Mastitis at Lácteos del Pacífico, S.A.

On a Tuesday afternoon in August 2002, Sr. Braulio Enríquez received a call that would end the relative tranquility he thus far enjoyed with his new business. His partner (and brother-in-law), Rubén Muñoz, informed him that clients had begun to return products that morning, complaining of bad odors and leakage from sour creams and cheeses. Immediately, Braulio left his office at the Salguanica Escuela (School) de Agricultura (SEA) and went to the facilities of the company that he had founded nine months before. En route to Pegañal, a provincial capital on Salguanica's Pacific coast, Braulio worried about the future of his company and about his own reputation. He also wondered about the causes of the problem and thought about what could be done to avoid losing clients.

The Origins of the Business

Since he was very young, Braulio aspired to own his own business. Part of his entrepreneurial motivation came from his family, who had been cheese producers in the northwest corner of the country. His first attempt had consisted of raising bees. His father lent him money to buy the panels. Braulio moved on in 1980 when he had the opportunity to study at SEA, specializing in dairy production and processing. He subsequently completed graduate studies in Scotland, and returned to teach at SEA. The SEA faculty position provided him and his family with security while he sought out an opportunity to develop a business.

In 1998, Braulio seized such an opportunity with his brother-in-law, Rubén, who sold crude (nonpasteurized) milk house-to-house. That year the Salguanica congress passed a law prohibiting the sale of crude milk. This represented a real threat to Rubén's business, and he asked Braulio's help to learn the pasteurization process. Braulio knew, however, that simply pasteurizing milk and selling it was not an attractive business opportunity. He also knew that if Rubén only pasteurized milk or cheeses, he would fail to take advantage of more lucrative by-products. So Braulio proposed to Rubén that they go into business together not only to sell pasteurized milk or "queso fresco"[1], but also higher value-added products such as sour creams, ripened cheeses, and yogurt (see Appendix 1), which could be made by processing using fat skimmed from the crude milk.

Although this was an attractive partnership -- Rubén had access to customers and raw material, and faced pressure to change; and Braulio had technical knowledge and the desire to start-up his own business -- it would take two years to initiate the first tests. Towards the end of 2000 (and with the law still not yet being enforced), the future partners finally prepared samples to test the *pegeño* market (estimated population about 265,000). The samples came out well; their friends and family were impressed with the product, and the partners decided to make the investment in machinery and equipment.

In August 2001, they began construction of a 300 sq meter plant on Rubén's property behind his house in Pegañal. The new company was constituted Lácteos del Pacífico, S.A. By November they had received the basic equipment to initiate operations: a pasteurizing machine, molds, tables, cold room, and a skimming machine from France (Total cost: US $21,000).

DAIRY PRODUCTION IN SALGUANICA

The Salguanica Dairy Sector

In 2001, dairy was the third most important agricultural product of Salguanica after coffee and bananas. Salguanica has the highest per capita dairy consumption in Central America: 169 liters of milk annually. Fifteen percent of the region's spending on food went to dairy products, and per capita dairy consumption had been increasing. Local consumption (net of exports and imports) had grown an average of 4.8% annually from 1982 (Appendix 2), whereas the population grew 2% annually. Growth in internal production was even greater --Salguanica reached self-sufficiency in dairy products in 1987, and soon became an exporter. The rate of growth in production had been sustained by an internal market protected from subsidized imports (enforced through permit restrictions), development of several major processing plants by national companies and cooperatives, and, an increase in technological capabilities for smaller producers.

As of 1987, Salguanica dairy producers could be divided into three categories: (1) Three major national producers; (2) several smaller, regional mechanized producers; and (3) thousands of family producers whose (unpasteurized) production was directly consumed or traded in informal commerce. The partners intended to make Lácteos del Pacífico (LdP) the regional mechanized producers for Pegañal. Braulio thought that once the new laws were enforced, LdP could serve customers currently served by the region's unpasteurized producers.

