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HUMAN DIETARY PREPARATIONS

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This invention is concerned with improvements in or relating to human dietary preparations in dry form adapted to be made up with an aqueous liquid to provide a readily assimilable liquid food. In particular the invention relates to such preparations which provide substantially all the essential requirements for human nutrition and which may be termed "comprehensive diets."

Comprehensive diet preparations in liquid form are of importance in hospitals and similar institutions for the nutrition of patients who, for one reason or another, may be unable to take a normal diet; such preparations may also be of value in circumstances where normal foods are not available or cannot be prepared as for example may be the case in the armed services whilst on active service. Thus whilst one of the prime intended uses of the comprehensive diet preparation is for hospital work, it will be readily appreciated that there are many other circumstances where such preparations will be of value.

Comprehensive diet preparations should contain essentially a readily assimilable protein, a source of calories and, preferably, mineral salts and vitamins, thus giving a composition which supplies all the human nutritional requirements. Hitherto comprehensive diets have frequently been made up in liquid form, for example by hospital dieticians, as and when required. While such diets may be satisfactory from the nutritional viewpoint, they cannot, in general, be stored and the services of a skilled worker are thus required whenever a fresh supply is required. To the best of our knowledge a comprehensive diet able, in itself, to support the entire nutritional requirements of a patient has not previously been prepared in a stable dry form which is adapted to be readily made up with aqueous media into liquid form suitable for ingestion.

It is an object of the present invention to provide a stable, storable, human dietary preparation in solid form which is adapted to be readily made up with aqueous media to form an ingestible liquid.

It will be appreciated that all the constituents of such a solid dietary preparation should be firstly readily dispersible in aqueous media and secondly readily digestible. Those requirements place a considerable limitation upon the constituents which may be used and give rise to particular difficulty in providing that the food should have the necessary calorific value. Carbohydrates are a principal source of calorific value, but virtually the only carbohydrates which are both readily dispersible and readily digestible are the sugars, and to supply the whole of the necessary calorific value with sugars would make the product so sweet as to be unpalatable and would probably also lead to digestive disturbances. To supply some or all of the calorific requirements with fats leads to difficulties in obtaining a dry, stable product; furthermore the fat tends to separate out on dispersion of the product in aqueous media giving an unattractive and unpalatable product. The use of wetting or emulsifying agents to overcome this last difficulty is objectionable in that medical authorities consider that foodstuffs should not contain such substances.

The present invention is based on our discovery that

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pulverulent, dispersable readily assimilable proteins of low bulk density (volume/weight), are able to absorb and retain a substantial proportion of certain suitable fats and that when these proteins containing absorbed fats are dispersed in aqueous media, a chemically and physically stable dispersion is obtained from which the fats have no substantial tendency to separate under normal conditions of use. It appears that in such dispersions the protein acts as a wetting or emulsifying agent ensuring dispersion of the oil. By taking advantage of this discovery we are thus able to formulate a comprehensive diet preparation in which a substantial proportion of the calorific requirement is provided by a fat thus reducing the proportion of sugar required.

In this way the palatability of the resulting dietary preparation is considerably improved. Furthermore the preparations do not under normal conditions of usage exude fat or appear greasy, although under physical stress (i.e. conditions of unusual heat or pressure) some exudation of fat will of course occur. The solid product remains relatively free-flowing and is readily dispersed in aqueous media. The resultant liquid further exhibits substantially no oiliness as regards taste or appearance.

The palatability of the preparation may be further improved by replacing a further quantity of sugar with a water-soluble dextrin, which is able to supply a proportion of the calorific requirement without adding to the sweetness of the product.

Whilst as stated the nature of the protein used is of prime importance in achieving the object of the invention, it is found that the fat employed must also be of certain restricted nature. Thus the fat must be a stable assimilable bland fat having a melting point below 25° C.

Accordingly the invention provides a human dietary preparation in solid form adapted to be dispersed in aqueous media to provide a liquid food preparation comprising a pulverulent, water-dispersible assimilable protein of low bulk density, and a stable assimilable bland fat having a melting point below 25° C. absorbed in said protein.

The ingestible aqueous media in which the food is dispersed prior to use may be, for example, water or milk, of which water is preferred.

Preferred fats for the preparations according to the invention are those which have a melting point below 15° C., such as arachis oil, sesame oil, olive oil and cottonseed oil; of these arachis oil is preferred for reasons of palatability. Fats having melting points higher than 25° C. are not suitable for use in the invention as they are difficult to incorporate in the protein and tend to separate out on dispersion of the food in aqueous media.

Various proteins may be used for the purpose of the present invention, but such proteins must be of low bulk density (volume/weight) such that they will absorb the fat employed. In practice we prefer to use a protein the bulk density of which is less than 6.5 ccs./gm. although material having a somewhat higher bulk density can be used but with increasing difficulty in handling; however in general it is best that the bulk density of the protein be not less than 4 ccs./gm., again for ease of handling, although we have used with some success a protein the bulk density of which is as low as 2.4 ccs./gm. Protein having a bulk density less than 4 ccs./gm. when used in the present process may also give a product having a more greasy appearance and with poorer flow properties.

The protein must of course be water-dispersible and readily assimilable; furthermore it should preferably have a substantial proportion of its particles in the form of flakes in order to ensure stable absorption of the fat,