Quality of Egg Nog

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

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Egg Nog is a popular holiday beverage primarily sold and consumed in a period of about seven weeks from just prior to Thanksgiving to New Year's Day. Although some egg nog is prepared at home, considerably more is made by dairies. Most of it is consumed as purchased or fortified with appropriate "spirits."

Webster's New International unabridged dictionary defines egg nog as a drink made from eggs beaten with sugar, milk or cream, and often rum, brandy, or other liquor, or sometimes wine is added and is usually served cold and flavored with grated nutmeg.

Egg nog is defined by Connecticut regulations (1) as a clean, wholesome food product made from two or more of the following ingredients: milk products, eggs, sucrose and/or dextrose, spices, wholesome edible stabilizer, and salt. Optional ingredients may include harmless artificial flavor and color. It shall contain not less than 6% by weight of milk fats, not less than 1% by weight of egg yolk solids, not more than 1/2-% by weight of stabilizer, and not more than 50,000 standard plate count of bacteria per gram.

To make egg nog dairies usually purchase a concentrate containing flavoring, stabilizer, spices, egg yolk solids, color, etc., which is mixed with fresh milk and cream, and sugar and egg yolk solids if not included in the concentrate. The egg nog is then homogenized, pasteurized, bottled, and refrigerated.

In this study we report on the microbial, nutritional, and keeping quality of some commercial egg nogs.

METHODS

Twenty-eight samples (quarts or half-gallons) of non-alcoholic egg nog were collected at either dairy plants or food stores in Connecticut from November 18-25, 1980. The collection, microbial and chemical analyses, calculations, and tests for keeping quality are described in our previous reports on the quality of yogurt (2), juice drinks (3), and cottage and ricotta cheese (4). Egg yolk solids were determined by the AOAC method (5).

RESULTS AND DISCUSSION

All results refer to data in the table. One dairy company made 5 brands, one made 4, and one made 2. In all, 20 processors were represented. Fourteen brands were manufactured in Connecticut.

Flavor and viscosity (thickness or consistency) in egg nog is a matter of personal taste. Viscosities ranged from a consistency of cream to slightly heavier than whole milk. The flavor also varied among brands, from highly aromatic and strongly flavored to lightly flavored, bland products.

Some labels listed use of stabilizers; the type varied among brands. Most labels stated use of either vegetable gums (carob bean gum, guar gum) and carrageenen. Some also stated they contained mono- and diglycerides and one stated use of calcium sulfate and cellulose gum. Stabilizers provide a heavier consistency and help disperse the fat particles.

A few brands did not list ingredients, except to note that artificial color and flavor had been used. The use of natural

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Microbial and chemical analysis of commercial egg nogs

Sample number	Brand[1]	Code period (days)	Age at purchase (days)	Total aerobic count[2] (no./g)	Coliform bacteria (no./g)
1	A & P (Hood, Agawam, MA)	15	8	110	<1
2	A.C. Petersen Farms, West Hartford, CT	13	3	410	<1
3	Axelrod's (Crowley Foods, Albany, NY)	18	6	150,000	86
4	Cumberland Farms, Meriden, CT	18	8	600	<1
5	Dairy Mart, Enfield, CT	22	1	470	<1
6	Deary Bros., Webster, MA	14	12	92	<1
7	Finast (Garelick Farms, Franklin, MA)	15	5	1,600	<1
8	Garelick Farms, Franklin, MA	15	4	1,300	<1
9	Grand Union, ultra-pasteurized[4] (Tuscan Dairy Farms, Union, NJ)	38	26	35	<1
10	Greenbacker Schwink, Meriden, CT	17	1	290	37
11	Guida-Seibert, New Britain, CT	20	4	2,100	4
12	Hood, Boston, MA	15	8	240	<1
13	Marcus Dairy, Danbury, CT	21	3	5,400,000	9
14	Mill Pond Farm, Milford, CT	12	0	530	<1
15	Moser Farms, ultra-pasteurized (Tuscan Dairy Farms, Union, NJ)	35	2	40	<1
16	Mountain Dairy, Storrs, CT	10	2	67	<1
17	Norman's Dairy, Jewett City, CT	10	3	1,300	<1
18	Pathmark, ultra-pasteurized (Tuscan Dairy Farms, Union, NJ)	35	17	39	<1
19	Pioneer Dairy, Southwick, MA	14	6	850	<1
20	Royal Dairy, ultra-pasteurized (Tuscan Dairy Farms, Union, NJ)	36	19	55	<1
21	Sealtest, Hartford, CT	22	4	180	<1
22	Shady Glen Dairy Farm, Manchester, CT	not dated[5]	0	2,100	<1
23	Shop Rite, ultra-pasteurized (Tuscan Dairy Farms, Union, NJ)	36	21	440	<1
24	Stew Leonard's, Norwalk, CT	30	1	400	<1
25	Stop & Shop (Hood, Boston, MA)	15	8	67	<1
26	Sun Glory (Hood, Agawam, MA)	15	8	53	<1
27	University of Connecticut, Storrs, CT	10	0	1,900	17
28	Wade's Dairy, Fairfield, CT	22	8	11,000	<1