Eighty percent of Salguanica's dairy products were sold in the country's 45,000 retail stores, the overwhelming majority of which are tiny neighborhood storefronts, often nothing more than a stall (although in the capital region, supermarkets serving the middle- and upper-class were becoming more popular). The other 20% were distributed through bakeries, restaurants, and institutions. Breakdown by product type is detailed in Appendix 3.

Dairy Production Process and Economics

Dairy production employs three sets of technologies: *técnicas lecheras* (milk or milking), *técnicas mantequeras* (churning into butter or related products), and *técnicas queseras* (conversion to cheese). LdP used suppliers for the raw milk, and focused on dairy conversion processes: técnicas mantequeras and técnicas queseras.

LdP initially employed three full-time workers. Rubén's wife (Braulio's sister) worked half-time, monitoring production and inventory levels, about which she consulted with Braulio daily.

The firm's breakeven production quantity, leaving out salaries for the partners, was 400 liters per day. Initial production settled at 500 liters daily with a goal of 1,000 liters per day for the second year. Five hundred liters per day yielded only marginal profits, and the partners did not feel secure enough to leave or even cut back on their regular jobs – Braulio continued to work full time at SEA, and Rubén continued selling raw milk door-to-door.

Margins were slim, in part, because of the production mix. Milk and queso fresco yielded low margins because of competition from both unpasteurized producers and large national companies that had great volumes of scales, and sold milk and queso fresco cheap as a way to hook-in clients.

The line of products beyond the staples of milk and queso fresco was initially limited to three types of cheeses (one semi-hard, one smooth, and one dry) and sour cream. They were planning to produce yogurt for the coming year, and intended to continue to introduce products with the greatest added value and profit potential.

Yogurt, like sour cream, was a highly profitable product. Comparatively, milk and queso fresco yielded low margins. The critical factor for these products was volume. The large national companies sold milk and queso fresco cheap as a way to hook-in clients.

Braulio observed that business profits depended on the percentage of fat contained in milk. In 2000, the year in which Braulio and Rubén conducted their initial tests, processed milk reached a fat level of 3.5%. Salguanica laws required a minimum level of 2% fat for milk and 1.5% for cheese, which would allow them to skim off substantial quantities of fat for more profitable items.

At the time, a kilogram of cheese sold for US $2.30 and a liter of sour cream sold for US $1.53. A kilogram of cheese requires approximately seven liters of milk, whereas a liter of sour cream requires only one liter, although this relation could vary depending on the existing fat level in milk. Milk as raw material accounted for most of the production costs (Appendix 5 and 6).

Management of Quality in Milk Production

In the first nine months of operation, the partners tried to get the business running on an even keel. A critical problem throughout that time had been employee supervision, due largely to the absence of the partners in the company during the day. In the first months the company suffered high employee turnover: some employees were unable to perform the tasks; others left because they didn’t like the work. The result had been a high variability in the indices of quality.

Milk is an ideal medium for microorganism development. Therefore, all handling must take place under strict hygienic conditions. Immediately after the milking, milk contains a small amount of germs. This amount increases quickly with the contact with the air, the milking utensils, or the hands of the milker. In order to avoid the deterioration of the raw material, preservation measures are necessary and products must be processed as soon as possible.

Quality controls must be applied at the beginning of the production process, especially for the raw milk, and must be implemented at the microbiological level. It is also necessary to ensure the validity of the measurements and that the correct tests are performed (Appendix 7).

The partners had planned to acquire the necessary equipment and hire a laboratory assistant to exclusively perform quality control when the production level reached a thousand liters daily. But by August 2000, they still had not done so.

