



NOV 10 2004

Paul Ruger
Food Technologist
Wells' Dairy, Inc.
1 Blue Bunny Drive
Post Office Box 1310
Le Mars, Iowa 51031

Re: Docket No. 2004P-0519

Dear Mr. Ruger:

This is in response to your application on behalf of Wells' Dairy, Inc., to the Food and Drug Administration (FDA) for a temporary permit to market test, in interstate commerce, cottage cheese that will deviate from the United States standard of identity for cottage cheese (21 CFR 133.128) in that the product is formulated using fluid ultrafiltered (UF) skim milk. Fluid UF skim milk is obtained by subjecting skim milk to a physical separation process called ultrafiltration using a membrane with a pore size of 10,000 Daltons molecular weight cutoff, resulting in the partial loss of lactose, minerals, water-soluble vitamins, and water present in skim milk. The casein to whey protein ratio of skim milk is not altered during the ultrafiltration process. The moisture content of fluid UF skim milk so obtained is about 80 percent. Fluid UF skim milk is added to skim milk at a level needed to increase the total solids of the cheese milk by 5 to 25 percent. The physical, chemical, and sensory properties characteristic of cottage cheese are not altered in the test product. The fluid UF skim milk will be declared in the ingredient statement of the finished cottage cheese as "ultrafiltered skim milk." The test product meets all the requirements of the standard with the exception of the use of fluid UF skim milk. In all other respects, the test product will conform to the standard for cottage cheese.

For the purposes of this permit, the names of the test products will be 1) Blue Bunny Brand "Cottage cheese, 4% milkfat, homestyle, large curd" 24 ounces; "Cottage cheese, 4% milkfat, original, small curd" 32 ounces; "Cottage cheese, 4% milkfat, original, small curd" 24 ounces; "Cottage cheese, 4% milkfat, original, small curd" 12 ounces; "Cottage cheese, 2% milkfat, reduced fat" 24 ounces; "Cottage cheese, 2% milkfat, reduced fat" 12 ounces; "Cottage cheese, 1% milkfat, lowfat" 24 ounces; "Cottage cheese, 1% milkfat, lowfat" 12 ounces; and "Cottage cheese, Health Smart, fat free" 24 ounces; 2) Great Value Brand "Cottage cheese, 4% milkfat, large curd" 24 ounces; "Cottage cheese, 4% milkfat, large curd" 16 ounces; "Cottage cheese, 4% milkfat, small curd" 24 ounces; "Cottage cheese, 4% milkfat, small curd" 16 ounces; "Cottage cheese, 1% milkfat, lowfat, small curd" 24 ounces; "Cottage cheese, 1% milkfat, lowfat, small curd" 16 ounces; and "Cottage cheese, fat free, small curd" 24 ounces; and 3) ShurFresh Brand "Cottage cheese, 4% milkfat, small curd" 24 ounces. The information panel of the labels will bear nutrition labeling in accordance with 21 CFR 101.9.

2004P-0519

LET 1

Page 2 – Mr. Paul Ruger

Relying on the representations made in your application, we are hereby granting your request to make interstate shipments for test marketing purposes of a total of 15 million pounds (6.8 million kilograms) of the test product. You must submit finished labels to the Team Leader, Regulations and Review Team, Food Labeling and Standards Staff, Office of Nutritional Products, Labeling, and Dietary Supplements, before the test product is shipped in interstate commerce. The test products will be manufactured by Wells' Dairy, Inc., at 12th and Lincoln Street, S.W., Le Mars, Iowa 51031. The test products will be distributed by Wells' Dairy, Inc., throughout the States of Iowa, Minnesota, Wisconsin, Missouri, Nebraska, Oklahoma, Kansas, South Dakota, North Dakota, Arkansas, and Colorado. Each of the ingredients used in the test product must be declared on the labels as required by the applicable sections of 21 CFR part 101.

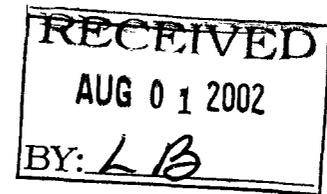
This permit will be effective for 15 months, beginning on the date the permit holder introduces or causes the introduction of the test products into interstate commerce, but not later than 3 months after notice of issuance of the permit is published in the Federal Register. Before you test market the product, you must notify FDA, in writing, of the date the 15-month period will begin.

While this permit is in effect, FDA will refrain from recommending regulatory action against shipments of cottage cheese covered by this permit on the grounds that the food fails to comply with 21 CFR 133.128 because of the above described deviation from the standard.