[1] Address follows name if made and sold by processor; otherwise processor and address shown in parenthesis.

[2] Standard plate count of bacteria.

[3] g (grams) per 227 grams (8 ounces or 1 cup); mg (milligrams) per 100 grams.

flavors such as vanilla, ground nutmeg, and oil of nutmeg was indicated on some labels. Only 5 brands (samples 6,11,14,24,27) did not list artificial color or flavor on the labels.

The average code period (number of days from manufacture to date stamped on the container as last day of sale) for 27 samples was 20.1 days. The longest code period was 38 days; the shortest 10 days. One sample (number 22) was undated, but a code date is not required for egg nog.

We stored each sample at 40 F (4.4 C) to the code date (date stamped on the container). All had acceptable flavor quality to that date. The undated sample

Acidity (% lactic (acid)	Total solids (%)	Fat (g/227 g)[3]	Protein (g/227 g)	Carbohydrate (g/227 g)	Calories (no./227 g)	Egg yolk solids (%)	Sodium (mg/100 g)[3]	Sample number
0.13	26.7	14.3	8.2	36.6	305	0.6	88	1
0.16	30.6	17.5	10.6	39.4	353	1.6	80	2
0.14	27.1	12.1	7.7	40.2	297	0.7	123	3
0.14	26.9	15.1	6.7	37.5	309	0.7	90	4
0.16	25.5	14.2	7.8	33.9	292	1.0	95	5
0.14	29.4	12.2	6.1	46.4	317	0.9	160	6
0.20	32.2	13.7	10.7	46.5	349	0.8	110	7
0.20	30.6	12.3	8.3	46.6	328	0.9	128	8
0.15	28.3	15.5	8.1	38.2	321	0.8	120	9
0.18	31.5	18.4	9.0	42.4	367	0.8	80	10
0.12	23.1	12.7	7.8	30.5	265	0.7	58	11
0.12	27.4	14.4	7.5	38.7	312	0.6	143	12
0.14	26.4	15.8	9.1	33.2	308	0.7	73	13
0.13	26.0	14.8	9.0	42.4	301	1.0	60	14
0.15	31.8	14.7	8.0	46.6	348	1.1	178	15
0.15	26.7	15.6	8.2	34.9	310	1.0	83	16
0.15	28.7	13.6	8.2	41.6	319	0.8	60	17
0.12	30.7	15.1	7.4	44.6	341	1.0	140	18
0.15	22.3	14.6	6.4	28.6	268	1.1	150	19
0.16	28.4	16.0	8.0	37.8	324	0.7	143	20
0.18	26.9	13.8	10.4	34.7	301	1.1	90	21
0.18	30.0	18.6	8.3	39.4	354	1.1	105	22
0.12	29.7	14.3	6.1	44.1	327	1.0	138	23
0.18	23.7	13.6	9.1	29.1	273	0.9	85	24
0.12	27.4	14.4	5.9	40.5	311	0.3	83	25
0.12	26.9	14.3	6.4	39.0	307	0.5	80	26
0.17	40.2	21.5	8.4	59.6	461	1.2	80	27
0.14	27.9	16.8	8.7	36.1	327	1.1	73	28

