



Scientists compared the nutrient content of 69 vanilla-flavored ice creams and frozen yogurts.

Ice creams and frozen yogurts vary widely in key nutrients

Christine M. Bruhn □ John C. Bruhn

The combined forces of consumer demand, nutritional labeling requirements and product innovation have led to a range of frozen dairy desserts that vary significantly in several nutrients highlighted on the nutritional label. Ice creams and yogurts available in California were surveyed in 1995 for nutrient content. Ice creams varied from 70 to 270 calories and from 0 to 18 grams of fat per half-cup serving. Two ice cream products met the Food and Drug Administration's definition for a "good source" of vitamin A, providing 10% or more of the Recommended Daily Value of the nutrient, and 21 were "good sources" of calcium. While no frozen yogurts met the requirement for a good source of vitamin A, 10 were good sources of calcium.

The Nutritional Labeling and Education Act (NLEA) of 1990 led to modifications in the legal requirements for minimum levels of milk solids and fat in frozen dairy desserts. Prior to NLEA implementation, state and federal regulations defined ice cream as containing 10% milk solids and 10% milkfat and weighing at least 4.5 pounds per gallon. Ice milk — the lower milkfat, lower-cost frozen dessert that was available for decades — was required to contain between 2% and 7% milkfat and at least 11% milk solids. Those products not meeting the definitions for ice cream or ice milk were labeled "frozen dairy dessert." California regulations specified that frozen yogurt must contain 3.5% milkfat, weigh 4.0 pounds per gallon, and meet a specified total acidity.

Under today's standards, products labeled "ice cream" or "frozen yogurt" must still meet the same minimum re-

quirements for milkfat and solids, except that products with lower fat levels can also be called ice cream or frozen yogurt as long as they meet federal NLEA labeling guidelines. A product labeled "low fat" must have 3 grams fat or less per serving, a "light" product must have one-third less fat than the standard product, a "reduced fat" product must have 25% less fat than the standard product, and a "nonfat" product must have 0.5 gram fat or less per serving. Standards for ice milk, which is no longer on the market, were abolished in 1995.

Manufacturing a lower milkfat product that meets consumer expectations for flavor and texture is a challenge. Milkfat gives frozen dairy products richness and promotes desirable textural qualities known as "mouth-feel." It also contributes its own flavor and is a good carrier and synergist for added flavor compounds. In making

