A Review of the Artisan Cheese Industry

A Senior Project

presented to

the Faculty of the Dairy Science Department

California Polytechnic State University, San Luis Obispo

In Partial Fulfillment
of the requirements for the Degree
Bachelor of Science

By Jeffrey Mason February, 2013

© 2013 Jeffrey Mason

Acknowledgements

This project would not have been a success without the guidance and help from the Dairy Science Department Professors. I would first like to thank Dr. Bruce Golden for being my advisor on this project. His hard work and dedication helped in building my project greatly. I would also like to acknowledge Barbara & Tony Martin from Dairy Goddess Farmstead Cheese and Jim & Christine Maguire from Rinconada Dairy. They gave me useful insight to the industry from their years of experience. Lastly I would like to thank Dr. Amy Lammert for information on the latest dairy processing techniques and plant management.

Abstract

The aim of this study was to determine the financial profitability of artisan cheese making, why it has become popular, processing differences compared commercial processing and any issues within the industry. Many studies suggest that the consumers are the driving force behind the increased popularity of artisan cheese. Consumption of specialty or artisan cheese grew by 75% between the years of 1994 and 2003. This movement in the American culture towards locally made small scale products can also be observed in other industries. The consumers preferences have changed they are now willing to pay more for a high quality product.

Within the artisan cheese industry the popularity of raw milk cheeses was greater than the pasteurized milk cheeses. In a survey conducted by Oregon State University professors the consumer was still willing to pay for raw milk cheeses even if they thought that it could be a less safe product.

This cheese comes at a higher price though, it costs the dairyman more to produce artisan cheese then it would cost a large scale commercial creamery to produce the same cheese.

Dairymen have to commit more of their time to make the business profitable. The most profitable on-farm processing that I observed were the goats and sheep dairies. An even more profitable group of dairies were the goats and sheeps dairies that were able to diversify their business.

Table of Contents

Abstract	iii
Table of Tables	v
Table of Figures	vi
Introduction	1
Consumers desire for Artisan Cheese	2
The dairyman's desire to make Artisan Cheese	4
The profitability of farmstead cheese making	5
Artisan Cheese marketing	8
Raw Milk Cheeses	9
Microbiological quality of Raw Milk Cheeses	12
Fundamental steps for cheese production	13
Bulk tank to cheese vat	13
Cheese vat to final product	15
Differences in farmstead cheese processing	17
Conclusion	22

Table of Tables

Table 1. Consumption of specialty cheese and total consumption of cheese in the United States	.3
Table 2. Size and experience of the sampled on-farm processors	. 6

Table of Figures

Figure 1. Distribution of processing net income for on-farm dairy processors	
Figure 2. On-farm processing profitability by species of animal milked	8
Figure 3. Consumer preference for raw milk cheeses vs. pasteurized milk cheeses	10
Figure 4. Consumer willingness to pay for specialty cheese	12
Figure 5. Sheeps milk bulk tank	19
Figure 6. Pressing hoops	20
Figure 7. Aging room	21

Introduction

It used to be common practice for the dairy farmer to be the producer, processor, distributor and marketer of their milk. In recent years there has been resurgence in the production of farmstead made dairy products. This includes cheeses, ice cream, milk, yogurt and other dairy products in non-pasteurized versions. Consumers are asking for their products to be produced locally with minimal processing and they are willing to pay a premium price for these products.

Other industries such as micro brewing, baking and wine making have also shifted towards on site small scale processing. All of these small scale processors are marketing their products at farmer's markets, on site, natural foods stores, and specialty food retail stores.

For a dairyman to start processing their own milk into cheese is a big undertaking. The biggest issue is the capital that it requires to start processing. Since the dairyman has now acquired all of the responsibility of processing their milk and marketing it, a large amount of time has to be committed for the business to be successful. My objective was to determine the financial profitability of artisan cheese making, why it has become popular, processing differences compared to commercial processing and any issues within the industry.

Consumers desire for Artisan Cheese

The quantity of artisan cheeses being produced in the United States in the past 20 years has grown significantly, especially in Wisconsin, California and the New England areas. This recent renaissance in cheese making is being compared to the wine boom in the Napa Valley (Howland 2004). There is not one reason why artisan cheese popularity is growing so fast but it is a combination of cheese making innovation, the farmers desire to capture more of the consumer's dollar and the fact that the American consumer's preferences have changed.

