

QUALITY OF SOUR CREAM AND NON-BUTTERFAT SOUR DRESSING

*A Cooperative Study by the Connecticut Department of Agriculture
and The Connecticut Agricultural Experiment Station*

By Lester Hankin, Donald Shields, and J. Gordon Hanna



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Sour cream is enjoyed by many persons who use it in diverse manners such as a base for chip dips, as a dressing for baked potatoes, as a topping on fruit or vegetables, and as an ingredient in cooking and baking. In 1978 the average annual consumption of sour cream and dips was 817 grams (1.8 pounds) per person, about a three-fold increase from 1954 (1). This compares closely with yogurt consumption of 1185 grams (2.6 pounds). More recently, other sour products have been offered for sale. These include sour dressings, sour half and half, and non-butterfat sour dressings.

Sour cream is made either by using lactic acid bacteria to produce acid and flavor compounds in a milk product or by acidifying the milk mixture with food grade acids, with or without the use of lactic acid bacteria or enzymes (usually rennin). The former product is labelled cultured sour cream and the latter acidified sour cream. In Connecticut, sour cream must contain at least 18% milk fat (7). Sour half and half and acidified sour half and half is made like sour cream and acidified sour cream, but regulations allow less milk fat (10.5 to 18.0%). The acidity of all soured products must not be less than 0.5% expressed as lactic acid (7).

There are no specific regulations for non-butterfat sour dressings except that wholesome ingredients must be used and labelling and listings of ingredients must comply with State regulations (8).

This study details by brand name microbial and chemical analyses of soured products offered for sale in food stores in Connecticut.

METHODS

Twenty-one samples of sour cream (including one sour half and half) and seven samples of non-butterfat sour dressing were collected at food stores in Connecticut during October through December 1980. The collection, microbiological and chemical analyses, and calculations have been described in our previous Bulletins on quality of yogurt (2), juice drinks (3), egg nog (4), cottage and ricotta cheese (5), and chip dips (6).

RESULTS AND DISCUSSION

Additives: All seven of the non-butterfat sour dressings but only 5 of the 21 sour creams stated on the label that a stabilizer or emulsifier was used (Table 1). Stabilizers thicken the product and emulsifiers help keep fat dispersed. The usual stabilizers, vegetable gums and carrageenens, and the emulsifiers mono- and diglycerides were used. The use of tapioca flour was declared on the labels of two samples (numbers 23 and 27), presumably added to thicken and enhance the consistency. Labels on two samples (numbers

Table 1. Code period, declared additives, and nutrients found in sour cream and sour dressing