TABLE 1. Nutrient values of vanilla-flavored ice cream available in California

Brand	Calories	Saturated			Cholesterol	Cholesterol	Sodium	Sugar	Protein	Vit. A	Calcium	Special ingredients
		Total fat	fat	% RDV								
		grams	grams	% RDV	mg	% RDV	grams	grams	% RDV	% RDV		
Haagen Dazs	270	18	11	40	120	4	21	5	10	15	Egg yolk	
Ben & Jerry	230	17	10	32	95	2	21	4	15	15	Egg yolk	
Knotts	170	11	8	15	45	2	15	3	8	14		
Select/Safeway*	170	10	6	21	65	2	15	3	8	10	Egg yolk	
Smith	170	10	6	17	50	2	14	3	8	10	Egg yolk	
Classic	170	10	6	17	50	2	14	3	8	10		
Select/Safeway	160	10	6	13	40	2	15	3	8	10		
Homestyle/Safeway	160	8	5	15	45	3	18	3	6	10	Egg yolk	
Dreyers	150	10	6	12	35	1	11	2	6	6		
Sunnyside	150	9	6	13	40	1	15	2	6	6		
Carnation	150	9	3	8	25	1	11	2	4	4		
Golden Creme	150	9	6	13	40	1	15	2	6	6		
Breyer	150	8	6	12	35	2	15	3	6	10		
Lucerne	150	8	5	11	35	2	15	2	6	8		
Jerseymaid*	150	8	5	15	45	2	12	3	8	8	Egg yolk	
Albertsons	150	8	5	7	20	2	13	2	4	8		
Albertsons*	150	8	5	17	50	3	15	2	4	8	Egg yolk	
Lady Lee	140	9	6	13	40	2	12	2	8	8	Egg yolk	
GoodDay	140	8	5	7	20	2	12	2	4	8		
Smith	140	8	5	10	30	2	13	2	6	8		
Crystal	140	8	5	10	30	2	16	2	6	8		
Meadowbrook	140	7	4	12	35	1	17	3	4	8	Egg yolk	
Jerseymaid	140	7	4.5	8	25	2	12	3	4	8		
Smith	140	7	4	10	30	3	15	2	7	9		
Adohr	140	7	2	8	25	2	9	2	4	6		
Mocha Mix†	140	7	1.5	0	0	3	12	1	0	0	Lactose free	
Janet Lee	140	7	5	7	20	2	14	2	4	8		
Thrifty	140	7	4	7	20	2	14	3	4	8		
Golden Creme*	140	7	4	18	55	2	16	2	6	8	Egg yolk	
Mountain Dairy	140	7	4	10	30	3	15	2	7	9		
Snowstar	130	7	4	9	25	2	15	2	4	8		
Jerseymaid	130	7	4	10	30	2	10	2	4	6		
Lady Lee	130	7	4	5	15	2	12	3	6	10		
Thrifty	130	7	4	7	20	2	10	2	4	6		
Bay View	130	6	4	10	30	2	15	2	4	8		
IGA	120	7	4	8	25	1	10	2	0	6		
Ralphs	120	7	4	9	25	2	13	2	6	8		
Mattus (low fat)	170	3	2	4	12	3	24	11	4	15		
Classic Light	120	4	3	6	20	2	18	3	4	8		
Crystal (light)	110	3.3	2	5	15	3	16	3	6	10		
Dreyers (reduced fat)	100	4	2.5	5	15	2	3	3	4	8		
Dreyers (Grand Light)	100	4	2.5	8	25	2	11	3	4	8	Egg yolk	
Jerseymaid (light)	100	4	2.5	5	15	2	15	1	4	6		
Mountain Dairy (light)	100	4	2.5	5	15	2	16	2	2	6		
Sunnyside (light)	100	3	1.5	3	10	2	14	3	4	10	Egg white	
Lucerne (low fat)	100	2.5	1.5	3	10	2	18	2	0	10		
Formost (low fat)	100	2	1	3	10	3	18	3	4	10		
Ralphs (reduced fat)	100	4	2.5	5	15	2	14	3	4	10	Egg yolks	
Ralphs (light)	90	2.5	1.5	3	10	2	15	4	4	10		
Jerseymaid (low fat)	90	2	1.5	0	0	2	12	3	4	10	Chol. reduced	
Lady Lee (low fat)	90	1.5	1	1	5	2	13	3	0	10		
Dreyers (fat free)	90	0	0	0	0	3	12	4	8	8	Egg white	
Ralphs (fat/chol free)	80	0	0	0	0	2	16	4	4	10		
Thrifty (nonfat)	70	0	0	5	15	4	6	4	0	15	Simplese	

*French vanilla

†Nondairy

TABLE 2. Nutrient values of vanilla-flavored frozen yogurt available in California

Brand	Calories	Saturated fat		Cholesterol % RDV	Cholesterol mg	Sodium % RDV	Sugar grams	Protein grams	Vit. A % RDV	Calcium % RDV	Special Ingredients
		Total fat grams	grams								
Haagen Dazs (97% fat-free)	160	2.5	1.5	15	45	2	19	8	0	25	Egg yolk
Breyers	140	3	2	3	10	2	21	3	2	8	
Colombo (low fat)	120	1.5	1	2	10	3	18	4	0	10	
Lucerne	110	3	2	5	15	2	18	3	2	10	Egg yolk
Lady Lee	110	3	2	2	5	3	14	3	2	10	
Thrifty	110	3	2	3	10	1	10	4	0	8	
Ralphs	100	3.5	2	4	15	2	15	4	2	10	
Dreyers (low fat)	100	2.5	1.5	3	10	1	14	3	2	6	
Smith (low fat)	100	1.5	1	2	5	2	20	3	0	10	
Lowfat Classic	100	1.5	1	2	5	2	20	3	0	10	
Albertsons (low fat)	90	1.5	1	2	5	2	15	3	0	10	
Dreyers (fat free)	90	0	0	0	0	3	14	4	2	8	
Lucerne (nonfat)	90	0	0	0	0	2	19	3	0	10	
Dannon (light)	80	0	0	0	0	3	6	4	0	15	
Lady Lee (nonfat)	70	0	0	0	0	1	11	2	0	8	