Michelle Corry states in "Say Cheese, Say Flavor", "I do think the American public is more adventurous and interested in food, and now we're taking pride in the food make in the Unites States." Quality and flavor are now the most important to the consumer while price, appearance and packaging have the least importance (Kupiec and Revell 1998). This is a perfect example showing that the consumer is willing to purchase a better quality cheese even though it is more expensive.

Restaurants and chefs have also capitalized on this trend. They see that they can add value, flavor and locally made ingredients to their menus, which is increasingly more important to the consumer. Chefs have many more options for locally made cheeses which are becoming increasingly better as the cheese makers become more experienced. Creative items that feature local artisan cheeses are becoming feature items on the menu (Howland 2004). Higher end restaurants are not the only ones using the artisan cheeses to their advantage. Burgerville is a local fast food restaurant in Oregon. They use Rogue Creamery's bleu cheese spread for a specialty burger. They only offer this burger seasonally, because Rogue cannot keep up with the demand that Burgerville has for their cheese. George Brown the owner of Burgerville says that,

"The custom bleu cheese spread helped Burgerville sell a lot of burgers." "I got emails when we pulled it from the menu and a great response when we brought it back." Brown credits the cheese with added just the sophisticated zing that they needed. Consumers enjoy the fact that the cheese that they are eating was made in a place that they are familiar with (Howland 2004). Corry also states that, "In general, people are not just ordering the cheese but commenting on it. We assumed people would order it as a first course, but they are ordering it for dessert of before dessert, as in Europe."

In 1995 the California Milk Advisory Board surveyed 50 leading restaurants in the San Francisco bay area. At that time none of the restaurants had a cheese course on their menu and only a handful had an artisan cheese on the menu. This survey was conducted again in 2000 with the same 50 restaurants. In that 5 year span half of the restaurants had added a cheese course and two thirds of them had an artisan cheese as an ingredient (Reed et al., 2011). Some of the restaurants had even added a short bio of the cheese maker to the menu.

Table 1. Consumption of specialty cheese and total consumption of cheese in the United States.

Type of cheese consumption	1994	2003	Growth
Total cheese consumption (million pounds)	7,000	8,800	1,800 (+26%)
Specialty cheese consumption (million pounds)	420 (6% of total)	815 (9% of total)	395 (+94%)
Total cheese consumption per capita (pounds)	26.6	30.6	4 (+15%)
Specialty cheese consumption per capita (pounds)	1.6	2.8	1.2 (+75%)

Redrawn from Reed et al., 2011.

The dairyman's desire to make Artisan Cheese

The dairyman's desire to make these beautiful handcrafted cheeses comes from their desire to gain more capital. When a dairyman starts his own on farm milk processing it is called a value added. Nicholson and Stephenson (2006) describe value added as being, "any activity that increases the per unit price received for farm production or any activity that transforms a product into another product that fetches more revenue on the market." Adding value to traditional farm production business occurs in other markets also.

In the state of Montana, Montana Farms & Bakery began growing wheat which had reasonable yields, but had superior baking qualities (Brester 1999). The Folkvord family owned this company and they wanted to start marketing their high end wheat directly to milling and baking companies. Initially their sales were not what they were expecting but it gave them an idea. They then purchased interest in a small bakery. They bagels they were producing were a success in the Bozeman area and soon the Folkvord's business was expanding deeper in the bakery and wheat production industries. The vertical integration of the farm allows the farmer to set their own prices to cover their production costs rather than being dependant on the market prices.

Federal and State governments also see benefit in supporting these on farm practices.

Their goal is to enhance or stabilize farming family's incomes and creating more rural employment (Nicholson and Stephenson 2006). The 2002 Farm Bill authorized \$40 million per year to the Value Added Agricultural Product Market Development Grants Program (VAPG).

The primary objective of the VAPG program is to help agricultural producers enter into value-

added activities related to the processing and/or marketing of bio-based value-added products. Generating new products, creating and expanding marketing opportunities, and increasing producer income are the end goals of this program (USDA 2013). On a state level there has been government support and funding from private companies. The state programs are mostly focused in the New England, Wisconsin and California areas. There is the New York State Farmstead and Cheese Makers Guild, Dairy Business Innovation Center, Vermont Institute for Artisan Cheese, and the California Artisan Cheese Guild. All of these programs provide cheese making workshops, marketing support and business planning.

