California Manufacturing Cost Annual

2015 Data

cdfa

CALIFORNIA

Manufacturing Cost Annual

2015 Data

This publication was prepared in the Division of Marketing Services, Dairy Marketing Branch, by:

Manufacturing Cost Unit Staff:

Leticia Regalado, *Supervisor*
Joseph Reno
Frank DeMattos
Tarik Halaq
Mark Buan

Special Thanks

This publication would not be possible without the cooperation of the individuals and firms engaged in the production, manufacture, and distribution of milk and dairy products.

We welcome your comments on this Manufacturing Cost Annual. Please send your comments and suggestions to:

Leticia Regalado, Supervising Auditor
Dairy Marketing Branch
1220 N Street
Sacramento, CA 95814

Table of Contents

Manufacturing Cost Overview

Introduction 2
Manufacturing Cost Overview 3

Butter

Butter Study 4
Butter Manufacturing Costs..... 5

Nonfat Dry Milk

Nonfat Dry Milk Study 7
Nonfat Dry Milk Manufacturing Costs..... 8

Cheese

Cheese Study..... 10
Cheddar Cheese Manufacturing Costs..... 11

Condensed Skim and Cream

Condensed Skim Overview..... 14
Cream Overview 15

Plant Flowchart Diagrams

Butter and Nonfat Dry Milk Plant..... 16
Cheese Plant..... 16

California Department of Food and Agriculture
Karen Ross, *Secretary*

Dairy Marketing Branch
1220 N Street, Sacramento, CA 95814-5621
(916) 900-5014 / www.cdfa.ca.gov/dairy
Email Address: dairy@cdfa.ca.gov

Introduction

The California Food and Agricultural Code specifies that the California Department of Food and Agriculture (CDFA) must consider manufacturing costs in determining appropriate minimum prices for products categorized as Class 4a (butter and dried milk products) and Class 4b (cheese). To comply with the legislative decree, CDFA has a direct need for gathering and summarizing information provided in the cost studies to formulate reasonable manufacturing cost (make) allowances through the public hearing process.

CDFA maintains a Manufacturing Cost Unit that consists of professional auditors specializing in dairy accounting practices. The auditors work with plant management to gather data on all aspects of the operation, review plant records on-site, and allocate plant expenditures to each product manufactured by the plant. The studies are conducted and developed in conformity with generally accepted accounting principles, cost accounting techniques, and instructions contained in the Dairy Marketing Branch's Audit and Cost Procedures Manual.

Any plant that produces Class 4a and/or Class 4b products may be asked to participate in the cost studies. Information gathered in the studies provides an accurate sampling of California's annual butter, nonfat dry milk (NFDM), and Cheddar cheese production. The 2015 California Manufacturing Cost Annual includes data obtained from seven butter plants, nine NFDM plants, and four Cheddar cheese plants. Data on condensed skim and cream is collected concurrently from plants that participate. Plants that manufacture condensed skim and cream but do not manufacture butter, NFDM, or Cheddar cheese are not included in the condensed skim and cream overview. As a result, data on condensed skim and cream is based on a lower percentage of annual production.

The data from the cost studies has a practical significance beyond the boundaries of California. They are the only studies in the U.S. which present the audited and detailed processing costs of butter, NFDM, and Cheddar cheese over several years. For the plants in the study, the results can help to isolate the actual costs of manufacturing and provide benchmark figures obtained from other California manufacturing plants. Consequently, although CDFA has the legal authority to collect cost information from the various types of milk processors, the majority of plants have found the information contained in the studies valuable and have cooperated voluntarily.

Introduction

Manufacturing Cost Overview

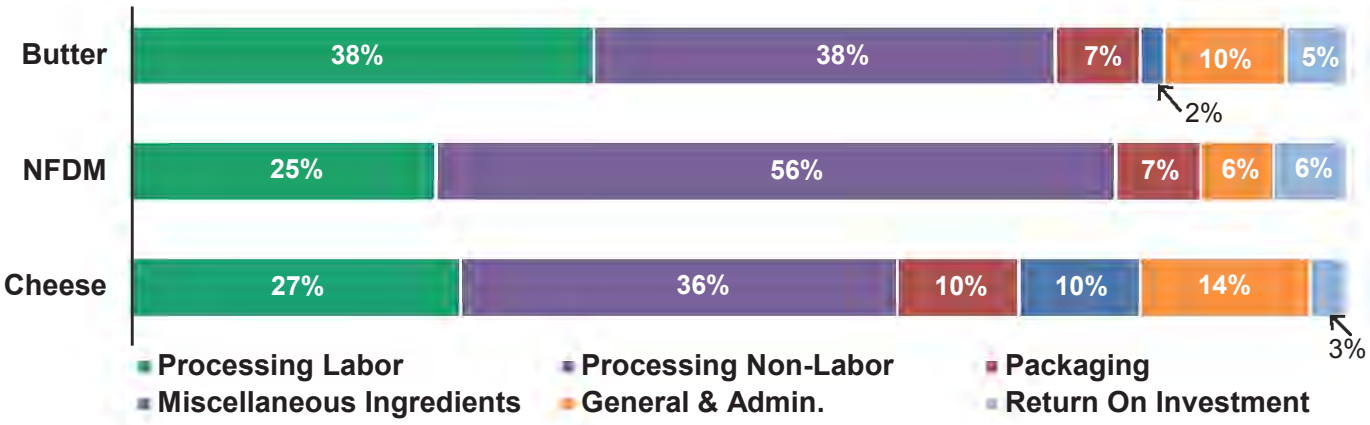
The weighted average manufacturing cost of a product includes six categories as presented in Figure 1. To obtain a weighted average cost, an individual plant cost is weighted by the plant's production volume relative to the total volume of all the plants included in a study.

- Processing labor costs are derived from plant wages, plant salaries, payroll taxes, and fringe benefits associated with the processing of a product.
- Processing non-labor includes costs such as, utilities, repairs, maintenance, supplies, depreciation, plant insurance, outside storage, and rental expenses.
- Packaging costs include all non-reusable items used in the packaging of a product, such as boxes, bags, tape, glue, and stretch wrap.
- Miscellaneous ingredients costs may include salt, color, rennet, etc.
- General and administrative costs include expenses incurred in the management of a plant, for example, office supplies, short-term interest, dues and subscriptions, accounting fees, headquarter expenses, office clerical wages, and executive salaries.