Sincerely yours,



Barbara O. Schneeman, Ph.D.
Director
Office of Nutritional Products, Labeling,
and Dietary Supplements
Center for Food Safety
and Applied Nutrition



CTeam Leader, Conventional Foods Team
Division of Standards and Labeling Regulations
Office of Nutritional Products, Labeling, and Dietary Supplements
Center for Food Safety and Applied Nutrition (HFS-822)
200 C St. SW
Washington, DC 20204

Re: Wells' Dairy Inc.
Application for Temporary Permit
Under 21 C.F.R. 130.17

1) The name and address of the applicant is:

Wells' Dairy, Inc.
One Blue Bunny Drive
Le Mars, IA 51031

- 2) The applicant is regularly engaged in producing the food involved.
- 3) The applicable definition and standard of identity is that for cottage cheese, 21 C.F.R. 133.128.
- 4) The proposed variation from the standard is:
 - a. Use of ultra-filtered skim milk to fortify the skim milk used in cottage cheese making.
- 5) The basis for believing that the food is wholesome and nondeleterious is that extensive research shows that cottage cheese can be made utilizing ultra-filtered skim milk that does not differ from cottage cheese manufactured only from skim milk.
- 6) Ultra-filtered skim milk will be supplemented to the cheese skim at a level so as to increase the total solids of the final cheese milk by 5 to 25%. The product will still conform to the standard of identity 21 C.F.R. 133.128 (a); because of this a name change is not necessary.
- 7) The purpose of effecting the variation is to add value to our product while maintaining product integrity.

WELLS' DAIRY, INC.



- 8) The variation is intended to give better value to the consumer and control long-term cost. Previous studies have not looked at the aspect of ultra-filtered milk supplementation of cottage cheese milk.
- 9) The ultra-filtered skim milk would be supplemented into Blue Bunny labeled cottage cheese as well as Old Home, Great Value, Fastco, Hy-Vee, and Shur-Fresh labels. Specifically listing the units by brand, type, and container size: **Blue Bunny**-small curd 32 oz., small curd 24 oz., large curd 24 oz., reduced fat 2% 24 oz., lowfat 1% 24oz., Health Smart fat free 24 oz., small curd 12 oz., reduced fat 2% 12 oz., lowfat 1% 12 oz., unsalted dry curd 12 oz. **Old Home**-small curd 32 oz., large curd 32 oz., reduced fat 2% 32 oz., small curd 24 oz., large curd 24 oz., reduced fat 2% 24 oz., lowfat 1% 24 oz., fat free 24 oz., small curd 12 oz., large curd 12 oz., reduced fat 2% 12 oz., lowfat 1% 12 oz., fat free 12oz., dry curd 12 oz., small curd chive 12 oz., small curd pineapple 12 oz., small curd 4 oz., small curd peach 4 oz., small curd pineapple 4 oz. **Great Value**-small curd 24 oz., large curd 24 oz., lowfat 1% 24 oz., fat free 24 oz., small curd 16 oz., large curd 16 oz., lowfat 1% 16 oz. **Fastco**-small curd 24 oz., small curd 12 oz. **Hy-Vee**-small curd 24 oz., lowfat 1% 24 oz., small curd 12 oz., lowfat 1% 12 oz. **Shur-fresh**-small curd 24 oz. A sample PLI of each type of cottage cheese to be market tested (4%, 2%, 1%, fat free) is attached for the Blue Bunny brand.
- 10) The applicant desires to introduce such food into interstate commerce over a fifteen (15) month period. This period is necessary to allow a sales comparison over peak consumption periods and to perform annual sales comparisons.
- 11) The estimated amount of food that will be distributed is 15 million pounds. This is the smallest amount of product necessary to perform accurate sales comparisons over the entire test market, and to avoid creating production conflicts.
- 12) The areas of distribution are: Iowa, Minnesota, Wisconsin, Missouri, Nebraska, Oklahoma, Kansas, South Dakota, North Dakota, Arkansas, and Colorado.
- 13) The address at which such food will be manufactured is:
12th and Lincoln St. SW
Le Mars, IA 51031
- 14) Such food is to be distributed in the state it will be manufactured in.
- 15) Not Applicable

WELLS' DAIRY, INC.



16) It is necessary to distribute the food in other states in order to get a representative sample of applicants entire market.

Please address any questions or comments you may have concerning this application to my attention.

Paul Ruger
Food Technologist
Wells' Dairy, Inc.
1-800-942-3800 ext. 2319

PRODUCT LABELING INFORMATION

08-24-93

DESCRIPTION: Wells' Blue Bunny Cottage Cheese-Small Flake
 PACKAGE SIZE: Plastic 24 Oz (680g)
 ITEM NUMBER: 16260
 ADDITIONAL: Grade A, 4% Milkfat Minimum

NUTRITION FACTS

Serving Size 1/2 Cup (113g)
 Servings Per Container 6

AMOUNT PER SERVING

CALORIES 120

CALORIES FROM FAT 45

% DAILY VALUE **

Total Fat 5g	8%
Saturated Fat 3.5g	18%
Cholesterol 25mg	8%
Sodium 450mg	19%
Potassium 125mg	4%
Total Carbohydrate 4g	1%
Dietary Fiber 0g	0%
Sugars 3g	
Protein 13g	26%

Vitamin A 4 Vitamin C * Calcium 8 Iron *
 Thiamin 2 Riboflavin 10 Vitamin B6 8 Vitamin B12 10
 Phosphorus 10 Zinc 2 Pantothenic Acid 2

* Contains less than 2% of the Daily Value of these nutrients.

** Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	CALORIES	2,000	2,500
Total Fat	Less Than	65g	80g
Saturated Fat	Less Than	20g	25g
Cholesterol	Less Than	300mg	300mg
Sodium	Less Than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Protein		50g	65g

INGREDIENTS: Cultured Skim Milk, Milk, Cream, Salt, Guar Gum, Carob Bean Gum, Carrageenan, Mono & Diglycerides, Polysorbate 80, Potassium Sorbate (To Protect Freshness).

Kosher

When refrigerated from 33° to 40°F this product will be fresh and wholesome for at least one week beyond the date printed on the label.

MFD. BY WELLS' DAIRY, INC.
 1 BLUE BUNNY DR PO BOX 1310
 LEMARS, IOWA 51031 - U.S.A.
 PLANT # STAMPED ON CONTAINER

PRODUCT LABELING INFORMATION

08-24-93

DESCRIPTION: Wells' Blue Bunny Reduced Fat 2% Cottage Cheese
 PACKAGE SIZE: Plastic 24 oz (680g)
 ITEM NUMBER: 16304
 ADDITIONAL: Fat has been reduced 50% from full fat cottage cheese, from 5g to 2.5g per serving. Grade A, 2% Milkfat, Vitamin A & D.

NUTRITION FACTS

Serving Size 1/2 Cup (113g)
 Servings Per Container 6

AMOUNT PER SERVING

CALORIES 100

CALORIES FROM FAT 25

% DAILY VALUE **

Total Fat 2.5g	4%
Saturated Fat 2g	10%
Cholesterol 15mg	5%
Sodium 450mg	19%
Potassium 135mg	4%
Total Carbohydrate 5g	2%
Dietary Fiber 0g	0%
Sugars 4g	
Protein 14g	28%

Vitamin A 10 Vitamin C * Calcium 10 Iron *
 Vitamin D 25 Thiamin 2 Riboflavin 10 Vitamin B6 8
 Vitamin B12 10 Phosphorus 15 Zinc 2 Pantothenic Acid 2
 * Contains less than 2% of the Daily Value of these nutrients.

** Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	CALORIES	2,000	2,500
Total Fat	Less Than	65g	80g
Saturated Fat	Less Than	20g	25g
Cholesterol	Less Than	300mg	300mg
Sodium	Less Than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Protein		50g	65g

INGREDIENTS: Cultured Skim Milk, Milk, Cream, Salt, Guar Gum, Carob Bean Gum, Carrageenan, Mono & Diglycerides, Polysorbate 80, Potassium Sorbate (Preservative), Vitamin A Palmitate, Vitamin D3.

Kosher

When refrigerated from 33° to 40°F this product will be fresh and wholesome for at least one week beyond the date printed on the label.

MFD. BY WELLS' DAIRY, INC.
 1 BLUE BUNNY DR PO BOX 1310
 LEMARS, IOWA 51031 - U.S.A.
 PLANT # STAMPED ON CONTAINER

PRODUCT LABELING INFORMATION

08-24-93

DESCRIPTION: Wells' Blue Bunny 1% Lowfat Cottage Cheese
 PACKAGE SIZE: Plastic 24 Oz (680g)
 ITEM NUMBER: 202847
 ADDITIONAL: Grade A, 1% Milkfat, Vitamins A & D Added

NUTRITION FACTS

Serving Size 1/2 Cup (113g)
 Servings Per Container 6

AMOUNT PER SERVING

CALORIES 90	CALORIES FROM FAT 10	% DAILY VALUE **
Total Fat 1g		2%
Saturated Fat 1/2g		3%
Cholesterol 10mg		3%
Sodium 460mg		19%
Potassium 115mg		3%
Total Carbohydrate 4g		1%
Dietary Fiber 0g		0%
Sugars 3g		
Protein 13g		26%

Vitamin A 10 Vitamin C * Calcium 8 Iron *
 Vitamin D 25 Thiamin 2 Riboflavin 10 Vitamin B6 8
 Vitamin B12 10 Phosphorus 10 Zinc 2 Pantothenic Acid 2
 * Contains less than 2% of the Daily Value of these nutrients.

** Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	CALORIES	2,000	2,500
Total Fat	Less Than	65g	80g
Saturated Fat	Less Than	20g	25g
Cholesterol	Less Than	300mg	300mg
Sodium	Less Than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Protein		50g	65g

INGREDIENTS: Cultured Skim Milk, Milk, Cream, Skim Milk, Salt, Guar Gum, Mono & Diglycerides, Carrageenan, Polysorbate 80, Xanthan Gum, Carob Bean Gum, Phosphoric Acid, Potassium Sorbate (Preservative), Natural Flavors, Vitamin A Palmitate, Vitamin D3.

Kosher

When refrigerated from 33° to 40°F this product will be fresh and wholesome for at least one week beyond the date printed on the label.

MFD. BY WELLS' DAIRY, INC.
 1 BLUE BUNNY DR PO BOX 1310
 LEMARS, IOWA 51031
 PLANT # STAMPED ON CONTAINER

PRODUCT LABELING INFORMATION

03-07-01

DESCRIPTION: Wells' Blue Bunny Health Smart Fat Free Cottage Cheese

PACKAGE SIZE: 24 oz (680g)

ITEM NUMBER: 483629

ADDITIONAL: Cultured, Grade A, Vitamins A&D; Now with added Calcium; Four times more calcium than fat free cottage cheese without added calcium. Calcium has been increased from 6% to 25% RDI (Recommended Daily Intake).