[4] All egg nogs were made from pasteurized dairy products. Ultra-pasteurized means heat-treated at or above 280°F (138°C) for at least 2 seconds as compared with regular pasteurization of 145°F (62.8°C) for 30 minutes or 161°F (71.7°C) for 16 seconds.

[5] This sample did not show a code date. Code dating of egg nog not required by law. Sample was kept for 20 days (average code period for all samples) from day of manufacture and remained of acceptable quality.

remained acceptable for the simulated code period of 20 days. The age of the samples at purchase is shown in the table.

Two samples were above the standard of 50,000 standard bacterial plate count. In fact, most samples contained less than 1,000 standard plate count per gram which suggests good manufacturing and packaging methods. There is no standard for the number of coliform bacteria in egg nog but milk must contain not more than 5 per milliliter. Four egg nogs (samples 3,10,13,27) contained greater than 5 coliform bacteria per gram. Eight samples contained a few yeasts (less than 15 per gram) and only two samples contained mold

contaminants (less than 4 per gram). Yeasts and molds in such small numbers in this type of product are not significant.

The acidity of the egg nogs ranged from 0.12% to 0.20%, which is low compared to yogurt (about 1%) or cottage cheese (about 1.2%). The total solids content, which includes all ingredients except water, ranged from 22.3 to 40.2%; averaging 28.3%.

The fat content per 227 grams (8 ounces) shown in the table, includes fat derived from milk fat as well as that from egg yolk solids. Egg yolk solids contain about 63% fat. The total amount of fat per 227 grams ranged from 12.1 to 21.5 grams (5.3 to 9.5%), averaging 15 grams (6.6%). Taking into account the amount of fat derived from egg yolk solids, only 4 samples (numbers 3,6,8,11) did not contain (within 10%) the amount of milk fat required (6%).

Protein content per 227 grams ranged from 5.9 grams to 10.6 grams, and averaged 8.0 grams. Carbohydrate content averaged 39.4 grams per 227 grams with a range from 28.6 to 59.6 (12.6 to 26.3%). Carbohydrates include both lactose from dairy products as well as sucrose or dextrose which is added. Caloric content per 227 grams ranged from 265 to 461 calories. The average was 321 calories. By comparison, 227 grams (8 ounces) of whole milk contains about 138 calories, vanilla ice cream about 459, strawberry yogurt about 252, and creamed cottage cheese about 234.

Nineteen of the 28 samples (68%) contained, within 20%, the amount of egg yolk solids required. The sodium content averaged 104 milligrams per 100 grams; the range being 58 to 178.

No egg nogs contained either benzoate or sorbate, both commonly used as preservatives. Two samples (numbers 10, 13) declared use of benzoate but the benzoate probably was in the concentrate used to make the egg nog and was diluted by other ingredients. The limit of detectability for benzoate is 0.002%. As much as 0.1% is allowed in food.

CONCLUSIONS

The flavor quality of all egg nogs remained acceptable to the code date assigned by the manufacturer. Flavor ranged from fairly bland to highly aromatic. Total fat content ranged from 5.3 to 9.5%, protein from 2.6 to 4.7% and carbohydrate from 12.6 to 26.3%. Caloric content averaged 321 calories per 227 grams (8 ounces), ranging from 265 to 461. About 68% of the samples met the requirement for content of egg yolk solids.

Of the 28 samples examined, 26 met the standard of less than 50,000 standard plate count of bacteria per gram. Yeast and mold contamination was minimal and only four samples contained coliform bacteria in excess of 5 per gram.

Purchasers of egg nog in Connecticut generally receive a good quality product containing a high level of calories with no preservatives and in conformance with state regulations.

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