The profitability of farmstead cheese making

There is a lot of funding and assistance available for farmers that are trying to start their own farmstead cheese business. In 2011, 18 California on farm processors received funding. Of these 18, 5 of them were specifically processing dairy products. The amount of money they received varied from \$48,000 to Curds and Whey dairy to \$300,000 to Rosa Brothers Milk Company (USDA 2013). Every state has similar amounts of applicants and recipients, all rewarded money up to \$300,000. This may prompt the question what is the financial performance of these operations if they need this much assistance to start up. Charles Nicholson and Mark Stephenson conducted an in depth financial analysis of dairies in New York, Vermont and Wisconsin. The main objective of this research is to observe the financial performance, overall business and income statements for these farmstead cheese operations. These dairies varied in size, experience, variety of cheese produced and species of animal milked.

Table 2. Size and experience of the sampled on-farm processors.

	Statistic	Cows	Goats and Shee	p Total
Years Farming	Mean	16.9	9.5	14.1
	Maximum	62.0	20.0	62.0
	Minimum	1.0	1.0	1.0
# of Mature Animals	Mean	42.9	87.1	59.9
	Minimum	6.0	24.0	6.0
	Maximum	110.0	300.0	300.0
Years in Processing	Mean	6.5	5.9	6.3
	Maximum	54.0	16.0	54.0
	Minimum	0.0	0.0	0.0

Redrawn from Nicholson and Stephenson 2006.

Table 2 compares the size of the dairies and their experience with milk processing and farming. I find this useful is making my own judgment on the ability of the dairymen to run an on farm processing business.

The net income for the majority of the on farm processors that were observed showed a negative income. The average net business income was the worst for the dairymen milking cows, the mean was \$90,000. This was impacted largely by an outlier, with it removed from the data the mean was \$13,333. The dairymen that produced sheep and goat products were profiting on average \$15,000 per year. On the processing level more goat and sheep dairymen generated a profit but lost money on production. While dairymen that milked cows made money on milk production they lost money on milk processing. This could be due to the consumer preferences in the area that the cheese was marketed in.

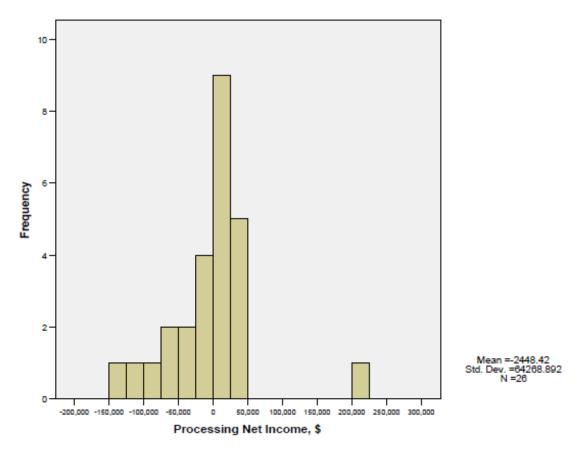


Figure 1. Distribution of processing net income for on-farm dairy processors. Nicholson and Stephenson 2011.

From Figure 1 it is easy to see that there is a good possibility that an on farm processing business will not be profitable. These data, however, was only gathered from a restricted area of the United States only. Other areas that have large amounts of on farm processors such as California and Oregon may be more profitable. These data includes farms that are making cheese and or other dairy products; this includes fluid milk, butter, yogurt and kefir. There is a high processing expense for these dairymen. To market their product and have a processing net income that is positive, the processed milk needs to be sold at \$100 per cwt. This means they would be selling their cheese at \$10 per lb and fluid milk at \$8.60 (Nicholson and Stephenson 2006).

