacky but granular mix results.

In Example 1 solid food ingredient A may be any one or a mixture of the following: a starch product including unmodified potato starch, unmodified tapioca starch, unmodified corn-starch, unmodified sago starch; modified potato, tapioca, corn and sago starches which dissolve or thicken at lower temperatures than the unmodified starches or whose solutions have lower viscosities; pregelatinized starch, dextrans and amylose; a sugar including dextrose, sucrose, lactose, corn syrup solids; a proteinaceous food derivative having when moistened adhesive, binding or thickening properties, including wheat gluten, pectin, amylopectin, casein, casein salts, gelatin.

Examples of aqueous solutions or dispersions of solid food ingredients B are tomato paste, orange concentrate, lemon concentrate, pureed fruits and vegetables, concentrated milk products including condensed whole milk, condensed skim milk, condensed cream, single-strength cream, half-and-half milk and cream, and condensed whey. It will be understood also that part or all of the water in these solutions or dispersions of food solids may be replaced by glycerine, propylene glycol or syrups of sorbitol, glucose, invert sugars, molasses, etc.

Example 2

Solid food ingredient C and solid food ingredient D are added to a blender and water is added in quantity sufficient to form, upon thorough blending, a granular, moist tacky mixture. Instead of water, a water-miscible solvent such as glycerine, propylene glycol, ethyl alcohol or ethyl acetate may be used, either alone or in admixture with water. Also mixtures of these solvents may be used.