Return on investment (ROI) allowance is an opportunity cost that represents how much interest the plant could have earned if its capital was not tied up in land, buildings, and equipment. In other words, it is viewed as an alternative source of income had the plant invested its capital elsewhere.

The chart below displays the breakdown of manufacturing cost for each product by category (Figure 1).

Figure 1. Manufacturing Costs by Category



Butter Study

The butter study included seven butter processing plants. The seven plants processed 575.44 million pounds of butter during the period January 2015 through December 2015, representing 99.90 percent of the butter processed in California. Production included both bulk and cut butter; however, published costs are for the processing of bulk butter (25kg and 68lb block) only.

To avoid revealing plant specific information, each plant was assigned to either a low or high cost group based on its total manufacturing cost. In 2015, the low cost group included three plants, while the high cost group included four plants. Table 1 lists the weighted average cost per pound for each category of the butter manufacturing cost.

Table 1 Butter Manufacturing Costs

BUTTER MANUFACTURING COSTS

CURRENT Study Period: January through December 2015
With Comparison to the same time period Prior Year (2014)

- Manufacturing cost data were collected and summarized from seven California butter plants. The seven plants processed 575.44 million pounds of butter during the 12-month study period, January through December 2015, representing 99.90% of the butter processed in California.
- The volume total includes both bulk butter and cut butter, but the costs reflect only costs for bulk butter (25 kg and 68 lb. blocks).
- To obtain the weighted average, individual plant costs were weighted by their butter processing volume relative to the total volume of butter processed by all plants included in this cost study.

Breakdown of Butter Manufacturing Costs - January through December 2015

Categories	Low Cost Group	High Cost Group	Range of Costs Minimum	Range of Costs Maximum	CURRENT Weighted Average Cost All Plants Jan-Dec 2015	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2014	Actual Difference Current Less Prior Year
	Dollars Per Pound of Butter						
Number of Plants	3	4	7	7	**7**	7	0
Processing Labor	$0.0571	$0.0839	$0.0432	$0.1704	**$0.0692**	$0.0708	-$0.0016
Processing Non-Labor	$0.0721	$0.0685	$0.0561	$0.1605	**$0.0705**	$0.0658	$0.0047
Packaging	$0.0132	$0.0127	$0.0120	$0.0145	**$0.0130**	$0.0133	-$0.0003
Misc. Ingredients	$0.0038	$0.0030	$0.0028	$0.0044	**$0.0034**	$0.0034	$0.0000
General & Administrative	$0.0173	$0.0186	$0.0103	$0.0230	**$0.0179**	$0.0218	-$0.0039
Return on Investment	$0.0106	$0.0096	$0.0029	$0.0184	**$0.0102**	$0.0092	$0.0010
Average Total Cost	$0.1741	$0.1963	--	--	**$0.1842**	$0.1843	-$0.0001
Volume in Group (Lbs.)	316,673,391	258,764,641	--	--	**575,438,032**	606,858,470	-31,420,438
% Volume by Group	55.0%	45.0%	--	--	**100.0%**	100.0%	--

Butter Study

Butter Manufacturing Costs

Processing labor costs of $0.0692 per pound represented 38 percent of the total butter manufacturing cost. Analysis revealed general plant to be the most costly labor performed (Figure 2).

Figure 2. Butter Processing Labor

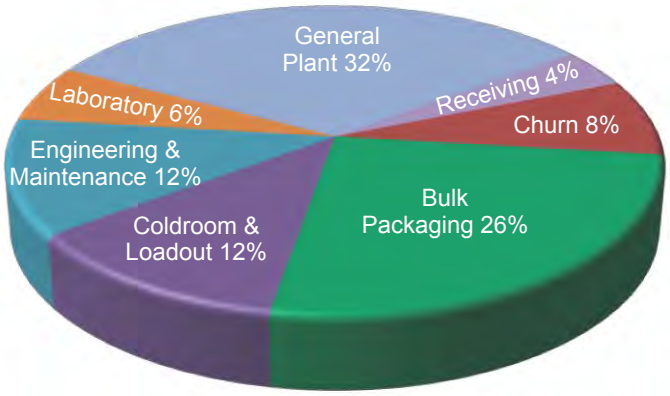
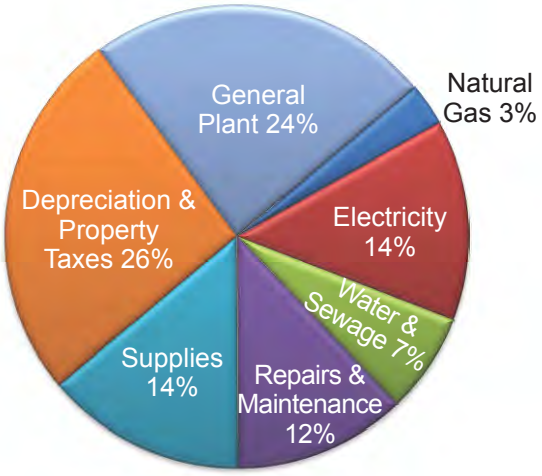
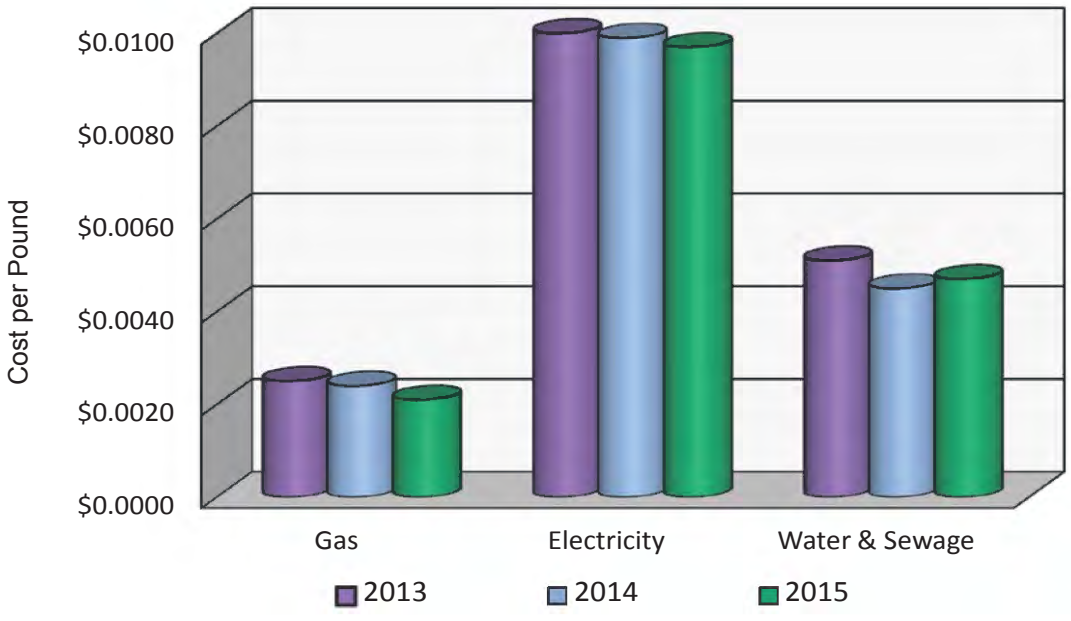


