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The Experience of the TIVISKI Dairy in Mauritania: Food Security First, Food Safety Second

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Abstract

For a dairy industry in developing country such as Mauritania, the question of food safety is posed in a context radically different from that of Europe at every level: raw material production, human resources and accessible technology, regulatory environment, market characteristics. This article describes the steps that the dairy TIVISKI (formerly "Laitière de Mauritanie") has taken to develop an industrial dairy for dromedary and cow's milk over the past decade, and ways a "made-to-measure" quality policy has been developed. The conclusion raises questions concerning the appropriate role for regulators of food safety in a very poor country: should health education to stimulate consumer awareness and demand for safety take precedence over (largely ineffective) attempts to control food suppliers? Should standards be adapted to local conditions, making it more feasible for regulators to actually do their job? Are double-standards the answer to enable some producers to export to Europe?

Introduction

From an industrialist's point of view, the concept of "food safety" gives rise to several types of questions. What type of environment do our products fall into? What is the inherent safety offered by our products? What standards are applicable and applied, i.e., what is the government's stance? What is the consumer's perception of safety?

The Environment of Our Products

For a dairy industry in a developing country such as Mauritania, the question of food safety is posed in a context radically different from that of Europe at every level: raw material production, human resources and accessible technology, regulatory environment, market characteristics.

The Raw Material

The main characteristic of the TIVISKI dairy is that all the raw material – whether it be dromedary's milk, cow's milk or goat's milk – is bought from semi-nomadic independent farmers. In a Sahelian, semi-desert country such as Mauritania, livestock is managed in a semi-extensive system. The 800 suppliers of the dairy do not possess even one meter of

fencing; they move around according to the seasons and grazing land available, and do their milking by hand. Water is scarce and often contaminated. After milking, the milk is transported considerable distances without refrigeration (up to 90 km on dirt roads) before arriving at a collection center where it is taken in and refrigerated. Each supplier sends his milk in his own container, as group purchasing has proved impossible.

Human Resources

Between milking and processing, milk passes from the hands of the farmers (who have no notion of hygiene) to the transporters, and finally to the factory staff. The factory workers are employed without preliminaries, and most have a very low education level. It is not easy to find dairy technologists as the country has no industrial tradition, and the dairy industry is particularly recent. Furthermore, the prospect of working in the collection centers, located in the river valley, is made unwelcoming by the mosquitoes, malaria, heat and environment.

The Regulatory Environment

The regulatory environment in Mauritania is characterized by the absence of standards and regulations, apart from vague references to international standards, as well as by the weakness of monitoring systems for food hygiene and quality.

The Market

The vast majority of consumers fit the following profile: limited purchasing power, poor level of hygiene, complete lack of scientific knowledge, extremely hardy immune system.

The Inherent Safety of Our Products

The quality provided to the consumer by the products put on the market is the only aspect of safety that we control. For us, safety is the most basic, elementary level of quality. First of all, the products must present no risk to the consumer. Next, this base is built on by adding aspects such as the absence of additives, flavor, appearance, packaging, etc.

In the context described above, how can we make products that offer all the guarantees of safety?

The Raw Material

Fortunately, the handicap represented by the difficulties of milk collection is compensated for by the fact that the milk of local species (zebu cows and dromedaries) demonstrates superior resistance to bacterial action than that of livestock in temperate regions. The intensity of the sun and the dry air are also of help. This type of observation, scientific in principle, can be very useful when a food industry is being set up.

Given the number of containers that arrive (approximately 800 in the morning and the same quantity in the evening, spread over three collection centers), the time required to measure acidity and the difficulty of procuring reagents, the milk is simply tasted upon arrival to check its acidity level and verify that it is not mixed with water. The staff is trained to detect small differences in these two parameters. When in doubt, they may use the acidimeter or densimeter, or consult the manager. The rejection of milk in doubtful cases is of no great

consequence as the quantities are small. Milk is systematically rejected when it seems too impure or has a strange flavor. The transport containers are cleaned and disinfected by the dairy staff, and hygiene guidelines are given to the suppliers.

The refrigeration of milk in collection centers used to be done in cooling tanks, but the addition of more expensive flash cooling systems has considerably improved the quality of the milk.

Microbiological Contaminants

It should be clearly stated that despite the difficulties of milk collection, the raw material is of very acceptable bacteriologic quality. Tests show that the microbial reductase of the milk of individual suppliers is active for between two and five hours, while for bulk milk in the cool season, it is active for approximately four hours for cow's milk and five for the consistently more resistant dromedary's milk.

Veterinary Medication Residues

As far as medication residues are concerned, the farmers can be divided into two categories. On one hand, the majority of suppliers are small-scale owners with very modest incomes. They live in healthy areas, and are thus not inclined to spend money to treat their livestock. This is amplified by the fact that the government has provided them with free veterinary care in the past. On the other hand, a number of breeders medicate their livestock themselves with more or less good judgment, whence the risk of residues in the milk. The most common medications, aside from vaccinations and vitamins, are antibiotics and antiparasitics.

The dairy has always considered that the risk of residues in bulk milk is tempered by the prevalence of non-medicated milk. All suppliers are asked and reminded to respect the waiting periods, but the company does not have the means to monitor 800 breeders, nor to test for residues in all the milk.

It is reassuring to note that a series of Delvotest analyses performed over a four-month period in 1999 yielded negative results, a sign that the farmers are either respecting the required timeframe, or that their use of antibiotics is very limited.

Nevertheless, dairy farming is such a recent activity that it is difficult to impose many constraints on farmers for fear of discouraging them. Food security must be achieved before food safety can be dealt with.

Human Resources and Technology

Upon arrival at the collection center, the milk enters an industrial system: cooling, refrigerated storage and isothermal transportation in stainless steel equipment, pasteurization and packaging in a modern factory.