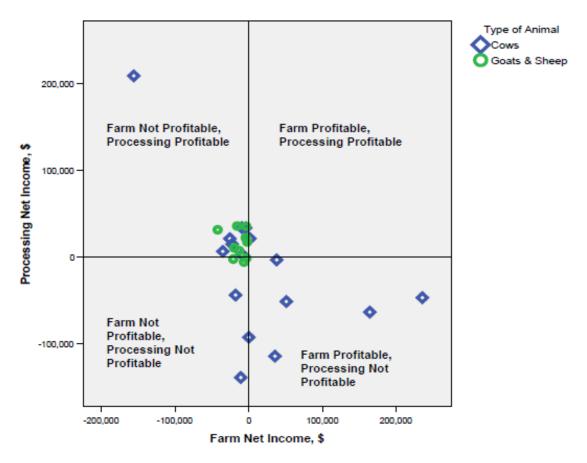


Figure 2. On-farm processing profitability by species of animal milked. Nicholson and Stephenson 2011.

Artisan Cheese marketing

The first few planning steps are crucial for the dairyman if they want a successful business. Determining a business plan that outlines labor, target markets, employing family, financial risk, and how much time you have available to commit to the business. Dairymen often have a difficult time finding the time to market their product properly, because they do not have the time. Finding the right market is crucial to the success of the business. "Consumers of specialty cheeses typically have a broader knowledge of cheese, spend more money on

purchasing cheese, consume a large variety of cheeses, and have little brand loyalty. (McCarthy el al., 2001)" These consumers are only a small portion of who will purchase your cheese. Creating appeal to consumers that may not be familiar with artisan cheeses is very important for selling a large quantity of cheese. An easy way for farmers to expose consumers to their product is selling it at farmer's markets. In the focus group that was conducted by Barbara Reed and Christine M. Bruhn 2011, the responses showed that it was important for the cheese makers to establish a relationship with the customers directly. Consumers enjoy hearing the farmer's story of how they started making cheese and how the farm is operated. If the cheese is being sold at a cheese shop, winery or grocery stores a short bio on the farm and cheese maker is a great way to connect to the consumer. In a survey conducted by Reed and. Bruhn they asked how a narrative about the cheese would influence their purchase, even if they were not initially inclined to buy the cheese. One participant stated, "I don't think you can underestimate narrative. You hear a story about a 90-year-old cheese maker up in the mountains, and even if it's really strong cheese that I might not normally buy, I might try it. It has everything to do with the person selling me the cheese." Increasing sales at a retail outlet can be achieved by in store tastings and demonstrations. This can be very effective when a product is first introduced at that retail outlet. Stores will often feature similar cheeses and offer samples so that customers can compare and choose their favorite in that category (Reed and Bruhn 2003).

Raw Milk Cheeses

The artisan cheese industry can be divided into two broad areas pasteurized or raw.

Whether the consumer purchases the product based on if it is pasteurized or not is entirely their preference. Their preference is based on they value; flavor, aroma, overall appearance and if

they feel that raw milk cheese is safe for consumption. In 2011 a tasting experiment was conducted by Oregon State University professors to determine the consumer's preference for types of artisan cheeses. Eight hundred ninety consumers were surveyed at a food festival in Oregon. The majority of the participants were 35 yrs and older, had a 4 year college degree and were fairly wealthy. These consumers fit into the typical range for specialty cheese consumers (Colonna,. et al). They were asked which sample they preferred based on appearance, color aroma, flavor, texture, and other. They were also asked to rank the following cheeses characteristics; local, artisan, organic, farmstead and sustainable. 104 of the 890 participants stated that they could not detect a difference between the raw milk cheese (RMC) and the pasteurized milk cheese (PMC), and 41 indicated no preference. This test also showed that there was a significant preference for RMC over PMC. 426 chose RMC compared to the 319 that chose PMC.

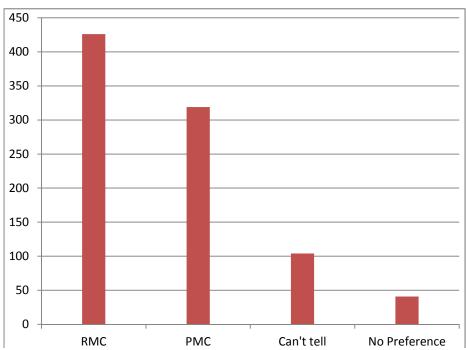


Figure 3. Consumer preference for raw milk cheeses vs. pasteurized milk cheeses. Redrawn from Colonna., et al. 2011.