Figure 3. Butter Processing Non-Labor



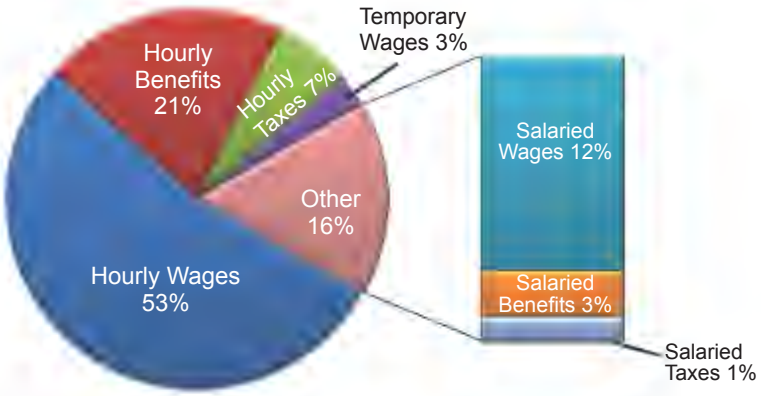
Processing non-labor costs of $0.0705 per pound represented 38 percent of the total manufacturing cost. Furthermore, the combined utility costs for electricity, natural gas, water and sewage accounted for 24 percent of processing non-labor costs (Figure 3). Figure 4 below provides the changes in utility costs over a three-year period.

Figure 4. Butter Utilities Comparison



Butter Study

Figure 5. Butter Payroll Costs



Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers compensation). Figure 5 provides a breakdown of plant payroll costs by percentage.

Packaging cost of $0.0130 per pound represented 7 percent of the total manufacturing cost. Bulk packaging includes all non-reusable items used in the packaging of bulk butter, such as boxes, bags, cartons, liners, tape, glue, and stretch wrap.

Miscellaneous ingredient costs remained unchanged in 2015. The weighted average cost of $0.0034 per pound represented 2 percent of the total manufacturing cost.

General and administrative costs of $0.0179 per pound represented 10 percent of the total manufacturing cost.

Return on investment costs increased 11 percent to $0.0102 per pound due in part to a 2.99 percent increase in the Moody's BAA corporate bond index.

The cost of manufacturing butter decreased to $0.1842 from $0.1843 per pound the year prior.

Figure 6 provides us a comparison for each category of cost over a three-year period.

Figure 6. Butter Manufacturing Costs Comparison

Nonfat Dry Milk Study

The 2015 nonfat dry milk (NFDM) study included nine plants whose combined production was 687.12 million pounds, representing 97.44 percent of the NFDM produced in California.

To avoid revealing plant specific information, each plant was assigned to either a low cost group, medium cost group, or high cost group based on its total manufacturing cost. In 2015, each cost group included three plants. Table 2 lists the weighted average cost per pound for each category of the manufacturing cost.

Table 2. Nonfat Dry Milk Manufacturing Costs

NONFAT DRY MILK MANUFACTURING COSTS

CURRENT Study Period: January through December 2015
With Comparison to the same time period Prior Year (2014)

- Manufacturing cost data were collected and summarized from nine California NFDM plants. The nine plants processed 687.12 million pounds of NFDM during the 12-month study period, January through December 2015, representing 97.44% of the NFDM processed in California.
- The volume includes NFDM, both animal and human consumption. NFDM for human consumption represented 99.60% of the 687.12 million pounds of NFDM processed, and NFDM for animal consumption represented 0.40%.
- The volume total includes all grades of NFDM packaged in any container size, but the costs reflect only costs for 25 kg and 50 lb. bags of NFDM.
- To obtain the weighted average, individual plant costs were weighted by their NFDM processing volume relative to the total volume of NFDM processed by all plants included in the cost study.

Breakdown of Nonfat Dry Milk Manufacturing Costs - January through December 2015

Categories	Low Cost Group	Medium Cost Group	High Cost Group	Range of Costs Minimum	Range of Costs Maximum	CURRENT Weighted Average Cost All Plants Jan-Dec 2015	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2014	Actual Difference Current Less Prior Year
	Dollars Per Pound of NFDM							
Number of Plants	3	3	3	9	9	**9**	9	0
Processing Labor	$0.0447	$0.0605	$0.0967	$0.0335	$0.1442	**$0.0523**	$0.0460	$0.0063
Processing Non-Labor	$0.0994	$0.1376	$0.1569	$0.0856	$0.2786	**$0.1138**	$0.1133	$0.0005
Packaging	$0.0151	$0.0152	$0.0158	$0.0143	$0.0159	**$0.0152**	$0.0152	$0.0000
General & Administrative	$0.0129	$0.0128	$0.0199	$0.0082	$0.0415	**$0.0133**	$0.0145	-$0.0012
Return on Investment	$0.0124	$0.0161	$0.0074	$0.0038	$0.0228	**$0.0132**	$0.0121	$0.0011
Average Total Cost	$0.1845	$0.2422	$0.2967	--	--	**$0.2078**	$0.2011	$0.0067
Volume in Group (Lbs.)	448,317,979	197,463,855	41,340,550	--	--	**687,122,384**	708,223,453	-21,101,069
% Volume by Group	65.0%	29.0%	6.0%	--	--	**100.0%**	100.0%	--

Processing Labor: Labor costs associated with processing of product, including wages, payroll taxes and fringe benefits.
Processing Non-Labor: Includes costs such as utilities, repairs and maintenance, laundry, supplies, depreciation, plant

Nonfat Dry Milk Study

Nonfat Dry Milk Manufacturing Costs

Processing labor costs were $0.0523 per pound, 14 percent higher than in 2014. The weighted average cost for 25-kg bag packaging labor was $0.0065 per pound, representing 12 percent of processing labor costs (Figure 7).