SELLING DAIRY IN PEGAÑAL

The Pegañal Market

Lácteos del Pacífico clients comprised three groups:

	Pct of Sales August 2002
Pulperías -- small neighborhood stores serving most of the population	40%
Institutional clients -- schools, hospitals, asylums, the ports and the enterprise zones where large numbers of production employees worked.	50%
In-plant and Rubén's route clients	10%

Selling to Retail Clients (through Pulperías)

Lácteos del Pacífico opened for business in November, the first month of summer in Salguanica, and historically a time at which suppliers could not maintain sufficient volume to meet demand. Retail competitors, who did not produce their own product, had to import products from other regions to sell in Pegañal.

Nevertheless, they had difficulties with initial sales. Established competitors serving pulperías had important advantages, most important the fidelity of the owners whom they had long serviced. Often there were strong bonds of friendship or even family. Braulio and Rubén did not request any kind of exclusivity or special considerations in these stores, only the opportunity to have their products available there.

A second problem was that most pegeños did not see unpasteurized milk as unhealthy. Like most Latin Americans, pegeños do not trust the government, so governmental warnings and directives carry little influence. They were also accustomed to the taste, appearance and smell of the unpasteurized produce.

Finally, some customers were put off by the very idea of added processing. Most pegeños preferred simple natural products; “processing” was seen as a form of adulteration.

To counter these relationships and perceptions, LdP quickly adopted a strategy of *minimizing* differences. They used simple packaging -- a plastic bag closed with a knot, similar to how unpasteurized products were sold. They marked prices comparable to those of nonpasteurized products even though their costs were higher (the costs of pasteurization came down to a minimum of 2.5 cents per cheese kilogram). The partners trusted that at similar prices and superior quality, customers would respond positively. This confidence was based on differences beyond health considerations: the nonpasteurized cheeses had hollows, were acidic, and had a strong odor, whereas their pasteurized cheeses were without hollows, tasted better, and maintained a fresh smell and appearance.

Pasteurization costs would not allow LdP to continue to match prices over the long term. The partners expected that as consumer interest and appreciation increased (and perhaps as the new laws were enforced), they could gradually raise prices -- although they would continue to try to keep prices below those of the large national dairy firms.

It was difficult to estimate the market share and position of informal retailers, although Ruben knew one local producer as the informal leader who established prices, with other competitors following suit. Braulio and Rubén tried to avoid the pricing games of leaders and followers, and sought instead to create their own image. They sought to secure a viable niche by sacrificing clients who demanded lower prices regardless of other considerations, and focusing instead on customers who could appreciate (and pay for) their product.

Selling to Institutional Clients

Braulio estimated that 80% of the distribution costs were to service the pulperías, which represented only 40% of the sales, and wanted to focus on larger clients. But with Institutional clients, Lácteos del Pacífico had the opposite problem. Institutional buyers wanted guarantees of health and legality. Both of these could be demonstrated by obtaining compliance certificates from the Ministry of Health and the Ministry of Commerce. The problem is that these certificates took 14 months or more to obtain, and that, in truth, LdP was not in compliance. Certification from the Ministry of Commerce required that no children or undocumented workers were employed. In fact, their only reliable worker was from another country, and not properly documented. For the more important certificate from the Ministry of Health, requirements included special water filters, which were costly, and which Braulio felt were not necessary.

Braulio was able to, for the time being, avoid these compliance issues by applying for the certification and obtaining temporary permits, which the ministries provided pending the on-site inspection. (These inspections were presently backed up 12-18 months.) Given that his competitors had no certification at all, these temporary permits appeased institutional clients (for the time being), and served to differentiate LdP products from those sold by unlicensed retailers. LdP labeled their products “Pasteurized” conspicuously using labels provided by the pasteurizing equipment manufacturer to reinforce the hygienic advantage of their product.

Performance

By August 2002, the business was succeeding. The company was profitably producing 1,200 liters daily (Appendix 4).

Quality was good. Common market practice was to extend eight days credit and to accept returns of unsold products. Between November 2001 and July 2002, returns averaged only three percent.