NUTRITION FACTS

Serving Size 1/2 Cup (113g)

Servings Per Container About 6

AMOUNT PER SERVING

CALORIES 80

CALORIES FROM FAT 0

	% DAILY VALUE **
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 10mg	3%
Sodium 430mg	18%
Potassium 160mg	5%
Total Carbohydrate 5g	2%
Dietary Fiber 0g	0%
Sugars 4g	
Protein 13g	27%

Vitamin A 25	Vitamin C *	Calcium 25	Iron *
Vitamin D 30	Thiamin 2	Riboflavin 10	Vitamin B12 2
	Phosphorus 10		

* Contains less than 2% of the Daily Value of these nutrients.

** Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	CALORIES	2,000	2,500
Total Fat	Less Than	65g	80g
Saturated Fat	Less Than	20g	25g
Cholesterol	Less Than	300mg	300mg
Sodium	Less Than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Protein		50g	65g

INGREDIENTS: Cultured Pasteurized Grade A Nonfat Milk, Grade A Whey, Corn Starch, Guar Gum, Citric Acid, Salt, Natural Flavors, Cultured Whey, Artificial Color, Lactic Acid, Phosphoric Acid, Carob Bean Gum, Carrageenan, Sodium and Potassium Phosphate, Soy Lecithin, Tricalcium Phosphate, Tricalcium Citrate, Potassium Sorbate (Preservative), Vitamin A Palmitate, Vitamin D3, L. Acidophilus and Bifidus Cultures.
KOSHER

MFD. BY WELLS' DAIRY, INC.
1 BLUE BUNNY DR PO BOX 1310
LEMARS, IOWA 51031
PLANT # STAMPED ON CONTAINER

CTeam Leader, Conventional Foods Team
Division of Standards and Labeling Regulations
Office of Nutritional Products, Labeling, and Dietary Supplements
Center for Food Safety and Applied Nutrition (HFS-822)
200 C St. SW
Washington, DC 20204

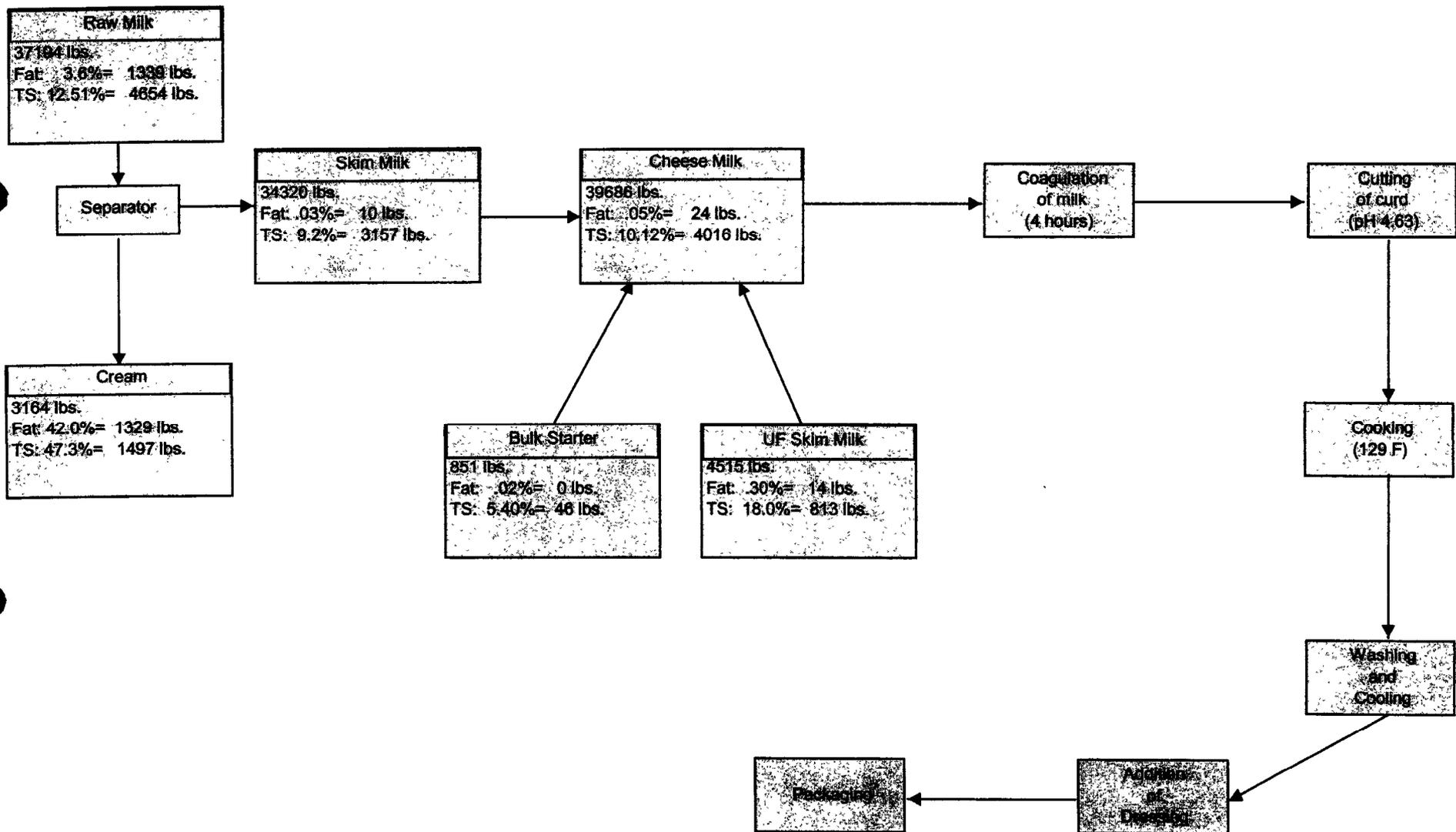
This information was requested to supplement the temporary permit application that was submitted earlier. The first page is a flow chart of the cottage cheese making process illustrating level of ultra-filtered skim milk addition and the stage at which it is added. The second page is the ultra-filtration process flow showing the balance of milk components that are retained and lost. The third page is a specification sheet for the ultra-filtered skim milk. Page four is the analytical results for the ultra-filtered skim milk permeate or the fraction of skim milk lost during the filtration process. The research articles included involve making cottage cheese utilizing ultra-filtered skim milk. These articles reveal evidence that ultra-filtered skim milk can be utilized while maintaining similar curd composition.