Overall the consumers stated that their choices and preferences were based on flavor, followed by texture and the other characteristics were minor in their decisions. The participants were asked a follow up question which was designed to help explain the above results. They were asked which characteristics from a pre-developed list pertained to PMC and RMC. 30% of the participants chose "more safe", "large industrial production", and "less complex flavor profile". For RMC the most common characteristics were "small production/artisan", "more complex flavor profile", "higher price" and "less safe". This is interesting because these cheeses that were being compared were coming from the cheese maker in Oregon. The same varieties were being tested against each other, just one was raw and the other was pasteurized. It shows that the consumers perception of these cheeses is slightly skewed, which may be affecting their preference. It also shows that the consumer is willing to pay more for a RMC even if they believe that it is a "less safe" product.

Following the tasting preferences experiments, the participants were asked "What is the most you would be willing to pay to try a 4-oz specialty cheese?" To give structure to their responses there were four choices offered. They began at \$2 for a 4-oz serving to \$8 for a 4-oz serving. This is a range of \$8 per pound to \$36 per pound. In the \$2 range 24% said that they were willing to pay for the specialty cheese. In the \$4 range it increased to 43%, in the third it dropped to 23% and in the fourth range there was 10%. Almost half of the participants were willing to pay \$16 per pound for a specialty cheese. This price is double of many large scale production cheeses.

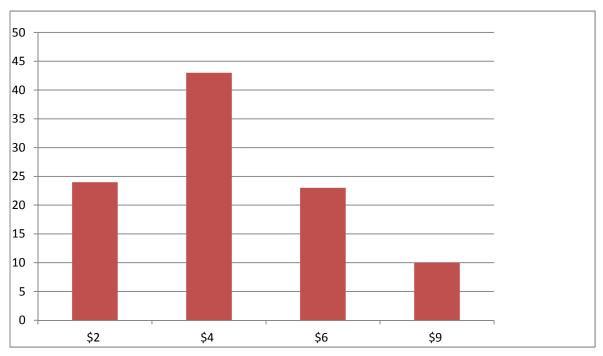


Figure 4. Consumer willingness to pay for specialty cheese.

Microbiological quality of Raw Milk Cheeses

The safety of RMC is a constantly debated topic in the dairy industry. Food scares and illness drive support for more regulation on pasteurization and raw milk enthusiasts are firm believers in the quality of their product (Colonna,. et at.) Currently the FDA requires, "mandatory pasteurization for all milk and milk products in final package form intended for direct human consumption" (Nsofor). There is an exception to this rule, "Cheeses identified by standards at 21 CFR 133 *et seq.* may be made from raw milk. They typically have to be aged for a defined time period in order to control microbial pathogens (Nsofor.) The aging times of the varieties of cheese can vary but at minimum a cheese must be aged for no less than 60 days and no warmer than 35 F. To be considered pasteurized the milk should be heated to 161 F for 15 seconds; this is called high temperature short time or HTST. The other method is called batch pasteurization; the milk is heated to 145 F for 30 minutes. Most artisan cheese makers choose to use the batch method because the equipment for it is less expensive (Paxson 2008).

Common pathogens that are found in the raw milk used for cheese making are *Listeria* monocytogenes, *Staphylococcus aureus*, *Salmonella* and *Escherichia coli*. Along with other bacteria these pathogens can compromise the quality and safety of the RMC if the cheese is not aged properly. In 2009, D.J. D'Amico and C.W. Donnelly conducted an experiment to determine the microbiological quality of raw milk used for small-scale artisan cheese in Vermont. Their goal was to assess the health risk of artisan and farmstead cheeses, especially those produced from raw milk. They collected data on 21 farms, 15 were cow's milk, 5 were goats and 4 were sheep's. Milk samples were collected daily and tested for SPC, CC, SCC and the presence of pathogens. Overall for the cow's milk the SCC was 224,000, SPC 49,000 and the CC was 9,126. This data set was skewed by the outliers on a few different farms. The presence of pathogens occurred on 14 of the 21 farms in at least 1 milk sample. The most common pathogen detected was *Staph. aureus*. The levels of *Staph. aureus* were significantly lower on farms that practiced fore stripping. Their results showed that most of the raw milk in Vermont that was intended for artisan cheese making was of good microbiological quality.