Sample number	Brand and manufacturer	Code period (days)	Age at purchase (days)
<u>Sour cream</u>			
1	A & P, grade A sour cream (Great A & P Tea Co., Washington, NY)	42	32
2	Axelrod's, natural sour cream (Crowley Foods, Binghamton, NY)	35	11
3	Axelrod's, sour cream with added onions (Crowley Foods, Binghamton, NY)	35	36 ²
4	Borden, sour cream (Borden Dairy & Services Division, Watertown, NY)	45	15
5	Breakstone's, all natural sour cream (Kraft Dairy Group, Walton, NY)	50	29
6	Cumberland Farms, grade A sour cream (Dairy Lea Special Products, Vernon, NY)	30	12
7	Dairy Lea, all natural sour cream (Dairy Lea Special Products, Vernon, NY)	30	22
8	Daitch, country packaged sour cream (Delaware County Dairies, Roxbury, NY)	25	13
9	Guida-Seibert Dairy, grade A sour cream (Friendship Dairy Products, Maspeth, NY)	42	32
10	Guida-Seibert Dairy, sour cream (Crowley Foods, Binghamton, NY)	35	15
11	Grand Union, sour cream (Crowley Foods, Binghamton, NY)	35	38 ²
12	Hood, sour cream (H.P. Hood, Boston, MA)	40	20
13	Hood, NuForm sour half and half (H.P. Hood, Boston, MA) ¹	40	22
14	Moser Farms Dairy, naturally flavored sour cream (Dairy Lea Special Products, Vernon, NY)	30	28
15	Pathmark, sour cream (Tuscan Dairy Farms, Union, NJ)	42	2
16	Royal Dairy, all natural sour cream (Dellwood Foods, Yonkers, NY)	35	28
17	Sealtest, all natural sour cream (Kraft Dairy Group, North Lawrence, NY)	60	35
18	Shop Rite, all natural sour cream (Atlantic Processing Co., Allentown, PA)	35	18
19	Stop & Shop, sour cream (Tuscan Dairy Farms, Union, NJ)	42	25
20	Waldbaum's, sour cream (Elmhurst Milk & Cream Co., Prattsburg, NY)	28	24
21	Wawa, all natural sour cream (Kraft Dairy Group, North Lawrence, NY)	60	22
<u>Non-butterfat sour dressing</u>			
22	Breakstone's, cultured sour dressing (Kraft Dairy Group, Walton, NY)	80	30
23	Cholesterol Watchers, non-butterfat sour dressing (American Whipped Products, Mt. Vernon, NY)	70	18
24	Daitch, Brisk 'n Bouncy non-butterfat sour dressing (Delaware County Dairies, Roxbury, NY)	30	28
25	Friendship, sour treat cultured sour dressing (Delite Foods, Lebanon, NJ)	49	43
26	King Sour, non-butterfat sour dressing (American Whipped Products, Mt. Vernon, NY)	70	33
27	King Sour, non-butterfat sour dressing with chives (American Whipped Products, Mt. Vernon, NY)	70	52
28	Sokreem, imitation sour cream, Hickory Farms (Broughton Foods Co., Charleston, WV)	90	70

Footnotes to Table 1.

1. Not a sour cream but placed in this group since it is a cultured product and contains milkfat.
2. Past code date when purchased.

Quality of Sour Cream

Declared Additives			Nutrients Found						Sample number
Stabilizer/ emulsifier	Artificial color	Artificial flavor	Fat (%)	Protein (%)	Carbohydrate (%)	Calories (no./28.4 g) ³	Sodium (mg/100 g) ⁴	Acidity (%)	
+	-	-	21.4	3.5	2.6	60	85	0.78	1
-	-	-	18.6	4.6	1.7	54	64	0.71	2
-	-	-	19.0	4.0	3.0	55	520	0.74	3
+	-	-	20.8	4.1	0.7	57	43	0.77	4
-	-	-	18.6	3.6	3.2	54	68	0.78	5
-	-	-	20.0	4.8	2.5	58	50	0.86	6
-	-	-	19.6	3.9	3.8	57	58	0.82	7
-	-	-	18.7	3.3	3.2	54	48	0.70	8
-	-	-	18.1	3.2	3.9	53	50	0.66	9
-	-	-	19.1	2.1	3.9	55	113	0.70	10
-	-	-	16.3	4.0	6.2	52	50	0.81	11
+	-	-	21.0	3.6	1.2	58	45	0.78	12
+	-	-	12.5	4.0	4.1	40	50	0.93	13
-	-	-	20.2	4.5	2.5	58	63	0.81	14
-	-	-	18.2	3.1	4.8	54	50	0.80	15
-	-	-	17.9	2.9	4.4	53	104	0.82	16
-	-	-	18.1	4.3	3.9	55	105	0.55	17
-	-	-	18.8	2.4	4.1	54	65	0.80	18
-	-	-	19.0	3.6	4.4	56	80	0.92	19
-	-	-	17.0	3.6	4.5	52	53	0.83	20
-	-	-	22.0	3.9	2.2	62	80	0.95	21
+	+	+	17.7	2.4	5.4	53	65	0.77	22
+	-	+	12.7	2.6	6.9	42	38	0.70	23
+	+	+	16.2	4.7	4.5	51	63	0.96	24
+	-	-	14.3	4.6	4.6	46	50	0.87	25
+	-	+	11.8	3.6	5.2	39	120	0.74	26
+	-	+	12.3	3.6	5.6	41	248	0.76	27
+	+	+	17.4	2.5	4.7	52	70	0.80	28

3. 28.4 grams = one ounce (about 2 tablespoons).