Figure 7. NFDM Processing Labor

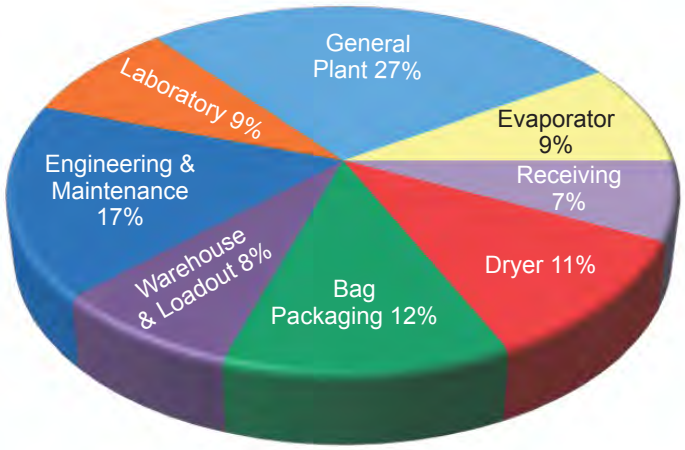
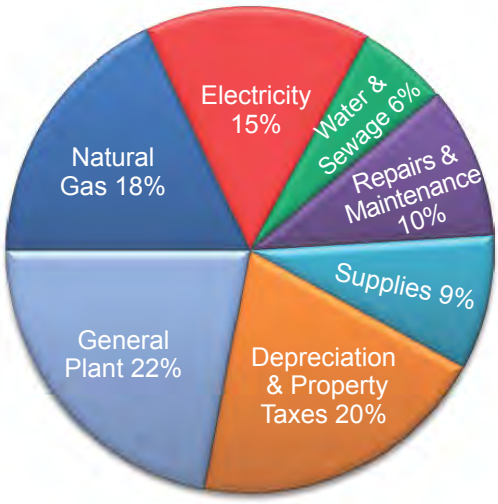
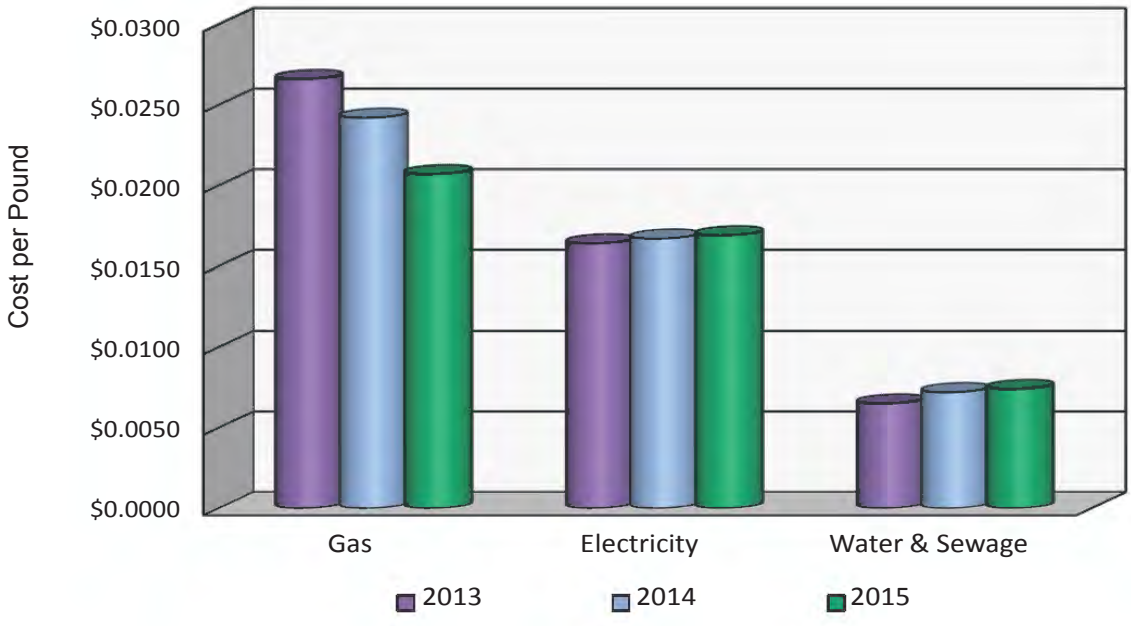


Figure 8. NFDM Processing Non-Labor



Processing non-labor costs of $0.1138 per pound accounted for 56 percent of the NFDM manufacturing cost. The operation of both an evaporator and a dryer adds significantly to the utility costs of a powder processing plant so it comes as no surprise that natural gas costs were the largest processing non-labor expense (Figure 8). Figure 9 below provides the changes in utility costs over a three-year period.

Figure 9. NFDM Utilities Comparison

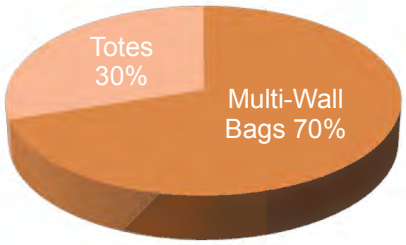


Nonfat Dry Milk Study

Packaging costs remained the same at $0.0152 per pound representing 7 percent of the total NFDM manufacturing cost. Seventy percent of the NFDM was packaged in 25-kg or 50-lb multi-wall bags; the remaining 30 percent was packaged in totes weighing between 1,100 to 3,200 lbs each (Figure 10).