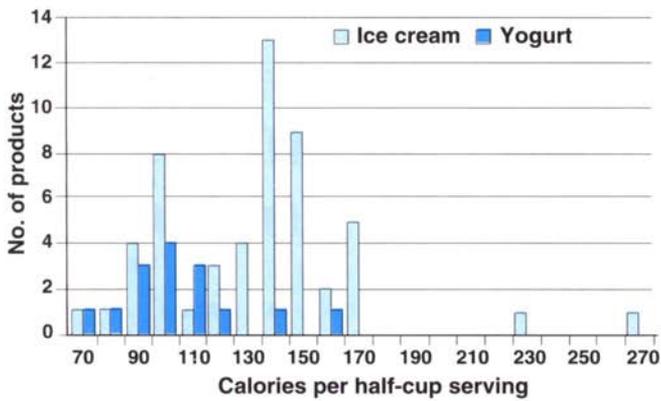


Fig. 1. Calorie content of vanilla-flavored ice creams (n = 54) and frozen yogurts (n = 15) available in California.

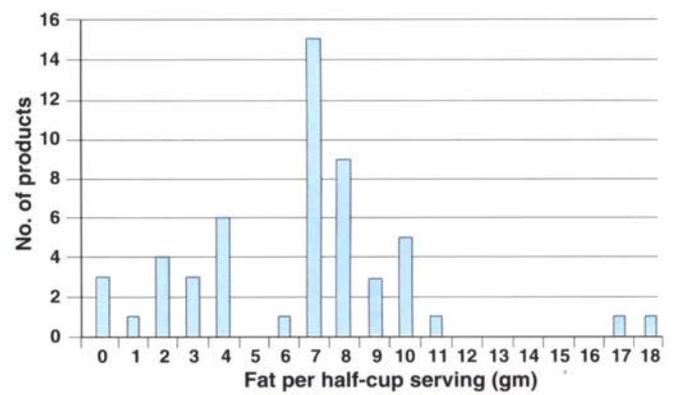


Fig. 2. Milkfat content of vanilla-flavored ice creams (n = 54) available in California. “Low fat” has 3 grams of fat or less per serving.

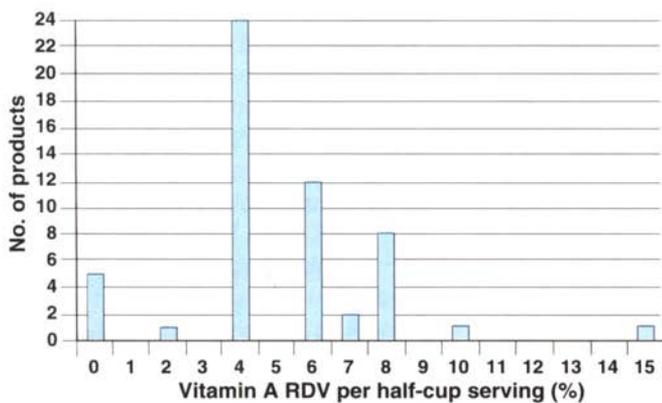


Fig. 3. Vitamin A content of vanilla-flavored ice creams (n = 54) available in California. The Food and Drug Administration defines a food providing 10% or more of the Recommended Daily Value of a nutrient as a “good source.”

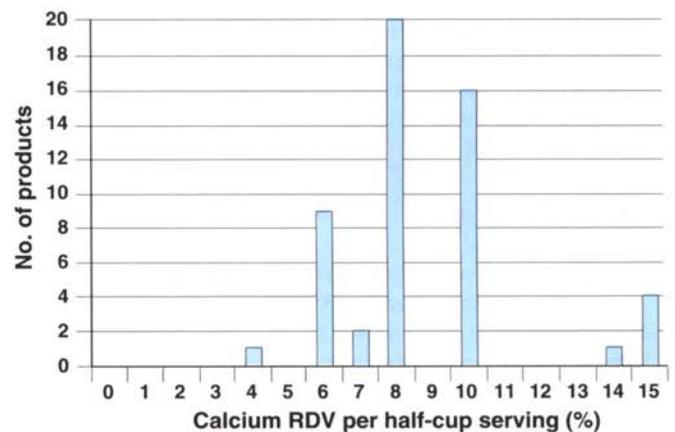


Fig. 4. Calcium content of vanilla-flavored ice creams (n = 54) available in California. The Food and Drug Administration defines a food providing 10% or more of the Recommended Daily Value of a nutrient as a “good source.”

products with reduced milkfat, frozen-dessert manufacturers must do more than just substitute milk for cream. Other ingredients in the formula are varied to achieve the desired flavor, body and texture.