A commissioned salesman had responsibility for sales and distribution to the pulperías except for the clients along Rubén's routes, to whom Rubén directly sold and distributed products. Initially, products were distributed once a week (on Thursday). As sales grew, distribution routes were also run on Mondays and then Tuesdays also.

All this was achieved without any substantial marketing costs. LdP did not publicize its products and the only marketing efforts were occasional attempts by Ruben or the salesman to interest a new store or institution. Yogurt was to be their first product supported by a publicity campaign.

THE SUPPLIERS

Lácteos del Pacífico had to compete not only with smaller non- pasteurized producers, but also with Salguanica's three giant dairy companies. Their advantage over these national companies was local production, which allowed them to be the cost leaders of pasteurized products for the region.

The company obtained milk from thirty-eight suppliers. This way, they could avoid dependency on a few suppliers and could keep costs of raw materials at a stable level. On average, suppliers obtained about 5.5 daily liters of milk per cow. Smaller farms delivered about 30 liters daily; larger farms brought in about 170 liters.

Regional demand of milk was fairly constant throughout the year, but supply was seasonal. To guarantee adequate year-round supplies, the partners cultivated two groups of suppliers: The "bajura" near the coast, and the "altura" in the mountains. Bajura production goes down in the brutal heat and humidity of the coastal summer; but altura production goes *up* in the temperate mountain summer. By using both types of producers, LdP could maintain level production.

Rubén knew bajura producers from his raw milk business, but to purchase from altura suppliers meant competing with the national companies. It turned out that altura suppliers were very happy to deal with LdP; the national companies imposed what many felt were excessive demands -- applying a cooling process that lasted between two to three days and subsequent delivery of produce to their processing facilities. In contrast, LdP did not require the cooling and arranged to pick up the milk themselves.

Braulio had other “process management” ideas as well: One was to provide equipment, materials and training so that the suppliers themselves could analyze the raw milk for microbiological contents. This could both ensure that the milk arrived in good condition and would thereby avoid returns and unnecessary processing costs. He also planned to advise suppliers on how to improve their yields through better grasses and food supplements. Braulio was especially interested in increasing the fat levels and proteins which would allow him to produce higher margin products. As of August 2002, however, neither of these plans had yet been implemented for lack of time and resources.

THE CRISIS OF AUGUST 2002

When Braulio received his partner’s call, he left immediately for Pegañal. Upon arrival, he went to speak to the salesman who had learned of the problem on this distribution route that morning. He clarified that the problems were with mostly with the sour cream, but also one type of cheese. No problems with other products were reported, but he also pointed out that he only spoke to a few customers from Monday’s route. With this information, Braulio began to analyze the microbiological content of the raw material. He soon realized that the crude milk from one supplier was infected with mastitis, an infection in the udder of the cow, which can produce pus, resulting in large quantities of bacteria and leukocytes in the milk.[2]

Rubén was optimistic that they were able to reclaim most of the products without customers even realizing there was a problem, but Braulio feared that the damage to his new business was extreme. The salesman felt that the most serious matter was that concern was LdP’s image and reputation. He explained the bitterness of store owners whose own customers had purchased and opened the products; they were concerned that *their own* reputations were tarnished.

By now it was 10 pm. The two partners and the salesman made plans to try to minimize the damage, by gathering all the possibly damaged lots that were outstanding. Each of the three would go to different stores and institutions as early as possible the following morning, to gather any potentially damaged products on the shelves.

Meanwhile, Braulio wasn't at all certain how to salvage the reputation of the company and was concerned about the consequences that this could have for his own reputation. Although he was emotionally very disturbed, Braulio tried to think coolly about how he could have avoided this situation and what they could say now to their clients. He also began to wonder what would happen if some of the consumers became ill.