We would limit usage of the ultra-filtered skim milk to our label of Blue Bunny branded cottage cheese. The graphics for the various products and container sizes are included. We chose to use "filtered skim milk" in the ingredient statement to differentiate this product for the marketing study.

Please address any questions or comments you may have concerning this application to my attention.

Paul Ruger
Food Technologist
Wells' Dairy, Inc.
1-800-942-3800 ext. 2319

Cottage Cheese Make Procedure Utilizing Ultra-filtered Skim Milk to Boost Total Solids by 10%



Raw Milk		
660,000 lbs.		
Fat:	3.60% =	23,760 lbs.
True Protein:	3.00% =	19,800 lbs.
Other Solids:	5.70% =	37,620 lbs.
Total Solids:	12.30% =	81,180 lbs.

Separator

Cream		
55,314 lbs.		
Fat:	42.00% =	23,232 lbs.
True Protein:	1.65% =	913 lbs.
Other Solids:	3.65% =	2,019 lbs.
Total Solids:	47.30% =	26,164 lbs.

Skim Milk		
604,686 lbs.		
Fat:	0.09% =	528 lbs.
True Protein:	1.65% =	18,887 lbs.
Other Solids:	3.65% =	35,601 lbs.
Total Solids:	5.39% =	55,016 lbs.

UF
(3.6 X)

UltraFiltered Skim Milk		
166,289 lbs.		
Fat:	0.32% =	525 lbs.
True Protein:	11.13% =	18,510 lbs.
Other Solids:	7.07% =	11,748 lbs.
Total Solids:	18.51% =	30,783 lbs.

Dilute Permeate		
438,397 lbs.		
Fat:	0.00% =	3 lbs.
True Protein:	1.65% =	378 lbs.
Other Solids:	3.65% =	23,853 lbs.
Total Solids:	5.30% =	24,233 lbs.

R.O.
(3.0 X)

Concentrated Permeate		
131,519 lbs.		
Fat:	0.00% =	3 lbs.
True Protein:	0.29% =	375.86 lbs.
Other Solids:	18.09% =	23,793 lbs.
Total Solids:	18.38% =	24,172 lbs.

35,683 Gallons of Water		
Water		
306,878 lbs.		
Fat:	0.00% =	0 lbs.
True Protein:	0.00% =	2 lbs.
Other Solids:	0.02% =	60 lbs.
Total Solids:	0.02% =	62 lbs.

Pricing Assumptions:

Cream: 126% of the "AA" Butter Market - FOB Shipping Point
 UF Skim Premium: \$1.80 over Class III (\$.60 per pound of protein)
 Permeate: \$.04 per pound of solids

3701 S. Lindbergh Blvd.
 St. Louis, MO 63127
 tel: 800-325-9556
 facsimile: 314-821-3251
 email: ted@jacoby.com

David Hibbard, *Manager*
 Ted Jacoby, Jr., *Manager*
 Mike McCloskey, *Manager*

Robert Fassbender, *Manager*,
Farm Concentration Systems

PRODUCT:

Raw Skim milk for pasteurization. Ultrafiltered (Lactose and Mineral Reduced).

Concentrated 3.5 to 1 (3.3 to 3.5X)

Nomenclature: **UF SKIM Milk**

SENSORY:

Color: Fresh milk, creamy white
 Flavor: Fresh milk, unheated, rich flavor
 Odor: Fresh raw milk Sweet and clean

QUALITY:

Product will conform to USPH Grade "A" standards delivered to receiving plants.

Standard Plate Count:	300,000 / ml	Maximum
Coliform	3,000 / ml	Maximum
Acidity	.35%*	
Maximum		
Temperature	45 degrees F.	Maximum
Antibiotic Free. Antibiotics are tested on all milk prior to usage.		
Free from extraneous matter		

All material shall conform in every respect to the applicable laws and regulations of the location in which they are produced, and the location to which they are shipped.

