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F3003

EMULSIONS

FIELD OF THE INVENTION

5 This invention relates to sauces for intended addition
in a heated state to prepared food or for addition to food
for preparation together.

BACKGROUND TO THE INVENTION

10 Sauces are required to provide flavour and texture to
a food dish. The composition to which this invention
relates contain fat droplets dispersed in an aqueous base.
These two components of the emulsion may each contain other
15 components, for example, colours, flavours, emulsifiers,
stabilisers and thickeners. The sauce texture will be
required to have certain characteristics, for example
smoothness, creaminess and appropriate viscosity.

20 There is a general desire in dietary thought to reduce
the concentration of fats and oils in the food intake.
Both fats and oils are based on triglycerides and each may
be used as a sauce component. For convenience the term
"fat" will be used to identify the liquid triglyceride
25 component in the sauces.

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GENERAL DESCRIPTION OF THE INVENTION

5 The general desire to reduce fat intake is not in conformity with the necessity to have a certain concentration of fat in the sauce to give the necessary textural characteristics, in particular creaminess and smoothness, in association with a desirable flavour. However the applicants have now found these desirable characteristics can be achieved in a sauce provided the particle size distribution of the fat droplets dispersed in the aqueous medium is controlled.

15 This invention provides a sauce comprising from about 2% to about 10% by wt of fat droplets as an emulsion in an aqueous base wherein the droplets exist in two populations having:

- i) droplets above about 10 microns and
- 20 ii) droplets below about 5 microns, so that the emulsion is substantially free of fat droplets in the range 5 to 10 micron. The emulsion is substantially free of fat droplets in the 5 to 10 micron range because in that range there are only the tails of droplet distributions.

25 The bimodal fat droplet distribution provides the sauce with both a "rich" gloss and with a creamy smoothness which consumers associate with a higher fat sauce. At fat levels above 10% enhancing properties achieved by the use of a bimodal distribution become less noticeable, while below 2% there is too little fat available to justify splitting into two populations.

35 Although the sauce composition is defined as containing a specific range of fat, it must be appreciated the resultant sauce will have the desired textural



characteristics of a standard sauce containing fat droplets having a wide particle size distribution, but at a lower fat content.

5 Examples of the fats usable in the sauces of the invention are animal derived fats such as butter, tallow, lard and saturated and unsaturated fats, eg sunflower oil, maize oil, soya oil. These fats may optionally be hydrogenated, but a preferred feature is the use of
10 polyunsaturated fats in the fine emulsion. The invention extends to the use of fat replacers in the fine emulsion. These include polyols which are aliphatic or aromatic compounds which comprise at least four free hydroxyl groups. Such polyols in particular include the group of
15 sugar polyols, which comprises the sugars, ie the mono-, di- and oligosaccharides, the corresponding sugar alcohols and the derivatives thereof having at least four free hydroxyl groups. Examples of sugar polyols include
20 glucose, mannose, galactose, xylose, fructose, sorbose, tagatose, ribulose, xylylose, maltose, lactose, cellobiose, raffinose, sucrose, erythritol, mannitol, lactitol sorbitol, xylitol and alpha-methylglucoside. A generally used and preferred sugar polyol is sucrose.

25 The term 'polyol fatty acid polyester' is intended to refer to any such polyesters or mixtures thereof of which, on an average, more than 70% of the polyol hydroxyl groups have been esterified with fatty acids.

30 There is not criticality in the other components, although the proportions and processing may require variation to obtain the desired product.

LITERATURE

35 A two population, ie bimodal, emulsion is described in EP 0076548 (Unilever) in a spread composition. However



this is used in the preparation of a duplex O/W/O emulsion.

A sauce as prepared by a chef will usually have a small amount of butter stirred in as a last step in the preparation. It is expected this will form coarse droplets above 10 micron. The fat content of the base sauce before final butter addition would have a droplet size extending over a range and not limited to below 5 micron.

TEST METHODS

i) Fat droplet distribution: this was measured using a Malvern Mastersizer type MS20 obtainable from Malvern Instruments and a standard microscope.

ii) Viscosity: this was measured using a Contraves Rheomat 115 obtainable from Mettler-Toledo at 60°C and 50 sec⁻¹ shear rate.