Milk solids, for example, contribute to good body and smoothness in ice cream. They contain 36.7% protein, 55.5% lactose and 7.8% minerals. Sugar, in addition to providing sweetness, affects the viscosity of frozen desserts and improves the body and texture of the frozen product by lowering its freezing point. Corn syrup is frequently used because it is less expensive than sugar and provides a smooth texture and good body. Stabilizers, such as guar gum or microcrystalline cellulose, improve smoothness, help prevent ice crystal formation during storage, help the product resist melting and improve handling properties. Mono- or diglycerides are commonly used in ice cream to improve whippability and give it desirable properties in the freezer.

Frozen-dessert manufacturers have responded to the new NLEA labeling regulations by offering consumers a range of lower-fat products. In 1995, we surveyed supermarkets throughout California to record ice cream and frozen yogurt nutrient composition as presented on the "Nutrition Facts" label (tables 1 and 2). Although the survey does not include every product available in the state, the 69 products recorded represent the breadth available to the consumer. Vanilla-flavored ice cream and frozen yogurt were chosen as the standard for comparison to eliminate variation due to fat-containing flavorings, such as chocolate or nuts, or the higher sugar content of fruit flavors.

Ice creams vary in content

Ice creams varied significantly in total fat content, calories and other nutrients reported on the Nutrition Facts label (table 1). Many manufacturers produce more than one product to meet consumer preferences. Calories ranged from 120 to 270 per half-cup serving for regular ice creams and 70 to 170 for lower-fat variations. A caloric value of 140 per half-cup serving was the most common in the market-

place, while the highest values (230 and 270 calories) were found in the high-milkfat ice creams often called "super premiums" (fig. 1).

Standard ice cream products varied in fat content from 7 to 18 grams per half-cup serving. Lower-milkfat ice creams ranged from 0 to 4 grams fat per serving. Ice cream with 7 grams fat per serving was the most common, while three brands offered a zero-fat product (fig. 2).

The NLEA provides that food may be labeled as a "good source" of vitamin A or calcium if one serving provides 10% or more of the Recommended Daily Value (RDV). The vitamin A content of ice cream ranged from 0 to 15% RDV per serving, with high-fat products generally having higher values. Most ice creams provided 4% of the RDV for vitamin A, and only two products could be considered good sources of this nutrient (fig. 3).

Since ice cream contains milk solids, it can be an important source of calcium. Although most ice creams contained 8% of the RDV for calcium, 21 products contained 10% or more and could therefore be considered good calcium sources (fig. 4). Ice creams with higher milkfat ("super premiums") also contained more milk solids and provided 15% of the RDV for calcium. Lower-fat products contained from 6 to 10% of the RDV for calcium, and fat-free products contained from 8 to 15% of the RDV. The nondairy Mocha Mix had as many calories and as much fat as many brands of ice cream, but it contained no calcium and no vitamin A.

The cholesterol contents of ice creams ranged from 0 to 40% of the RDV per serving, with most falling in the 5 to 10% range (fig. 5). Four products claimed no cholesterol on the label, which is permitted under NLEA guidelines for foods that contain 2 mg or less of cholesterol per serving and meet other criteria related to total and saturated fat. The highest cholesterol levels were found in those products that contained egg yolks, some of which also contained up to 4% of the RDV for iron.

Ice cream was not a significant source of sodium. A half-cup serving

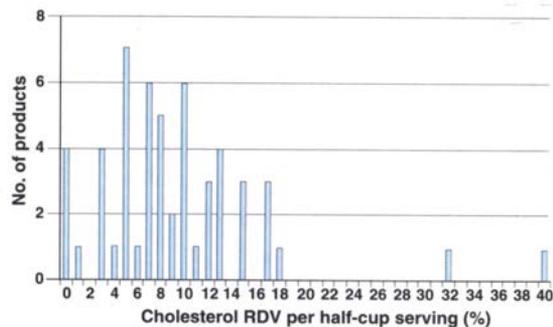


Fig. 5. Cholesterol content of vanilla-flavored ice creams (n = 54) available in California.