Fundamental steps for cheese production

Bulk tank to cheese vat

There are hundreds of varieties of cheese that a farmer can choose to start making and in general they all follow the same procedure. The milk is first pasteurized which can be done in different methods; Low temperature long time (Batch) or High temperature short time (HTST). The most common way for artisan cheese makers is the batch pasteurization method, because it

requires less expensive equipment. The batch method requires the milk to be heated to 145 F for 30 minutes. For raw cheeses the milk is pumped from the bulk tank directly into the cheese vat. The cheese vat is used for the conditioning of the milk. This is where calcium chloride, starter bacteria and rennet are added (Tong, 2011). The calcium chloride aids in the coagulation time and the firmness of the coagulum. When using calcium chloride, the amount of rennet needed is decreased, because it aids with coagulation.

With the exception on a few fresh cheeses like cottage cheese or quarg which use lactic acid, all cheese curd is formed by rennet or similar enzymes. Shortly after the rennet is added into the cheese vat coagulation occurs. The active ingredient in rennet is called chymosine.

Rennet transforms the casein in the milk into paracasein. The optimum temperature for rennet is 104 F, but it can be lowered depending on how hard the curd is desired. The amount of calcium chloride also affects the temperature, because it allows the rennet to create a much harder curd, this could lead to not be able to cut the curd. There are substitutes for animal rennet, because many people and cultures would rather eat cheese made from non-animal rennet.

Recently there has also been a shortage of quality animal rennet. The two main types of vegetarian rennet, one is a coagulating enzyme derived from plants and the other is a coagulating enzyme from micro-organisms (Tetra Pak 2003).

The starter culture in cheese making plays an important role; it produces lactic acid, breaks down protein and in some cases produces carbon dioxide. A common starter culture used are Mesophilic which have an optimum temperature between 77 F and 104 F. There are also Thermophilic cultures which develop up to 122 F. There is a window of 30-60 minutes from inoculation before the start of growth that is called the pre-ripening time. Mixing of cultures can be beneficial because they can support each other's functions. The mixed cultures produce the

needed lactic acid but they can also create aromas in the cheese and form carbon dioxide. The production of lactic acid in the coagulum stops when all of the lactose has been fermented. This process is usually fast but for some types occurs within one week. When the starter culture contains bacteria that form carbon dioxide, citric acid is produced to create the carbon dioxide. This step is crucial for cheeses like Swiss; the escaping carbon dioxide creates the holes and the texture of the cheese.

There can be impurities in the milk which can hinder the production of lactic acid or slow the acidification. Usually it is caused from soaps and acids that were not rinsed thoroughly out of the processing equipment. More serious contaminants are bacteriophages, which are thermo tolerant bacteria found in the soil and air. These affect the fermentation of the cheese milk. Saltpetre (sodium or potassium nitrate) can be added in small amounts to counter the bacteria. Too much Saltpetre will slow the growth of the starter, and slow down the ripening process. In some cheeses large amounts can discolor the cheese with reddish streaks (Bylund 2003). Antibiotics can also be in the milk; in the artisan cheese industry this may not be as common because many of the dairies practice organic farming.

Cheese vat to final product

Inside of the cheese vat after the rennet and starter culture have been added the coagulum is cooked. The cooking gets the coagulum to the desired firmness; stirring during this process allows even cooking and increases the loss of moisture. Cooking at different temperatures and duration affects the firmness of the curd.

The cutting of the coagulum is a way of removing the whey from the curd. To test if the coagulum is ready to be cut a knife is stuck into the clotted milk surface, and then removed slowly. It is ready for cutting as soon as a glass-like splitting flaw happens. With modern cheese vats stainless steel knives are rotated through the coagulum by a motor. The backsides of the knives are rounded to enhance the mixing. The smaller of cuts means the lower moisture content of final cheese product.

With some varieties there is a washing process that the curd goes through before all of the whey is extracted. About 1/2 to 1/3 of the whey is removed depending on the type of cheese. Water of good microbiological quality is added, it is constantly stirred into the curd whey mixture. The purpose of the washing process is to remove lactose and other soluble salts. The removal of lactose controls acidity in the cheese. Adding cold water to the mixture will increase the moisture in the cheese, while adding hot water will cook the curd and moisture will be removed.