COMPOSITION:

<u>Component</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Target</u>
True Protein	9.8%	11.2%	10.5%
Butterfat	.15%	.50%	.3%
Lactose	4.0%	5.0%	4.5%
Ash	1.5%	2.5%	2.0%
Moisture	80%	84%	82%
Concentration	3.3X	3.5X	3.4X

CONTAINER:

6000 gallon truckloads, 50,000 pounds / load



**SILLIKER LABORATORIES
OF NORTHERN CALIFORNIA**

1548 Cummins Drive
Modesto, CA 95358-6412
(209) 521-5503 Fax (209) 521-1005

FOOD SAFETY • QUALITY • NUTRITION

CERTIFICATE OF ANALYSIS

COA No:	CCA-5086228-0
Supersedes:	None
COA Date	3/28/01
Page 1 of 1	

TO:
Beth Koenig
California Dairies Incorporated
11894 Avenue 120
Tipton, CA 93272

Received From:	Tipton, CA
Received Date:	3/16/01
P.O.# / ID:	CDI - Tipton
Location of Test: (except where noted) Modesto, CA	

Analytical Results

Desc. 1:	ROC Permeate	Laboratory ID:	50527894		
Desc. 2:	3/15/01	Condition Rec'd:	NORMAL		
		Temp Rec'd (°C):	3		
Analyte	Result	Units	Method Reference	Test Date	Loc.
Ash	1.74	%	AOAC 945.48	3/20/01	
Calcium	86.5	mg/100g	AOAC 985.01	3/28/01	CHG
Fat - Mojonnier	0.01	%	Apparatus Manual	3/20/01	
ICP Sample Prep		Dry Ash & Microwave -	AOAC 985.01	3/28/01	CHG
Magnesium	19.6	mg/100g	AOAC 985.01	3/28/01	CHG
Phosphorus	131	mg/100g	AOAC 985.01	3/28/01	CHG
Potassium	388	mg/100g	AOAC 985.01	3/28/01	CHG
Protein - Kjeldahl			AOAC 991.20.1	3/24/01	
Protein Factor	6.38	-			
As Received	0.50	%			
Salt - Volhard	0.56	%	AOAC 937.09	3/22/01	
Sodium	163	mg/100g	AOAC 985.01	3/28/01	CHG
Solids - Mojonnier			Manufacturer's Inst.	3/20/01	
Solids	18.39	%			
Moisture	81.61	%			
Sugars			Internal HPLC	3/23/01	
Fructose	<0.10	%			
Dextrose	<0.10	%			
Sucrose	<0.10	%			
Maltose	<0.10	%			
Lactose	15.68	%			
Zinc	0.160	mg/100g	AOAC 985.01	3/28/01	CHG

Gordon Brock

Gordon Brock

Laboratory Director

Noted Test Locations: CHG-Silliker Laboratories of Illinois, 1304 Halsted Street, Chicago Heights, IL 60411

Comparison of Cold UF Retentate Blend Levels in Cottage Cheese Making

TC Jacoby Company, and the Wisconsin Center for Dairy Research

Cheese Manufacturing Date:

August 31, 2000

Project Objectives:

To look at different blend rates of cold UF skim milk with regular skim milk to determine optimum solids rate to use in the manufacture of Cottage cheese.

Background:

This trial was scheduled with T.C. Jacoby in conjunction with the first run looking at solids levels in the Cottage cheese vats.

This was

Summary:

Milk – After removing the raw milk needed for the control vat and for blending with vats 2 through 4, the balance of the milk was used for the cold UF process. The skim milk for UF was kept below 45° F during the cold process for the duration of 3 hours, the time it took to hit our 20% solids target.

The blending of the retentate with the raw skim was based solely on replacement percentage recommended by Vat one was the skim control, vat two was 7% replacement, vat three was 15%, and vat four was 20%. After blending the milk to the appropriate replacement percentage and pasteurizing at 165°/17 seconds, it was weighed on the CDR scale and gravity fed into the CDR cheese vats.

Cheese making – Four vats of Cottage cheese were made. Milk weights in the vats varied to solids level. Starter inoculation was based on weight and solids content of the milk in an effort to target a 6-hour set time. The acid set was cut at a 4.70 pH. There was some slight settling on the bottom of vats three and four, which were the 15% and 20% UF retentate replacement vats respectively.

Analysis - The raw, skim milk used for the cold UF and for the blending was analyzed for fat (Mojonnier method), solids (microwave), total protein, and casein content (Kjeldahl method). The raw milk was also plated for coliform, lactobacillus, psychotrophs, and total plate count. The skim retentate was analyzed for fat (Mojonnier method), solids (microwave), total protein, and casein content (Kjeldahl method). The raw retentate was also plated for coliform, lactobacillus, psychotrophs, and total plate count. Permeate samples were also analyzed for fat (Mojonnier method), solids (microwave), total protein, and casein content (Kjeldahl method). The raw permeate was also plated for coliform, lactobacillus, psychotrophs, and total plate count.