SPECIFIC DESCRIPTION OF THE INVENTION

Examples of sauces will now be given to illustrate, but not limit, the invention.

Example I

An initial fine emulsion was prepared using the components:

	% wt
Butter (unsalted)	37.5
Skim Milk Powder (SMP)	7.0
Water	53.5
Sodium caseinate	2.0



To produce 5 kg of fine emulsion, 2.675 kg of water was heated to approximately 60°C in a steam kettle; 350 g skim milk powder and 100 g sodium caseinate were mixed together and added to the heated water which was being stirred with a Silverson mixer type SXFP. 1.875 kg of molten butter was then added and the mix stirred while maintaining the temperature at 60°C.

This mixture was then homogenised at 2 litres/minute through a Crepaco piston homogeniser (obtainable from Crepaco/APV) at 60°C and at a pressure of 150 Bar. This emulsion contained fat droplets of mean diameter 0.7 microns with 90% less than 1.24 microns and 99.9% less than 4 microns. 1 kg of this emulsion was added, with stirring, to 8.75 kg of an aqueous phase at 70°C comprising the remaining components of a wine based sauce.

This aqueous base was prepared by boiling in a steam kettle 2.1 kg of a mixture of white wine and vermouth to reduce to approximately half the original weight, then adding 5.8 kg chicken bone stock and appropriate herbs and spices and warming to just below boiling point. To this was added 400 g of a modified waxy maize starch that had been slurried in 750 g water; the mix was returned the boil and then adjusted with extra water yield a final weight of 8.75 kg.

250 g of butter was then mixed into the whole with a paddle stirrer so as to provide 2.0% by weight in the total sauce of fat droplets above 10 microns.

The sauce obtained could be frozen before reheating and serving. The droplet size distribution was not changed by freezing.

Examination by microscope before freezing showed the sauce had an uneven fat droplet size distribution, with the



majority of fat droplets being of the order of 1 micron and less than 5 microns in diameter, but with a smaller number of larger droplets in the 10 to 100 microns range. The sauce product had 3% fat as fine emulsion and 2% as coarse emulsion, ie above 10 micron. It was a rich creamy sauce with a smooth surface.

Example II

Example I was repeated but the butter intended to provide the coarse emulsion was paddle stirred into the aqueous base at 60°C. This emulsion was then mixed by paddle stirring into the fine emulsion. Thus each of the two emulsions forming the bimodal droplet size distribution were prepared separately.

This sauce had the droplet size distribution of Example I and the same consumer characteristics.

Example III

A fine emulsion using sunflower oil (SFO) was prepared to the composition:

	% wt
SFO	30.0
Water	61.0
(SMP)	7.0
Sodium caseinate	2.0

3.05 kg of water was heated to at least 60C and 350 g skim milk powder and 100 g sodium caseinate added. The mixture was mixed by the Silverson of Example I until smooth. 1.5 kg sunflower oil was heated to approximately 60°C and then mixed into the water containing the milk proteins using the Silverson for 30 seconds.

Homogenisation was effected by passing the mix through the Crepaco homogeniser at 3 litres/minute at 50 Bar pressure at 60°C. 1 kg of this fine emulsion, ie 10% of final sauce, was then mixed with 8.75 kg of the aqueous base from
5 Example 1 and then 250 gm butter paddle stirred in at 60°C.

This sauce had the fine emulsion formed using polyunsaturated oil (3% in total) and butter (2% in total) forming the coarse, ie above 10 micron, emulsion.
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This sauce had a rich creaminess, a butter taste and a smooth appearance which was appreciated by consumers.

Thus the invention allows a bimodal emulsion sauce to
15 be prepared with reduced fat content and also, optionally, with a health preferred fat as a part of the fat content.

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CLAIMS

5 1. A sauce comprising about 2% to about 10% by weight of fat droplets as an emulsion in an aqueous base wherein the droplets exist in the two populations:

i) droplets above 10 microns, and

10 ii) droplets below 5 microns, so the emulsion is substantially free of fat droplets between 5 and 10 microns.

15 2. A sauce according to claim 1 wherein the fat droplets below 5 microns include a polyunsaturated fat.

3. A sauce according to claim 1 wherein the fat droplets below 5 microns include a fat replacer.

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