The factory is managed with almost exaggerated strictness to compensate for the unfavorable aspects of the physical and human environments. Special uniforms made for the staff are machine-washed daily, turbans are mandatory for lack of masks and caps, and the hygiene regulations are very strict. The cleaning of the equipment and premises is also extreme. Pasteurization is carried out at temperatures of 80 to 82°C in order to obtain satisfactory results. This protocol, set up experimentally and approved by the Center for International Cooperation in Agricultural Research for Development (CIRAD) for dromedary's milk, is applied to all pasteurized milks.

Rigorous selection and draconian training programs are used in order to train fairly competent staff. From time to time, the process must be undertaken again from scratch in

the collection centers with new recruits following various types of incidents, mainly provoked by certain farmers who are particularly fierce about defending their interests.

After processing, the daily analyses of the self-monitoring laboratory show that the finished products (including fermented products such as fermented milks, yogurts and fresh cheeses) almost systematically have zero coliform bacteria, and invariably zero E.Coli. The consensus is that their taste and appearance is extremely good.

It should be noted that at the beginning, as well as the disadvantage of having limited resources for starting up the company, we had the advantage of not being dairy technology specialists, and thus not having very academic ideas on the way in which a dairy industry should be run. We had to make do with what we had. A few simple notions, a great deal of pragmatism, the help of the Nouakchott Centre National d'Elevage et de Recherches Vétérinaires and advice gleaned from CIRAD have enabled us to find a way that quite naturally leads towards a fairly advanced, yet made-to-measure quality policy.

The Question of Standards

The effect of nonexistent regulatory constraints is two-fold. On one hand, this lack indisputably facilitates the setting up of an industry, as the trial and error and inevitable difficulties of the beginnings are not sanctioned by a monitoring body. The other side of the question is that there is no incentive to do the right thing. No difference is made between an industry that takes all possible measures to comply with the generally agreed upon quality criteria, and one that cuts costs in this area.

The Market and the Consumers

The consumer, newly arrived in the city, and reliant upon a strong pastoral tradition, firmly believes that raw milk is better, stating that "raw milk is natural, it's more better". He is totally unaware of the danger of contamination (tuberculosis, etc.) that raw milk presents. He does not get ill if he drinks raw milk sold in a plastic bag taken from a dubious bucket, and only a goat with a severe case of mastitic staphylococcus can kill a family. This is another advantage for nascent industries, or rather, a stroke of luck for the consumers, for the latter are very unlikely to fall ill as a result of the blunders of the former.

Furthermore, competition with European milk, wreathed in prestige but often ridiculously priced, and with the various powder-based artisanal milks, require that prices be kept low, which does not encourage the application of strict quality standards with the costs that they entail.

Dairy products of excellent quality can be found at retail stores in competition with other products of variable quality, without any standards, monitoring or official information to guide the consumers in their choice. Their only criteria are taste and price, and often their prejudices will favor imported products or those produced by their own tribe. These conditions require a solid code of ethics to ensure quality.

Repercussions of European Regulations on TIVISKI

One might believe that all is well in the best in the best of far-wests. However, even from far away, European regulations have an impact on dairy activity in countries like Mauritania. We will cite two concrete examples.

Dromedary's Cheese

To resolve a chronic seasonal over-production problem, TIVISKI (formerly the "Laitière de Mauritanie") produced the first cheese in the world made from dromedary's milk. It is interesting and its quality is high, but Mauritanians do not eat it because they do not like cheese. For legal reasons, the European market does not accept it (essentially because dromedary's milk is not provided for in the legislation, and because Mauritania is not on the list of authorized countries), and it is extremely difficult for a small enterprise in a developing country to soften the legislation of Brussels. Here again, the government of a developing country has more pressing issues to deal with than battling with the European Union for such a small economic stake.

lvomec

In November 2000, a scare ran through the population following a rumor and newspaper articles alleging that nationally-produced milk was fatal (causing kidney failure, liver failure, and even hepatitis B) due to Ivomec irresponsibly administered by farmers who did not respect the waiting period. There was a dramatic decrease in the sale of national products, while the sale of products imported from Europe increased considerably. Apart from the malicious nature of the rumor, it was the waiting period imposed by European regulations that gave the thesis its credibility, while it seemed impossible to attribute any harmfulness to the possible residues of Ivomec in local milk.

Some Thoughts and Questions by Way of Conclusion

At the present time, given how recent the activity is (12 years ago, in 1988, fresh milk was not available on the Mauritanian market), the enormous difficulties that must be overcome in order to build a modern industry, the archaic environment as concerns hygiene, the prejudices (against the sale of milk) that had to be fought against, we believe that it is necessary to distinguish between what can be controlled and what must be accepted and compensated for. Thus, for example, the higher pasteurization temperature balances out the contamination caused by collection.

There is no doubt that a great deal must be done in order to improve the sanitary situation and safety of food in the least developed countries, but the problems with which we are confronted were resolved in Europe at least a century ago. The ideal scenario would be for the authorities to develop health education throughout the population in order to create a consumer demand for quality.

In these conditions, should domestic policies adhere to the indisputably excellent Western standards, or should standards be adapted to local conditions, at the risk of having "second-rate" standards?

Should the industries alone be made to respect standards while the rest of the country continues to be unaware of them?

Back to Menu

Is it preferable to have the "very latest" food safety standards that no one respects, or more modest standards for the effective application of which the government can budget?

What should be done when producers wish to export milk to Europe: are double standards the answer?

What should be done when no local standards exist?

Are all Western standards necessary? Where does the real concern for the consumer health end and the obsession with zero risk, or even plain protectionism, begin?