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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



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(54) Title: PROCESSED CHEESES COMPRISING EMULSIFIED LIQUID SHORTENING COMPOSITIONS COMPRISING DIETARY FIBER GEL, WATER AND LIPID

(57) Abstract: According to the present invention, fat and caloric content of processed cheeses can be reduced by the replacement of a portion fat content normally found in processed cheeses with an equal amount of emulsified liquid shortening composition comprising dietary fiber gel, water and lipid. The result is that fat and caloric content of processed cheeses can be manipulated with minimal effect on taste and texture. Furthermore, these emulsified mixtures, or "emulsified liquid shortening compositions comprising dietary fiber gel, water and lipid", can further comprise functional foods such as high omega three and omega six oils and pure omega three and omega six fatty acids, medium chain triglyceride, beta carotene, calcium estearate, vitamin E, bioflavonoids, fagopyritrol, polyphenolic antioxidants of vegetable origin, lycopene, luteine and soluble fiber, for example Beta-Glucan derived from yeast, and other soluble fibers derived from grain, flax seed, and other vegetable and fruit fiber sources, and any combination thereof Hence, in addition to reducing fat and caloric content of processed cheeses, further health benefits can be achieved by replacing a portion of fat with emulsified liquid shortening compositions comprising dietary fiber gel, water and lipid.

1 **A. TITLE OF THE INVENTION**

2 **PROCESSED CHEESES COMPRISING EMULSIFIED LIQUID SHORTENING**
3 **COMPOSITIONS COMPRISING DIETARY FIBER GEL, WATER AND LIPID.**

4 **B. CROSS-REFERENCE TO RELATED APPLICATIONS**

5 The present invention is the subject of United States patent application number 10/689209
6 filed on 10/20/2003.

7 **C. TECHNICAL FIELD**

8 The present invention relates generally to the field of food science and relates specifically
9 to processed cheese foods comprising insoluble fiber compositions.

10 **D. BACKGROUND ART**

11 The present invention relates to processed cheeses comprising emulsified liquid
12 shortening compositions comprising dietary fiber gel, water and lipid. Recent media attention to
13 the global problem of obesity demonstrates a need for greater availability of foods with low
14 caloric and fat content. This is especially true for foods that typically have high fat and caloric
15 content, such as processed cheeses.

16 Processed cheeses typically comprise some fat. Other ingredients can vary according to
17 the type of processed cheese and the recipe followed, but typically, processed cheeses are high in
18 both fat and caloric content. Examples of processed cheeses include but are not limited to
19 processed cheese food, spreadable cheese foods and the like.

20 In recent years, some companies have begun to offer reduced fat processed cheeses. This
21 variety of processed cheese, however, often fails to retain the desirable taste and texture of
22 processed cheeses comprising higher fat contents.

23 The absence of a means to reduce the fat and caloric content of processed cheeses while still
24 producing a desirably flavored and textured processed cheese presents an unmet need in today's
25 food industry.

26 **E. DISCLOSURE OF THE INVENTION**

27 It is an object of the present invention to provide a unique composition of matter
28 embodied by low-calorie and low-fat processed cheeses. This reduction in caloric and fat content
29 answers an unmet need in the food industry to provide the consuming public with a healthier,
30 higher fiber alternative to traditional types of processed cheeses that typically are inherently
31 fattening. It is another object of the present invention to provide processed cheeses that have
32 been fortified with insoluble fiber and other functional foods.

33 Dietary fiber gels for calorie reduced foods hold the key to meeting this need. Dietary
34 fiber gels for calorie reduced foods are fully described in U.S. Patent number 5,766,662 (the '662
35 patent). These dietary fiber gels comprise insoluble dietary fibers consisting of morphologically
36 disintegrated cellular structures, and are characterized by their ability to retain large amounts of
37 water. Additionally, these dietary fiber gels are characterized by their high viscosity at low solid
38 levels. Other insoluble fibers derived from cereals, grains and legumes consist of
39 morphologically intact cellular structures, and thus impart a gritty texture to the foods in which
40 they are contained. The dietary fiber gels disclosed in the '662 patent, however, consist of
41 morphologically disintegrated cellular structures and thus impart a smoother texture than other
42 insoluble fiber formulations.

43 More specifically, the present invention utilizes emulsified mixtures of the dietary fiber
44 gels disclosed in the '662 patent, the emulsified mixtures further comprising, at a minimum,
45 water and lipid. These emulsified mixtures are fully described in and are the subject of United
46 States patent application number 10/669731 filed 09/24/2003. These emulsified mixtures, or
47 "emulsified liquid shortening compositions comprising dietary fiber gel, water and lipid", can
48 further comprise functional foods such as high omega three and omega six oils and pure omega
49 three and omega six fatty acids, medium chain triglyceride, beta carotene, calcium estearate,
50 vitamin E, bioflavonoids, fagopyritrol, polyphenolic antioxidants of vegetable origin, lycopene,
51 luteine and soluble fiber, for example Beta-Glucan derived from yeast, and other soluble fibers
52 derived from grain, flax seed, and other vegetable and fruit fiber sources, and any combination
53 thereof. Hence, in addition to reducing fat and caloric content of processed cheeses, further

54 health benefits can be achieved by replacing a portion of fat with emulsified liquid shortening
55 compositions comprising dietary fiber gel, water and lipid.