The whey can be drained from the curd using many methods depending on the variety of the cheese. Placing the curd in cloth bags that hold the curd but allow the whey to flow out is a method used for cream cheese production. For Munster and Brick cheeses the soft curd is poured into hoops or forms with a small amount of whey. The curd is lightly pressed and the whey escapes though the hoops. Cheddar type cheeses go through the "cheddaring" process. The whey is drained using a sieve or drainage screen, the curd is then allowed to fuse together in the bottom of the vat. After it is fused the curd is cut into manageable sized bricks, these bricks are flipped and rotated. During this time the pH and acidity are measured. The flipping of the bricks continues until the desired pH and acidity are obtained.

Salt is added directly to the curd before hooping and pressing. This is a very important step for the flavor, texture, and storing qualities of the cheese. It helps with the removal of whey, shrinking of the curd, hardening of the curd, flavor enhancing and prevents undesirable fermentation. There is two ways that salt is added either by brining or pouring on dry salt.

The process of hooping is what determines the final shape of the cheese. The curds are placed in a hoop which can be made of plastic or metal. There are small holes in the hoop which allows the whey to flow out when pressure is applied to the top of the hoop. The amount of pressure used depends on the variety of cheese, but pressing too hard initially can lead to moisture pockets in the final product.

Differences in farmstead cheese processing

A farmstead cheese maker will be following the same general processing steps that are outlined above but there are some significant differences in their production steps. What I noticed since these artisan cheese makers typically don't have large financial resources. This could be from the fact that most artisan cheese makers are relatively new or that their farms have small net incomes. Since they have a lack of capital more steps are done more traditional and hands on compared to having a piece of machinery to perform that task for you.

At the Rinconada Sheep and Goat Dairy in Santa Margarita, CA they have found a mixture of old fashioned and modern techniques that have made them a profitable artisan cheese maker. Since sheep only lactate for 6 months of the year, they decided to make an aged cheese. This is so that they can be selling cheese year round even though their sheep only produce for

half of the year. In addition to their sheep, the Maguire's also milk a small herd of Nubian goats this milk is used a sheep goat cheese blend.

Early on the owners of Rinconada Dairy (Jim and Christine Maguire) noticed that for their cheese making business to be profitable they had to diversify and to make their operations more efficient. They started by purchasing the best breed sheep for cheese making which is the East Friesian breed. These sheep performed well but there was still room for improvement after doing research and working with a professor from UC Davis, they bred the East Friesian ewes to a Lacaune ram. The most profitable mixture of these breeds was 2/3 East Friesian and 1/3 Lacaune. Profitability was determined by production and components of the milk.

This new combination of breeds worked great and the amount of cheese produced was increased. With this increase of production comes more by products from the cheese making process. Rinconada Dairy was dumping their leftover whey and they saw this as another area to increase efficiency of their business. The whey is now fed to feeder pigs which they purchase from Cal Poly Swine Unit. At the farmers markets they now offer pork products from whey fed pigs alongside of their cheese.

Inside of their cheese making room their equipment is new but it requires more hands on labor then a large scale cheese plant. The milk is moved from the bulk tank to pasteurizer or cheese vat in old fashioned milk cans. There are no complicated milk pipe lines to deliver the milk.



Figure 5. Sheeps milk bulk tank

Once in the cheese vat the curd is cut by mixing knives. After this the curds are removed my hand and placed into the pressing hoops. The curds are hand packed into the hoops, a follower is placed on top of the hoop. On top of the follower a 5 pound weight from a home gym is placed. After trial and error the Maguire's found that this weight was the perfect size and weight to press the whey from the curd. It is also a cheap and effective way to process their cheese. The weight is left on the follower for 24 hours until the whey is removed.



Figure 6. Pressing hoops.

When the pressed blocks of cheese are removed from the hoops they are immediately placed into tubs of brine. These tubs are then placed in the aging room for 24 hours. The temperature and humidity in the aging room are controlled manually. There is an air conditioner that regulates the air temperature. To manage the humidity, water is sprayed on the floor throughout the day.



Figure 7. Aging room.

The cheeses are left alone in the aging room for 60 days at a temperature of 56 to 57 degrees with the exception of one variety. The La Panza gold variety will be brought out of the room at it will be brushed with whey. This will cause the cheese rind to turn a gold color and it will also change the pH of the cheese.