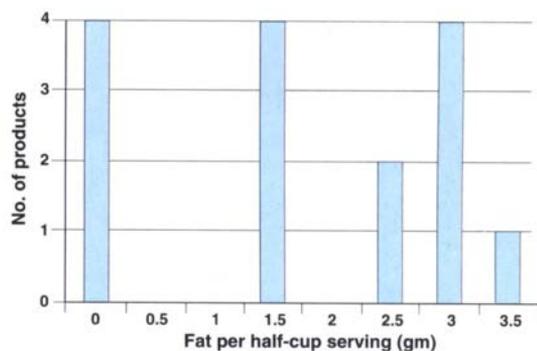


Fig. 6. Milk-fat content of vanilla-flavored frozen yogurts (n = 15) available in California.

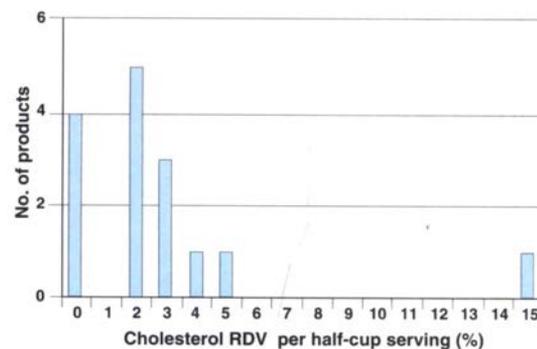


Fig. 7. Cholesterol content of vanilla-flavored frozen yogurts (n = 15) available in California.

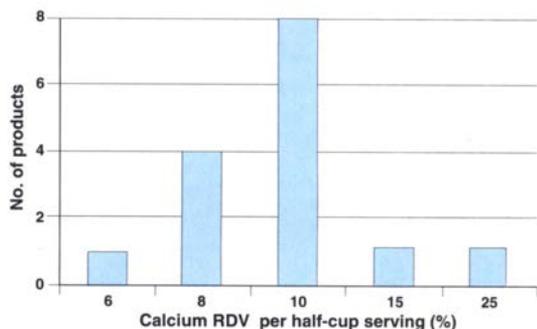
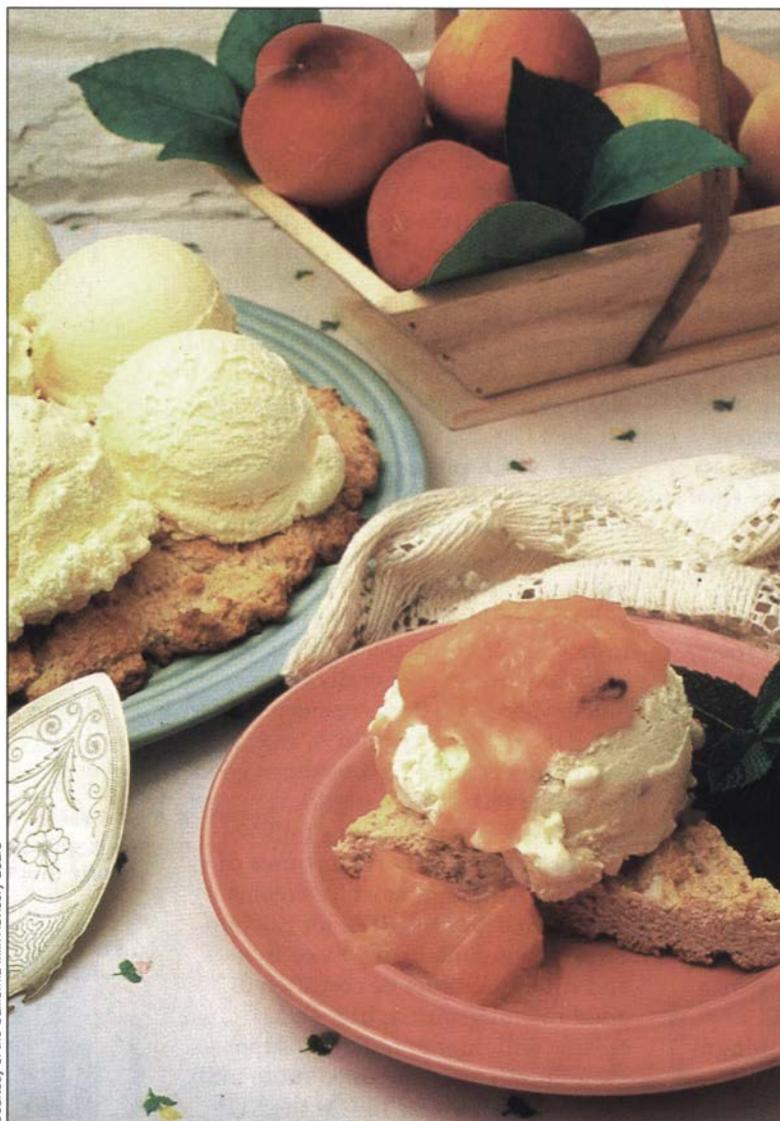