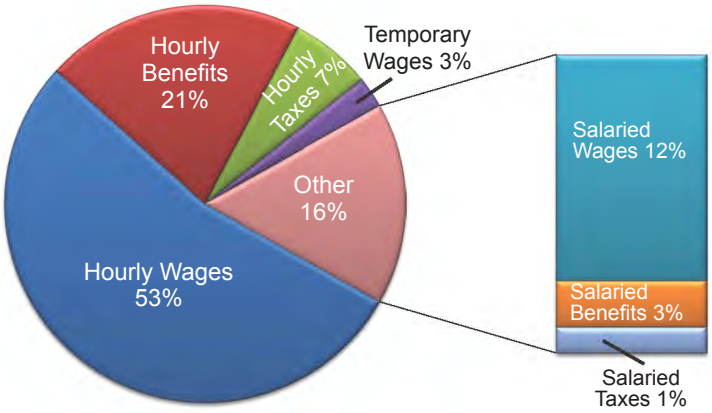
General and administrative costs of $0.0133 per pound represented 6 percent of the total NFDM manufacturing cost.

Figure 10. NFDM Packaging Size



The return on investment (ROI) allowance is calculated by subtracting accumulated depreciation from the original cost of assets; the remaining book value is then multiplied by the Moody's "BAA" corporate bond index. In 2015, ROI costs were $0.0132 per pound.

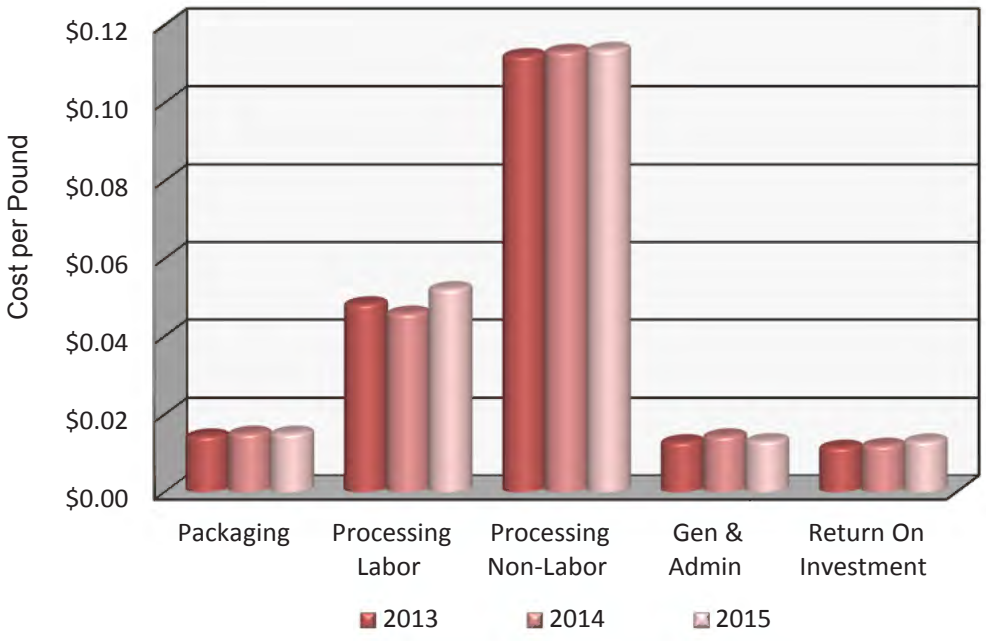
Figure 11. NFDM Payroll Costs



Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers' compensation). Figure 11 provides a breakdown of plant payroll costs by percentage.

In 2015, the NFDM manufacturing cost increased to $0.2078 per pound. Figure12 shows the changes that have occurred in each category of cost over a three-year period.

Figure 12. NFDM Manufacturing Costs Comparison



Cheese Study

In 2015, the cheese study included four processing plants. To avoid revealing plant specific information, the results gathered from all four plants were included in the calculation of one weighted average cost for each category of manufacturing expense (Table 3).

Table 3 Cheese Manufacturing Costs

CHEESE MANUFACTURING COSTS

CURRENT Study Period: January through December 2015
With Comparison to the same time period Prior Year (2014)

- Manufacturing cost data were collected and summarized from four California cheese plants. Due to confidential reasons, total cheese volumes cannot be displayed.
- The volume total includes both Cheddar and Monterey Jack cheeses, but the costs reflect only costs for 40-lb. blocks of Cheddar.
- Two plants processed 500-lb. barrels or 640-lb. blocks. Packaging costs and packaging labor for 40-lb. blocks were substituted for these plants.
- To obtain the weighted average, individual plant costs were weighted by their cheese processing volume relative to the total volume of cheese processed by all plants included in the cost study.
- For all cheese: the weighted average yield was 13.31 lbs. of cheese per hundredweight of milk. The weighted average moisture was 37.04% and the weighted average vat tests were 4.73% fat and 9.62% SNF.

Breakdown of Cheese Manufacturing Costs - January through December 2015

Categories	Total Cost One Group	CURRENT Weighted Average Cost All Plants Jan-Dec 2015	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2014	Actual Difference Current Less Prior Year
	Dollars Per Pound of Cheese			
Number of Plants	4	**4**	4	0
Processing Labor	$0.0640	**$0.0640**	$0.0581	$0.0059
Processing Non-Labor	$0.0862	**$0.0862**	$0.0858	$0.0004
Packaging	$0.0239	**$0.0239**	$0.0244	-$0.0005
Misc. Ingredients	$0.0251	**$0.0251**	$0.0281	-$0.0030
General & Administrative	$0.0342	**$0.0342**	$0.0338	$0.0004
Return on Investment	$0.0060	**$0.0060**	$0.0053	$0.0007
Average Total Cost	$0.2394	**$0.2394**	$0.2355	$0.0039

Cheese Study

In addition to Cheddar and Jack cheeses, the plants processed various other types of cheese and cheese by-products. For all Cheddar cheese though, the weighted average vat yield was 13.31 pounds of cheese per hundredweight (cwt) of milk, the weighted average moisture was 37.04 percent, and the weighted average vat test was 4.73 percent fat and 9.62 percent solids-not-fat (Table 4).