APPENDICES

Source for all data: Escuela Nacional Superior de Agrónomos, Montpellier, France

Appendix 1. Profit Margins in the Salguanica Dairy Industry (1998)

Product	Profit Margin
Pasteurized Milk	2%
Fresh Cheese	8%
Powdered Milk	12%
Ice cream cartons (½ gallon)	15%
Sour cream	25%
Ice cream pops (paletas)	30%
Ripened Cheese	42%
Butter (62.5 grs)	42%
Yogurt (22 grs)	48%

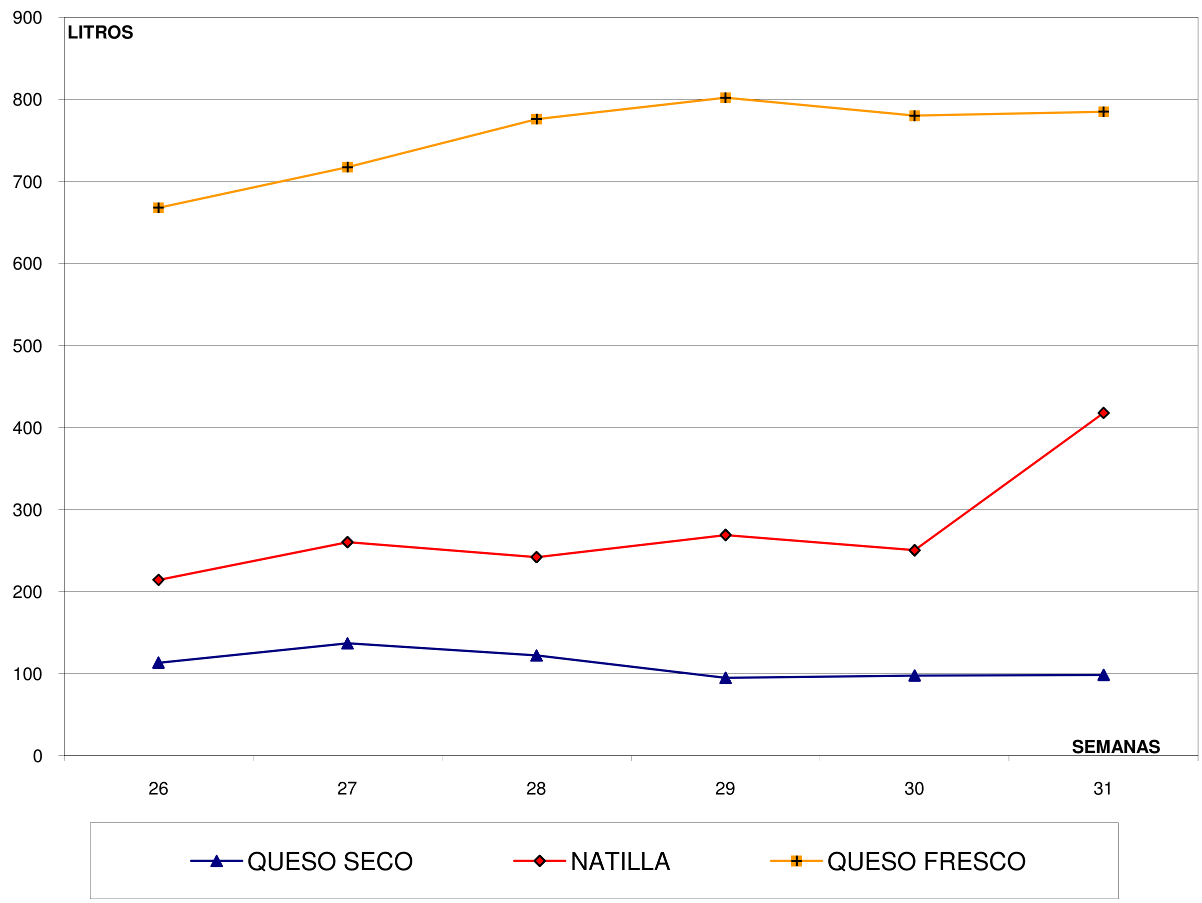
Appendix 2. Salguanica Dairy Per-Capita Consumption 1997-2001