56 According to the present invention, fat and caloric content can be reduced by the
57 replacement of the fat normally found in processed cheeses with emulsified liquid shortening
58 compositions comprising dietary fiber gel, water and lipid. This replacement of fat does not
59 adversely affect either the taste or texture of the processed cheeses. In fact, the added emulsified
60 liquid shortening helps to increase the moisture content of the cheese while simultaneously
61 lowering the fat content. The result is that fat and caloric content of processed cheeses can be
62 manipulated with minimal effect on taste and texture, and as stated above, additional health
63 benefits can be achieved through consumption of processed cheeses comprising emulsified liquid
64 shortening compositions comprising dietary fiber gel, water and lipid when functional foods are
65 included in the formulations.

66 Further objects, advantages and features of the present invention will present themselves
67 in the following detailed description.

68 F. BEST MODE FOR CARRYING OUT THE INVENTION

69 This invention is directed to processed cheeses comprising emulsified liquid shortening
70 compositions comprising dietary fiber gel, water and lipid. According to the present invention,
71 fat and caloric content can be reduced by the replacement of the fat normally found in processed
72 cheeses with emulsified liquid shortening compositions comprising dietary fiber gel, water and
73 lipid (hereinafter "emulsified liquid shortening"). This replacement of fat does not adversely
74 affect either the taste or texture of the processed cheeses. The result is that fat and caloric
75 content of processed cheeses can be manipulated with minimal effect on taste and texture.

76 Processed cheeses can be formulated such that the processed cheese comprises 0.1
77 percent to 3.5 percent dietary fiber gel solids by replacing an appropriate amount, that is, an
78 amount prorated to deliver this range of dietary fiber gel solids, of fat, including oil and liquid
79 shortening, with an essentially identical amount of emulsified liquid shortening. The result is
80 that fat and caloric content of processed cheeses can be manipulated with minimal effect on taste

81 and texture, and as stated above, additional health benefits can be achieved through consumption
82 of processed cheeses comprising emulsified liquid shortening compositions comprising dietary
83 fiber gel, water and lipid when functional foods are included in the formulations.

84 G. CLAIMS

85 I claim:

86 1. processed cheese, the cheese having a formulation, the cheese comprising emulsified
87 liquid shortening composition comprising dietary fiber gel, water and lipid,

88 wherein the emulsified liquid shortening composition comprising dietary fiber gel, water
89 and lipid is added in a prorated amount such that solids contained within the dietary fiber gel
90 represent 0.1 percent to 3.5 percent by weight of the overall processed cheese formulation, and

91 the emulsified liquid shortening composition comprising dietary fiber gel, water and lipid
92 replaces an equal amount of fat used in an otherwise identical recipe of processed cheese that
93 uses no emulsified liquid shortening compositions comprising dietary fiber gel, water and lipid.

94 2. processed cheese spread, the processed cheese spread having a formulation, the processed
95 cheese spread comprising emulsified liquid shortening composition comprising dietary fiber gel,
96 water and lipid,

97 wherein the emulsified liquid shortening composition comprising dietary fiber gel, water
98 and lipid is added in a prorated amount such that solids contained within the dietary fiber gel
99 represent 0.1 percent to 3.5 percent by weight of the overall processed cheese spread formulation,
100 and

101 the emulsified liquid shortening composition comprising dietary fiber gel, water and lipid
102 replaces an equal amount of fat used in an otherwise identical recipe of processed cheese spread
103 that uses no emulsified liquid shortening compositions comprising dietary fiber gel, water and
104 lipid.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/36664

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(7) : A23C 19/00
 US CL : 426/582
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 426/582, 573, 602, 603

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,324,531 A (HOEFLER et al) 28 June 1994 (28.06.94), columns 2-3.	1-2
Y	US 5,458,904 A (ZOLPER) 17 October 1995 (17.10.1995), column 2 lines 34-50, column 7 lines 55-60, column 10 lines 45-56.	1-2
Y	US 6,149,962 A (LOH et al) 21 November 2000 (21.11.2000), column 2 lines 62-65, column 3 lines 18-22.	1-2
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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

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INTERNATIONAL SEARCH REPORT

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Continuation of B. FIELDS SEARCHED Item 3:

WEST

search terms: shortening substitute, fat analog, fat substitute, fat replacement, lipid, fiber gel, water, cheese