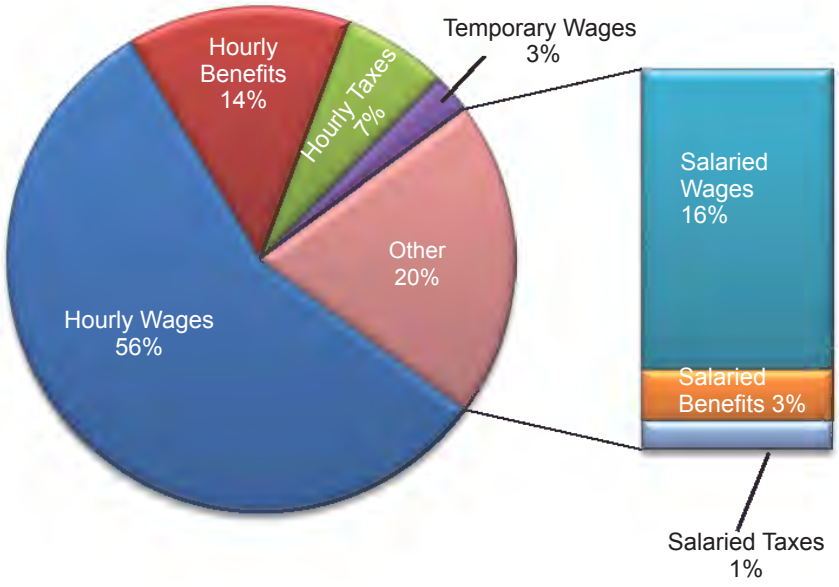
Cheddar Cheese Manufacturing Costs

Table 4. All Cheddar Cheese Production Parameters Comparison

Weighted Average Year	Finished Moisture %	Vat Fat Test %	Vat SNF Test %	Vat Yield (Lbs.)
2015	37.04	4.73	9.62	13.31
2014	37.13	4.42	9.43	12.40

Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers' compensation). Figure 13 provides a breakdown of plant payroll costs by percentage.

Figure 13. Cheese Payroll Costs



Cheese Study

Processing labor costs were $0.0640 per pound. For the plants that processed 500-lb barrels or 640-lb blocks, the weighted average packaging labor cost for 40-lb block Cheddar cheese was substituted (Figure 14).

Figure 14. Cheese Processing Labor

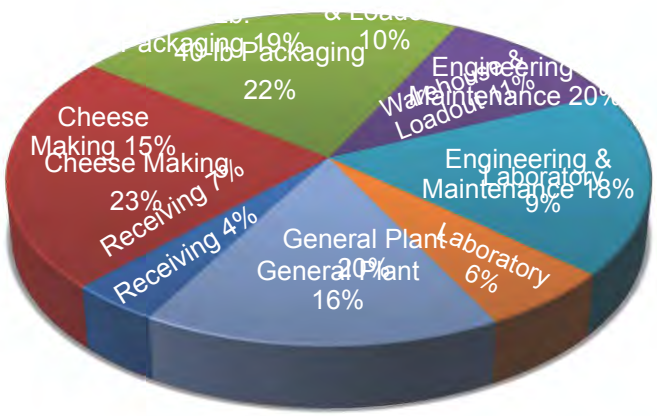
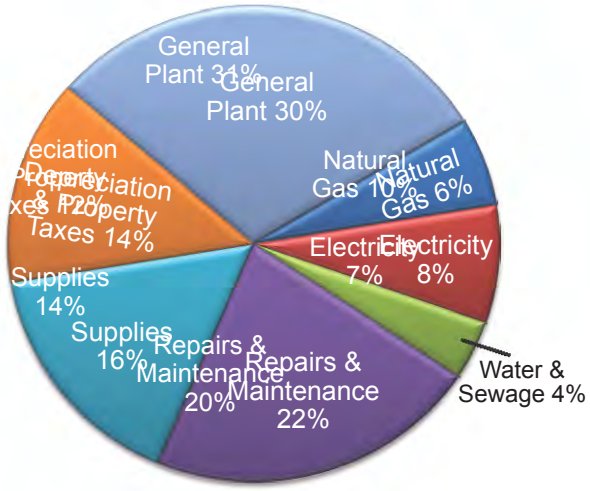
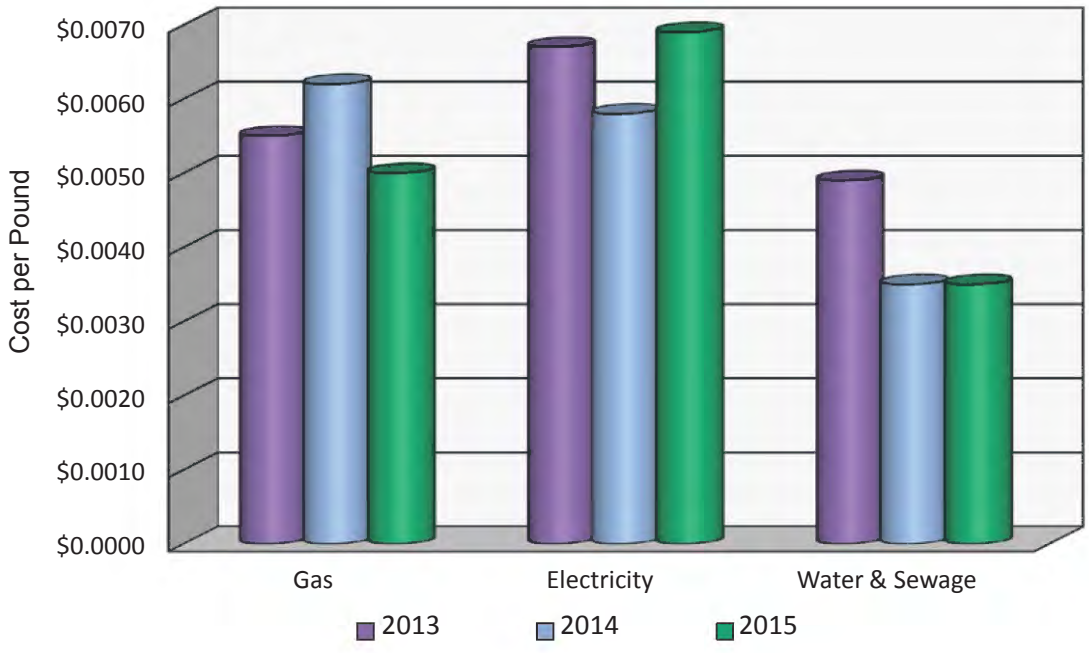


Figure 15. Cheese Processing Non-Labor



Processing non-labor costs of $0.0862 per pound were 36 percent of the total manufacturing cost. Furthermore, the combined utility costs of gas, electricity, water and sewage accounted for 18 percent of processing non-labor costs (Figure 15). Figure 16 below provides the changes in utility costs over a three-year period.