Year	Annual Production Millions of liters	Population Millions	Consumption per capita
1997	1,237	8.2	151.66
1998	1,296	8.3	155.82
1999	1,358	8.5	160.10
2000	1,424	8.7	164.50
2001	1,492	8.8	169.01

Appendix 3. Breakdown by Product Type in the Salguanica Dairy Industry

Product	% of Sales
Milk	41.4%
Powder Milk	9.3%
Yogurt	6.0%
Cheeses	19.0%
Ice cream	16.2%
Sour cream	4.0%
Butter & Lactose	4.1%

Appendix 4. Weekly production in Liters from Weeks 26 - 31 (2002)



Appendix 5. Variable Costs

	Percentage
Raw Materials (Leche)	75 - 78 %
Distribution	7 - 8 %
Gas, labor, etc.	14 - 18 %

Appendix 6. Cost Breakdown by Product Type in the Salguanica Dairy Industry

	Pasteurized Milk	Fresh Cheese	Yogurt	Sour cream	Butter
Labor	2%	5%	4%	3%	2%
Raw Materials	54%	56%	53%	42%	55%
Packaging	13%	3%	26%	21%	3%
Material spare parts, amortization of machines and energy	6%	11%	6%	9%	6%
Administrative Costs	6%	7%	2%	4%	6%
Distribution and promotion	12%	12%	7%	16%	22%
Financing costs	7%	6%	2%	5%	6%

Appendix 7. Tests to Ensure Product Quality[3]

Milk is submitted to several tests to determine if it is suitable for processing. These tests include the following:

- Determination of the density: to see if milk is pure)
- Point of freezing: indicates possible adulterations)
- Determination of the acidity: Milk with a greater acidity of 0,18% is rejected
- Precipitation with alcohol. mix equal amounts of milk and alcohol 68%. if coagulation takes place, the acidity is too elevated
- Boiling. If milk coagulates during boiling, it cannot be pasteurized
- Reaction with methylene blue. evaluates the degree of contamination with microorganisms.
- Sedimentation. Filtering milk through a special cotton indicates impurity contents
- Antibiotic presence
- Germ content. High germ content indicates the presence of mastitis in the producing cows.

Appendix 8. Health Significance of Mastitis

The effect of ingesting contaminated dairy products include nausea, vomiting for up to 24 hours diarrhea, loss of appetite, severe abdominal cramps, abdominal distention, and mild fever. Although these effects are unpleasant, they are normally temporary and pass within 24 hours.

In rare cases, however, contaminated dairy products could cause long-term damage or even death to infants, the elderly, children of lactating women, pregnant women and their unborn fetuses. In pregnant women, one potential consequence, Group B Streptococcal Infections, can potentially cause bladder infections, womb infections (amnionitis, endometritis), and even death of the fetus.

NOTE ON RESEARCH METHODS

All names and places in this case have been disguised. Everything else is accurate to the best of my knowledge and abilities. Data for this case was collected through several interviews with Braulio and his wife and sister, visits to the Salguanica School of Agriculture and the Lácteos del Pacífico facility in Pedregal, as well as one supplier and one other Dairy producer in the region. All discussions and interviews were conducted in Spanish, and the primary interview was taped.

ENDNOTES

[1] *Queso fresco* is fresh, unripened cheese, sometimes called "country cheese." Similar to cottage cheese or Ricotta, it does not undergo a maturing process. It is mild, usually unsalted, without much flavor, and is a traditional staple of the Pegeño diet.

[2] The pasteurization process annihilates more of 90% of the bacteria; normal crude milk has between 100,000 - 150,000 bacteria per milliliter. Milk contaminated with mastitis contains 1-1.2million bacteria per milliliter.

[3] Source: "Elaboración de Productos Lácteos: Manual para educación agropecuaria bajo la supervisión de la FAO."