Pasteurized, standardized milk was analyzed for fat (Mojonnier method), solids (microwave), total protein, and casein content (Kjeldahl method). The pasteurized, standardized milk was also plated for coliform, lactobacillus, psychotrophs, and total plate count. The dressing for the Cottage cheese was analyzed for fat (Mojonnier method), and solids (microwave).

The Cottage cheese was analyzed for basic composition in both the dry and creamed form. The whey was analyzed for fat (Mojonnier method), solids (microwave), and total protein (Kjeldahl method).

Results:

Milk

The raw, skim retentate used to blend with the raw, skim milk for vats two through four had a solids level of 19.15%, a fat of 0.58%, and a casein content of 9.78%. Looking at the standardized milk composition shows that our casein: fat ratio (C:F) was a 22.91 for the control and decreased to 19.30 for the 20% replacement vat. Vats two and three (7 and 15% replacement) had C:F ratios in-between. Solids level for the control was 8.83%, which is typical. Vats two through four were 9.07%, 10.07%, and 10.42% solids respectively for the control versus the experimental variables.

Microbiological results comparing the initial skim milk with the skim retentate showed a four-log increase in coliform, a two-log increase in standard plate count, and a one-log increase in lactobacillus. Psychotrophs did not change drastically. The pasteurized, standardized milks in all four vats had <1 cfu / g coliform, ~200 cfu / g standard plate count, <1 lactobacillus, and ~30 cfu / g psychotropic count.

Cheese

The dry Cottage cheese moisture was slightly lower on vat four versus the other three vats. However all the dressed Cottage cheese compositions were very tight when comparing the moisture, fat, salt, and pH. CDR did not evaluate the flavor, free whey, or free dressing as the cheese was shipped to _____ for evaluation. Cheese yield before dressing was 16.50%, 19.33%, 21.11% and 21.05% in order, vats one through four. Cheese solids recovery rate was highest for vat four with vat three slightly lower than vat two.

Whey

Whey solids and total protein increased slightly with the increasing milk solids level in the vat. However looking at the milk solids and milk protein lost in whey ratio we see decreases which shows we are recovering more solids and casein at the higher retentate replacement rate. Vat four was the exception for protein recovery as it showed slightly higher protein was lost in the whey when compared to initial milk protein.

Observations:

It is important to note that all observations were made on only a single vat for each variable. Cheese manufacturing went well on all four vats. It was noted by the cheese makers there was some slight settling on the bottoms on vats three and four at the time of cutting. The ripening/set time for these cheeses ranged from 6 to 6 ½ hours with no coagulant added. It has not been determined that with a small amount of coagulant or quicker set times in the 4 ½ to 5 hour time period would eliminate the slight settling or not. The final composition on all four vats was normal for Cottage cheese.

Looking beyond actual cheese yields, we tried to see how much solids and protein we were recovering in the cheese vat at the various replacement levels. The cheese solids recovery formula looks at the cheese recovered after factoring in milk solids, milk weight in the cheese vat and salt. Again this formula was based on the dry curd before dressing. The milk solids and protein lost in whey ratio looks at initial milk solids and protein and compares it to the whey solids and protein lost. The lower the number, the less solids and protein that is lost in the whey. When looking at these recovery rates, cheese yield, and settling question in the vat, it could be indicating a 20% solids, cold UF, skim retentate replacement in the neighborhood of 15% gives the highest recovery and lowest loss in the whey. Again keep in mind these variables and observations are drawn from only one set of variables and that no sensory panel was conducted on these cheeses.



Wisconsin Center for Dairy Research Cheese Applications Program

T.C. Jacoby/
Project: Cottage Cheese made with Cold Skim UF Milk
August 31, 2000

Operation	Var 1 Time (min)	000031-1 pH or TA	Var 2 Time (min)	000031-2 pH or TA	Var 3 Time (min)	000031-3 pH or TA	Var 4 Time (min)	000031-4 pH or TA
Milk	300 lb	Control TA 0.14 pH 6.64 Temp 90.1°F	300 lb	7% replacement TA 0.14 pH 6.67 Temp 90.0°F	225 lb	15% replacement TA 0.15 pH 6.68 Temp 89.8°F	220 lb	20% replacement TA 0.15 pH 6.68 Temp 90.1°F
Add Starter Ch Hansen DVS 970 100 g / 300 lb milk Cover cheese vat (90°F) until cut	0	TA --- pH --- Temp ---	0	TA --- pH --- Temp ---	0	TA --- pH --- Temp ---	0	TA --- pH --- Temp ---
Cooking (3/8" knives) 20 min, heat with no agitation	365	TA 0.40 pH 4.69	365	TA 0.42 pH 4.71	380	TA 0.45 pH 4.74	390	TA 0.47 pH 4.74
Start Agitation	385	pH 4.62	385	pH ---	400	pH ---	420	pH 4.67
Add Phosphoric Acid - 85% 1.32 oz per 50 gal or 36.5ml per 900 lb.	390	TA 0.46 pH 4.50	390	TA 0.49 pH 4.52	405	TA 0.53 pH 4.54	425	TA 0.56 pH 4.55
Start Cook	395	Temp 91.4°F	395	Temp 91.0°F	410	Temp 90.1°F	430	Temp 90.4°F
End Cooking Target temperature 132°F	485	Temp 132.4°F TA 0.50 w-pH 4.30 c-pH 4.44	485	Temp 132.4°F TA 0.51 w-pH 4.31 c-pH 4.49	500	Temp 132.4°F TA 0.56 w-pH 4.34 c-pH 4.51	510	Temp 132.0°F TA 0.59 w-pH 4.36 c-pH 4.62
Drainage	485 End		485 End		500 510		510 520	
Add Cold Water 3 washes (5 min ea) Pre-acidify chill water to 5.0 pH Cool to -40°F	505 515 525	Final T 44.0°F	505 515 525	Final T 44.0°F	520 530 540	Final T 44.0°F	520 530 540	Final T ---
Drainage	525	b curd 49.5	525	b curd 58.0	540	b curd 47.5		b curd 44.3
Add Dressing Ratio of 60% curd to 40% dressing	545	b dressing 32.0	545	b dressing 38.6	560	b dressing 31.0		b dressing 30.0