Figure 16. Cheese Utilities Comparison



Cheese Study

Packaging costs included all non-reusable items, such as boxes, liners, tape, glue, and stretch-wrap. The weighted average packaging cost for 40-lb block Cheddar cheese was substituted for those plants producing 500-lb barrel or 640-lb block cheese. Packaging costs were $0.0239 per pound.

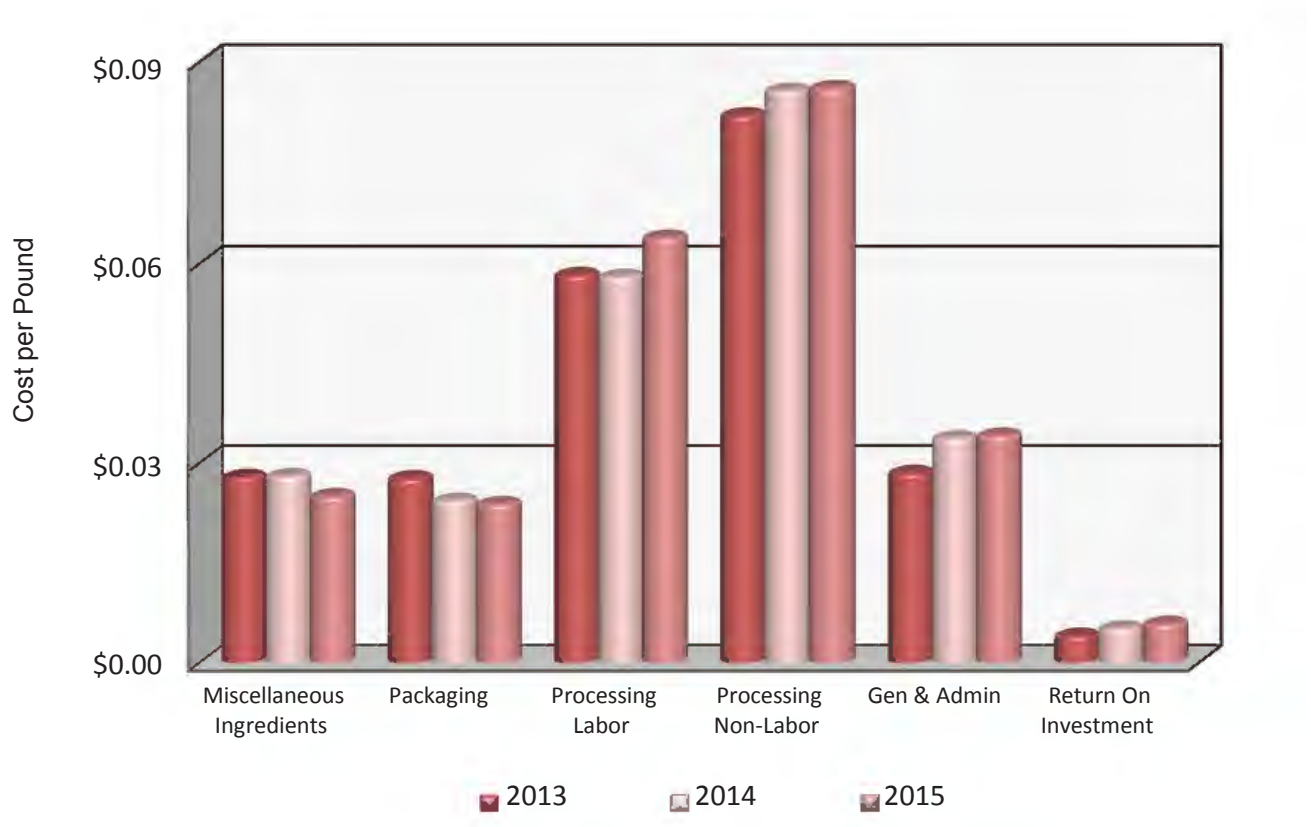
Misellaneous ingredient costs for Cheddar cheese included salt, color, rennet, fortification costs, etc. In 2015, the weighted average cost was $0.0251 per pound.

General and administrative cost of $0.0342 per pound accounted for 14 percent of the manufacturing cost.

Return on investment (ROI) cost increased 13 percent to $0.0060 per pound and represented just 3 percent of the total manufacturing cost.

Overall, the cost of manufacturing cheese increased from $0.2355 in 2014 to $0.2394 per pound in 2015. Figure 17 displays the type of changes occurring in each category of cost over a three-year period.

Figure 17. Cheese Manufacting Costs Comparison



Condensed Skim and Cream

The manufacturing cost of bulk dairy products, such as condensed skim and cream, are not as precise as packaged products like butter, NFDM, and cheese. There are very few direct costs associated with bulk dairy products. Most, if not all, bulk dairy product costs are derived from the general plant costs allocated to them based on component hundred-weight (cwt).

Condensed Skim Overview

In 2015, the condensed skim study was completed on nine plants whose combined sales were 418.4 million pounds (Figure 18). The weighted average manufacturing cost of condensed skim increased 27 percent from the prior year to a cost of $5.3716 per cwt. (Table 5).

Figure 18. Condensed Skim Sales Comparison

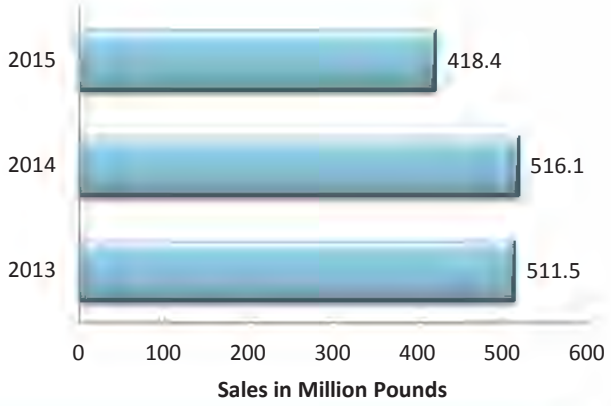


Table 5. Bulk Condensed Skim Manufacturing Costs

Table 5 Condensed Skim Manufacturing Costs

Current Study Period: January through December 2015
with Comparison to the same time period PRIOR YEAR (2014)

