CLAIMS

[1] A low-fat or fat-free air bubble-containing emulsion comprising, as an alternative to fat, a whey protein aggregate that contains particles having a 50% mean particle diameter of 2 to 10 μm,

wherein the low-fat or fat-free air bubble-containing emulsion is substantially free from stabilizers,

wherein the air bubble-containing emulsion is a food selected from the group consisting of ice creams, ice confectioneries, frozen yogurts, whip creams, whip deserts, margarines, spreads, and whip-type soft cheeses, and

when the food is one selected from ice creams, ice confectioneries, or frozen yogurts, the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food,

when the food is one selected from whip creams, the content of milk fat-containing fat in the food is 0.5 to 10% by weight or less than 0.5% by weight, based on the food,

when the food is one selected from whip deserts, the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food,

when the food is one selected from margarines, the content of milk fat-containing fat in the food is less than 0.5% by weight, based on the food,

when the food is one selected from spreads, the content of milk fat-containing fat in the food is less than 0.5% by weight, based on the food, or

when the food is one selected from whip-type soft cheeses, the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food.

[2] The low-fat or fat-free air bubble-containing emulsion according to claim 1, wherein the food is one selected from ice creams, ice confectioneries, or frozen yogurts, and the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food.

[3] A process for producing a low-fat or fat-free air bubble-containing emulsion without substantial use of stabilizers, the process comprising:

providing a mixture comprising a whey protein aggregate that has been produced by simultaneously subjecting a whey protein solution to heat treatment and mechanical shearing treatment and that contains particles having a 50% mean particle diameter of 2 to 10 μm, and water; and

stirring the mixture to form air bubbles,

wherein the air bubble-containing emulsion is a food selected from the group consisting of ice creams, ice confectioneries, frozen yogurts, whip creams, whip deserts, margarines, spreads, and whip-type soft cheeses, and

when the food is one selected from ice creams, ice confectioneries, or frozen yogurts, the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food,

when the food is one selected from whip creams, the content of milk fat-containing fat in the food is 0.5 to 10% by weight or less than 0.5% by weight, based on the food,

when the food is one selected from whip deserts, the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food,

when the food is one selected from margarines, the content of milk fat-containing fat in the food is less than 0.5% by weight, based on the food,

when the food is one selected from spreads, the content of milk fat-containing fat in the food is less than 0.5% by weight, based on the food, or

when the food is one selected from whip-type soft cheeses, the content of milk fat-containing fat in the food is 0.5 to 5% by weight or less than 0.5% by weight, based on the food.

[4] A process for producing a low-fat or fat-free ice creams, ice confectioneries, or frozen yogurts, without substantial use of stabilizers, the process comprising:

providing a mixture comprising a whey protein aggregate that has been produced by simultaneously subjecting a whey protein solution to heat treatment and mechanical shearing treatment and that contains particles having a 50% mean particle diameter of 2 to 10 μm, and water and

stirring and freezing the mixture to form air bubbles,

wherein the content of milk fat-containing fat in the low-fat or fat-free ice creams, ice confectioneries, or frozen yogurts is 0.5 to 5% by weight or less than 0.5% by weight, based on the low-fat or fat-free ice creams, ice confectioneries, or frozen yogurts.

[5] The process according to claim 4, wherein the air bubbles are formed at a temperature of -2.5°C or below.

[6] The process according to any one of claims 3 to 5, wherein the whey protein aggregate is used as an alternative to fat without drying.

[7] The low-fat or fat-free air bubble-containing emulsion according to claim 1 or 2 wherein the air-bubble containing emulsion is ice creams comprising at least 15% overrun.

[8] The process according to any one of claims 4 to 6 wherein the ice creams comprise at least 15% overrun.