4. mg = milligrams; g = grams.

Table 2. Microbiological analysis and sorbate content of sour cream and non-butterfat sour dressing

Sample number	Brand	Bacteria (no./g)	Yeasts (no./g)	Molds (no./g)	Coliform bacteria (no./g)	Sorbate		Acid producers (no./g)
						Claim	Found (%) ¹	
<u>Sour Cream</u>								
1	A & P	42,000	620	<10	45	-	0	70
2	Axelrod's	770	<10	<10	<10	-	0	1,500,000
3	Axelrod's, with added onions	90	<10	<10	<10	+	0.023	5,500
4	Breakstone's	<10	<10	51,000	<10	-	0	550
5	Borden	5,000	<10	<10	<10	-	0	1,000
6	Cumberland Farms	<10	<10	4,600	70	-	0	8,500
7	Dairylea	85	<10	100	<10	-	0	280
8	Daitch	<10	2,600	<10	45	-	0	170
9	Friendship	<10	<10	280	30	-	0	<10
10	Guida-Seibert	<10	<10	<10	<10	-	0	1,200
11	Grand Union	660	70	<10	40	-	0	10
12	Hood	<10	13,000,000	<10	<10	-	0	3,200
13	Hood, sour half and half	150	<10	<10	<10	-	0	75
14	Moser Farms	<10	<10	<10	<10	-	0	35
15	Royal Dairy	<10	<10	2,800	<10	-	0	38
16	Sealtest	50	<10	<10	45	-	0.004	25
17	Pathmark	55	<10	<10	65	-	0.038	13,000,000
18	Shop Rite	120,000	<10	<10	55	-	0	<10
19	Stop & Shop	1,800,000	<10	<10	30	-	0	1,400,000
20	Waldbaum's	<10	9,100,000	<10	35	-	0	60
21	Wawa	60	<10	<10	95	-	0	140
<u>Non-butterfat Sour Dressing</u>								
22	Breakstone's	20	<10	<10	20	+	0.020	20
23	Cholesterol Watchers	210	40	<10	<10	+	0.062	<10
24	Daitch, Brisk 'n Bouncy	2,900	45	<10	<10	-	0	15
25	Friendship, Sour Treat	260	<10	<10	<10	-	0	38
26	King Sour	160	<10	<10	<10	+	0	10
27	King Sour, with chives	470	30	<10	<10	+	0.044	20
28	Sokreem, imitation sour cream	430	190	<10	55	+	0	<10

Footnote to Table 2:

1. A zero level means less than 0.001%.

3 and 27) stated that hydrolyzed vegetable protein was added. Nonhydrolyzed soy protein was claimed as an ingredient in sample 28. Two samples, numbers 24 and 27, showed on the label that a sweetening agent was used: dextrose and sugar, respectively.

Labels on all of the non-butterfat sour dressings indicated that hydrolyzed vegetable oil was the fat component. Either skim milk or water was the first ingredient listed (the component in the highest concentration). None of the dairy sour cream labels listed use of artificial color or flavor, but most of the non-butterfat products declared their use (Table 1).

Labels on samples 22, 26, 27, and 28 listed use of an acidulant (lactic or citric acid or vinegar) probably to provide tartness. Cultured skim milk was listed as an ingredient for samples 22, 24, and 25).

Sodium citrate was a declared ingredient in three samples (numbers 1, 8, and 22). This material is called a flavor precursor, since, in products cultured with lactic acid bacteria, the bacteria transform the sodium citrate to desirable flavor compounds.

Monosodium glutamate (MSG), a flavor enhancer reputed to act by stimulating the taste buds, was stated as being used in sample 3. Sodium caseinate, derived from milk, was listed as an ingredient in sample 22.

Code periods: The code periods (days from manufacture to date stamped on the container) for sour creams averaged 39 days but the range was wide, from 25 to 60 days (Table 1). For non-butterfat sour dressings the code periods averaged 66 days; the range being from 30 to 90 days. The age of all samples at purchase varied from 2 to 70 days. All samples were of satisfactory quality when purchased.