Breakdown of Condensed Skim Manufacturing Costs - January through December 2015

Categories	CURRENT Weighted Average Cost All Plants	PRIOR YEAR Weighted Average Cost All Plants	Actual Difference Current Less Prior Year
	2015	2014	
	Dollars Per Hundredweight of Condensed Skim		
Number of Plants	**9**	8	
Processing Labor	**$1.9024**	$1.3883	$0.5141
Processing Non-Labor	**$2.8941**	$2.3998	$0.4943
General Administrative	**$0.4148**	$0.3321	$0.0827
Return on Investment	**$0.1603**	$0.1165	$0.0438
Average Total Cost	**$5.3716**	$4.2367	$1.1349
Volume in Group (LBS.)	**418,383,677**	516,055,002	(97,671,325)
% Volume by Group	**100.0%**	100.0%	

Condensed Skim & Cream

Cream Overview

In 2015, the cream study included eleven plants whose combined sales were more than 232.6 million pounds (Figure 19). The weighted average manufacturing cost of cream increased 10 percent to $5.7477 per cwt. (Table 6).

Figure 19. Cream Sales Comparison

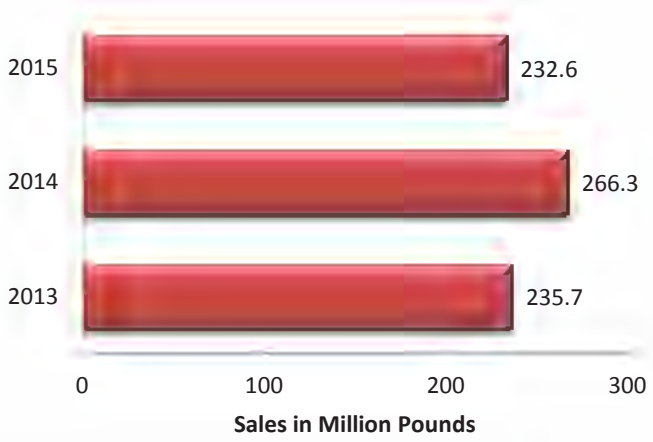


Table 6. Cream Manufacturing Costs

Table 6. Bulk Cream Manufacturing Costs

Current Study Period: January through December 2015
with Comparison to the same time period PRIOR YEAR (2014)

Breakdown of Cream Manufacturing Costs
January through December 2015

Categories	CURRENT Weighted Average Cost All Plants 2015	PRIOR YEAR Weighted Average Cost All Plants 2014	Actual Difference Current Less Prior Year
	Dollars Per Hundredweight of Cream		
Number of Plants	**11**	**10**	
Processing Labor	**$2.0109**	$1.6235	$0.3874
Processing Non-Labor	**$3.0943**	$2.9146	$0.1797
General Administrative	**$0.4647**	$0.4921	-$0.0274
Return on Investment	**$0.1778**	$0.1983	-$0.0205
Average Total Cost	**$5.7477**	$5.2285	$0.5192
Volume in Group (LBS.)	**232,607,783**	266,309,305	(33,701,522)
% Volume by Group	**100.0%**	100.0%	

Figure 20. Simplified Flowchart of a Butter and Nonfat Dry Milk Plant

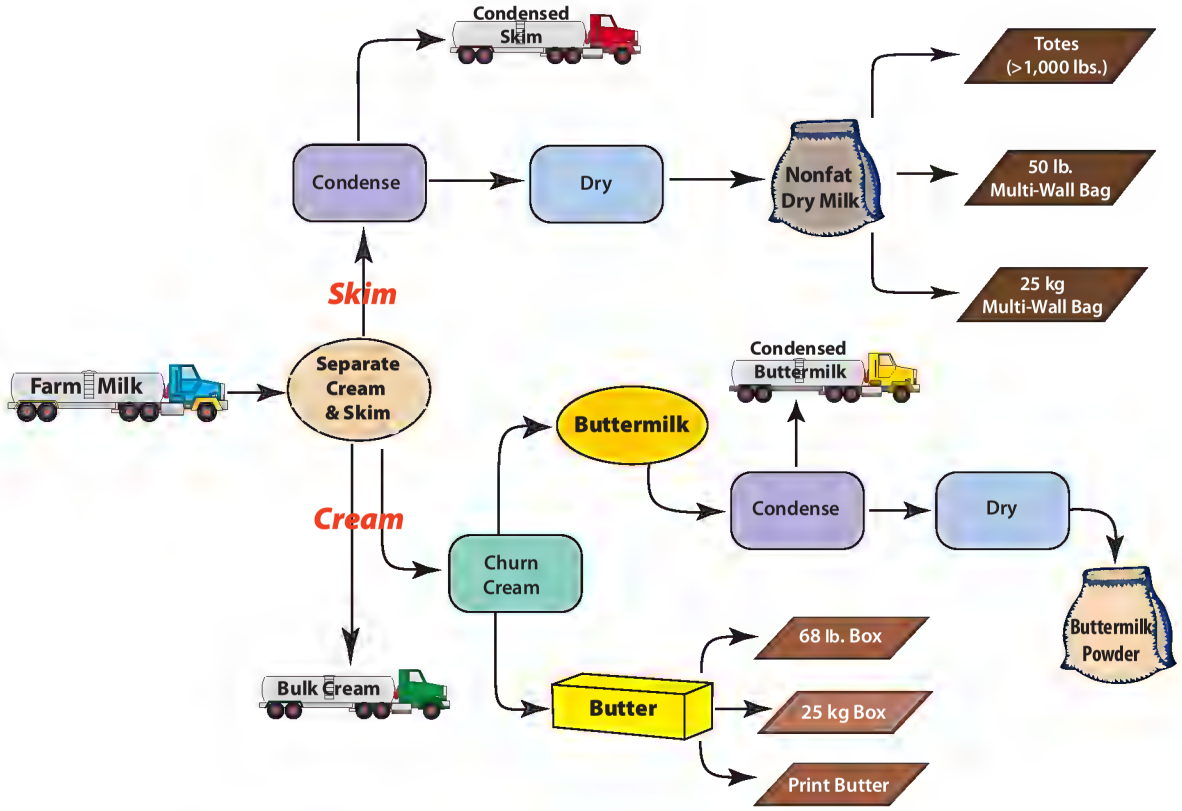


Figure 21. Simplified Flowchart of a Cheese Plant with By-Product Processing