Fig. 8. Calcium content of vanilla-flavored frozen yogurts (n = 15) available in California. The Food and Drug Administration defines a food providing 10% or more of the Recommended Daily Value of a nutrient as a "good source."

provided from 1 to 4% of the RDV. Similarly, it was not a major source of protein, with most ice creams providing 2 to 3 grams per serving.

Frozen yogurts

Frozen yogurts had less fat than ice cream, as the regulations require (table 2). Fat contents of regular frozen yogurts ranged from 3 to 3.5 grams of per serving, while low-fat yogurts ranged from 1.5 to 2.5 grams of fat, and nonfat yogurts contained 0 fat (fig. 6). Four frozen yogurt products on the market were nonfat. Cholesterol contents ranged from 0 to 15% of the RDV, with most products having 2% of the RDV for cholesterol (fig. 7). Calories per half-cup serving ranged from 100 to 160 for regular frozen yogurts and 70 to 100 for the lower-fat products (fig. 1). Calcium contents ranged from 6 to 25% of the RDV, with 10 products qualifying as a "good source" of calcium (fig. 8). Vitamin A contents ranged from 0 to 2% of the RDV. No frozen yogurt met the requirements of a "good source" of vitamin A.



Courtesy of the California Milk Advisory Board

Frozen yogurt was not a significant source of sodium, with most products providing 2 to 3% of the RDV. Most frozen yogurts provided 3 to 4 grams of protein per serving, although one brand that used a lot of milk solids contained 8 grams of protein.

Consumers have many choices

The survey demonstrated that consumers may select from a range of frozen dairy desserts that offer varying amounts of specific nutrients. These products also provide phosphorus, riboflavin and other important nutrients that are not part of the mandatory nutrition label. Manufacturers continue to modify their formulations to meet consumer preferences for flavor and nutritional composition. Consumer research has repeatedly demonstrated that taste is the primary factor in repeat purchase. Product taste is influenced by fat content, percentage of milk solids and quality and quantity of flavoring and other ingredients. Consumers can use the nutritional label and product taste to find the combination of flavor and nutrients that best fits their preference.

C.M. Bruhn is Consumer Food Marketing Specialist and Director, Center for Consumer Research, UC Davis; and J.C. Bruhn is Dairy Food Processing Specialist, Dairy Research and Information Center, Department of Food Science and Technology, UC Davis.

CALIFORNIA AGRICULTURE ASSOCIATE EDITORS

Animal, Avian, Aquaculture & Veterinary Sciences

Christopher M. Dewees
Kathryn Radke
Bennie I. Osburn
Barbara A. Reed

Economics & Public Policy

Harold O. Carter
Alvin Sokolow

Food & Nutrition

Barbara Schneeman
Eunice Williamson

Human & Community Development

Linda M. Manton
Karen P. Varcoe

Land, Air & Water Sciences

Pam Matson
Garrison Sposito
Henry J. Vaux, Jr.

Natural Resources

Barbara H. Allen-Diaz
Daniel W. Anderson
Richard B. Standiford

Pest Management

Edward G. Platzer
Joseph G. Hancock, Jr.
Michael K. Rust
Frank G. Zalom

Plant Sciences

Jodie S. Holt
Lee F. Jackson
G. Steven Sibbett

<http://www.ucop.edu/anrhome/danr.html>

Lorrie.Mandorlao@ucop.edu

PH: (510) 987-0044

FAX: (510) 465-2659