Microbial analysis: The total number of aerobic bacteria per gram of sour cream or non-butterfat sour dressing varied considerably among brands (Table 2). There are no bacterial standards for these products, but for example, a total aerobic count of 50,000 per gram is acceptable in pasteurized cream. Thus, only two samples were above the standard for pasteurized cream (Table 2). The number of acid-producing bacteria does not always coincide with the total aerobic count. The lactic acid bacteria used to ferment dairy products are fastidious in their growth requirements. If they are present in the manufactured product, most will not grow on the medium used for the total aerobic count. Bacteria other than lactic acid bacteria can

produce acid. Thus, for example, in sample 19 the acid producers may not be lactic acid bacteria since the total aerobic count is high. Conversely, in sample 2, the total aerobic count is low and the number of acid producers high, indicating a large number of lactic acid bacteria in the product. The low number of acid producers in the non-butterfat sour dressings probably is not important to keeping quality.

Contamination by yeasts and molds varied among samples (Table 2). Yeasts greater than 50 per gram are considered important. Mold contamination, except for a few samples was minimal. An excessive number of coliform bacteria (greater than 10 per gram) is not considered satisfactory and could indicate poor packaging technique.

We also tested for gram negative bacteria able to degrade proteins and fats, the major components of sour cream and dressing. Many of these gram negative bacteria are psychrotrophic, i.e., able to grow at refrigeration temperatures and cause spoilage. Few of these bacteria were found in the samples, indicating that any bacterial contamination detected by the total aerobic count was by gram positive bacteria, which are less likely to cause spoilage than the gram negative bacteria.

Nutrient quality: The percentage of fat in the sour creams (sample 13 excluded) varied from 16.3 to 22.0%; averaging 19.1% (Table 1). Only two samples (numbers 11 and 20) contained less than the 18% butterfat required. The non-butterfat sour dressing averaged 14.6% fat.

The number of calories in the sour creams averaged 55 per 28.4 grams (one ounce or about 2 tablespoons) and 46 in the non-butterfat sour dressings. The protein content averaged 3.7% for the sour creams and 3.4% for the non-butterfat dressings. The carbohydrate content averaged 3.4% for the sour creams and 5.3% for the sour dressings (Table 1).

The average sodium content of the sour creams (excluding sample 3) was 67 milligrams per 100 grams, ranging from 43 to 113. The non-butterfat sour dressings (excluding sample 27) averaged 68 milligrams per 100 grams, ranging from 38 to 120. Samples 3 and 27 were high in sodium content (520 and 248 milligrams per 100 grams, respectively). Their labels listed hydrolyzed vegetable protein, which can contain considerable salt, as well as salt as the third or fourth ingredient.

Sorbate, a food preservative used to

counteract yeast and mold growth, was found in only 6 samples. It was not present in 2 samples that listed it on the label, however it was present in 2 samples that did not declare its use (Table 2).

Acidity of the sour creams, a measure of tartness ranged from a low of 0.55% to a high of 0.95% (average 0.79%). All sour creams were within the regulation requiring at least 0.5% acidity calculated as lactic acid. Acidity of the non-butterfat sour dressings ranged from 0.70 to 0.96% (average 0.80%). Thus, each type of product generally had about the same tartness.

CONCLUSIONS

Two types of sour products are sold in Connecticut; dairy sour cream, a cultured product; and non-butterfat sour dressing. Code periods (days from manufacture to date stamped on the container) ranged from 25 to 90 days. Twenty-eight samples were tested.

Fat content averaged 19.1% for sour cream and 14.6% for non-butterfat sour dressings. Sodium content of all samples averaged 67 milligrams per 100 grams. Samples containing hydrolyzed vegetable protein were higher in sodium content. Non-butterfat products generally contained more additives than the sour creams. Two samples that did not declare the use of sorbate on the label contained this preservative.

Microbial contamination varied among types of products and brands. Only two samples contained a high number of aerobic bacteria. Seven samples contained substantial yeast contamination. Twelve samples contained a high number (greater than 10 per gram) of coliform bacteria.

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