Starter to cut

Finest at cut
curd located at layer at wash
some washing on bottom of vat

curd located if larger at wash
if settling on bottom of vat

Rate of pH drop until cut	Time (min)	pH
1 hour	60	6.47
2 hours	120	6.27
3 hours	180	5.82
3 hours 30 minutes	240	5.33
4 hours	270	5.18
4 hours 15 minutes	285	5.08
4 hours 30 minutes	300	5.02
4 hours 45 minutes	315	4.92
5 hours	330	4.84
5 hours 15 minutes	345	4.77

Time (min)	pH
60	6.51
120	6.26
180	5.89
240	5.56
270	5.28
300	5.12
330	4.95
340	4.88
365	4.73

Time (min)	pH
60	6.56
120	6.34
180	5.96
240	5.61
270	5.44
300	5.21
320	5.07
330	4.97
350	4.97
365	4.83
380	4.71

Time (min)	pH
60	6.58
120	6.35
180	5.98
240	5.67
270	5.49
300	5.33
330	5.11
360	4.93
375	4.86

Wisconsin Center for Dairy Research
August 28, 2000

Carol Chen Amy Dikkeboom Bill Hoesly Kristen Houck John Jaeggi Marianne Smukowski Bill Tricoli Matt Zimbric



Wisconsin Center for Dairy Research Cheese Applications Program

T.C. Jacoby

Project: Cottage Cheese made with Cold Skim UF Milk
August 31, 2000

Dressing Preparations for 2% Cottage Cheese

Ingredient	Ing. Wt. (lbs)	Grams	Percent of Mix	% Fat	% MSNF	% Total Solids
Whole Milk	150	68100	83.20%	3.70	8.67	12.37
Cream	13.0	5897	7.21%	29.75	6.66	32.66
Nonfat dry milk	11.05	5017	6.13%	0.50	96.00	96.50
Salt	4.50	2043	2.50%	---	---	100
Ger-town 1556 Stabilizer	0.82	372	0.45%	---	---	100
Crest Acid	0.48	218	0.27%	---	---	100
MicroGard	0.45	204	0.25%	---	---	100
Total	180	81852	100			

Note: *The compositional numbers are computer generated. Actual fat % and solids numbers for the dressing are located on the compositional sheet.

*Crest Acid was added by the Dairy Plant to bring the dressing pH to 6.07.

*MicroGard added at rate of 0.25% / wt of mix

Approximate Dressing Composition for 2% Cottage:

Solids: 22%
 Fat: 5.25%
 Total Protein: 5.00%
 Casein: 4.25%
 C:F ratio 0.80

August 28, 2000

n:\cheese\industry\ing_supp\tcjacob\00Aug\an000831.xls
ald,ijj

The data in the blurry box is as follows:

	Control 000831-1	7 % Replacement 000831-2	15 % Replacement 000831-3	20 % Replacement 000831-4
Dry Curd Composition:				
% Moisture	82.13	80.46	80.76	78.48
% Fat	0.76	0.75	0.80	0.80
Component Total:	82.89	81.21	81.56	79.28
% MNFS	82.76	81.07	81.41	79.11
% FDM	4.26	3.86	4.17	3.70
Dry Curd pH				
Day 1	4.33	4.39	4.45	4.42
Cottage Cheese Composition @ 7 Days:				
% Moisture	82.58	82.20	82.39	82.29
% Fat (mojonner)	2.92	2.79	2.91	2.40
% Salt	1.12	1.18	0.92	0.97
% Protein (N x 6.31)	10.05	10.06	10.52	11.36
Component Total:	96.67	96.23	96.74	97.02
% MNFS	85.07	84.56	84.86	84.31
% FDM	16.77	15.69	16.54	13.53
% S/M	1.36	1.44	1.12	1.18
Cottage Cheese pH				
Day 7	4.85	4.93	4.94	4.92
Cottage Cheese Micro				
Coliforms (VRB, CFU/g)	<10	<10	<10	<10
Yeast & Mold (Y / M, CFU / g)	1.44E+01	<10	<10	2.00E+01