Conclusion

The total amount of cheese sales will continue to grow, more specifically in the specialty cheese area (Howland 2004). The artisan and farmstead image will continue to play a significant role in the consumers purchasing preferences, when compared to large scale commercial processing. This will continue to drive dairymen to venture into the farmstead cheese making. From my research I have found this is a difficult business to be successful in. In most cases the dairymen that attempted to start an artisan cheese business and failed, experienced similar problems. Many dairymen do not know where to start, there is a lot of planning steps before cheese production begins. The business becomes too time consuming to correctly manage along with their usual work from owning a dairy. The dairyman can't find a market to sell their cheese in and they are not able to repay the debt they acquired from buying the processing equipment. Artisan cheese making can be profitable, but it is dependent on government grants, location of the farm, diversity of the farm and the ability to find a receptive market for the cheese.

References

- Nicholson, C., M. Stephenson. 2006. Financial performance and other characteristics of on-farm dairy processing enterprises in New York, Vermont and Wisconsin. Department of Applied Economics and Management. Cornell University.
- Sakovitz-Dale, Jane. 2006. Vermont Farmstead Cheese Marketing Study.
- D'Amico, D.J., C.W. Donnelly. 2010. Microbiological quality of raw milk used for small-scale artisan cheese production in Vermont: Effect of farm characteristics and practices. J. Dairy Sci. 93:134-147.
- Conley, Sue. 2007. Business models for artisan cheesemakers. University of California Cooperative Extension.
- Colonna, A., C. Durham., L. Meunier-Goddik. 2011. Factors affecting consumers' preferences for and purchasing decisions regarding pasteurized and raw milk specialty cheeses. J. Dairy Sci. 94:5217-5226.
- Howland, Daphne. 2004. Say cheese, say flavor. Accessed Jan. 1, 2013. http://www.bluecatmedia.com/images/print/Bluecat_FlavWin04.pdf
- Beata, Kupiec., Brian Revell. 1998. Specialty and artisanal cheeses today: the product and the consumer. British Food Journal, Vol. 100 Iss: 5 pp. 236-243
- Reed, Barbara., Leslie J. Butler., Ellie Rilla. 2011. Farmstead and artisan cheeses, a guide to building a business. The Regents of the University of California.ource
- USDA. 2013. Rural Development. Accessed Jan. 17, 2013 http://www.rurdev.usda.gov/BCP_VAPG.html
- Gellynck, Xavier., Jacques Viaene. 2002. Market-orientated positioning of on-farm processed foods as a condition for successful farm diversification. J. Ag Econ Vol. 53. Pgs. 531-548.
- Dixon, Peter. n.d. The business of farmstead cheese, yogurt and bottled milk products: considerations for starting a milk processing business. [Unpublished document]
- Paxson, Heather. 2010. Locating value in artisan cheese: reverse engineering terroir for newworld landscapes. American Anthropologist. Vol. 112. Pgs. 447-457
- Roberts, Jeffrey. 2007. The Atlas of American Artisan Cheese. Chelsea-Green Publishing Company. White River Junction, VT.

- Beata Kupiec, Brian Revell. 1998. Speciality and artisanal cheeses today: the product and the consumer. British Food Journal, Vol. 100 Iss: 5 pp. 236 243
- Paxson, Heather. 2008. Post-pasteurian cultures: The microbiopolitics of raw-milk cheese in the United States.
- Reed, Barbara, Christine M. Bruhn. 2003. Sampling and farm stories prompt consumers to buy specialty cheeses. California Agriculture 57(3):76-80. DOI: 10.3733/ca.v057n03p76
- McCarthy. M., S. O'Reilly, M. Cronin. 2001. Psychological, attitudinal and behavioral characteristics of Irish specialty cheese customers. Br. Food J. 103:313-330.
- Obianuju Nsofor. ND. Federal Regulation of raw Milk Cheese. Office of Food Safety, Food and Drug Administration.
- Tong, Phillip, Nana Farkye, Rafael Jimenez. 2001. Dairy Science and Technology Basics for the Artisan/Farmstead Cheesemaker Short Course. Dairy Products Technology Center. CPSU San Luis Obispo.
- G sta Bylund. 2003. Dairy Processing Handbook. Tetra Pak Processing Systems.
- Maguire, J., and C. Maguire. 2013. Personal Interview and Tour of Facilities.