Investment challenges in milk sector (Case of a dairy factory in southwest of Algeria): Development prospects.

Elhassan Benyagoub*

Faculty of Life and Natural Sciences,
Department of Biology, Mohammed TAHRI University of Bechar, (08000), Bechar-Algeria.
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ABSTRACT
In this work, we are interested in studying the investment challenges of packaged reconstituted milk production in Southwest of Algeria. To reach this objective, we have calculated the cost price of two products (pasteurized milk and fermented milk) which present the main production line of the dairy factory of Bechar, to assess the profitability of the company. The cost price of milk was calculated from the general balance that shows all the movements of the accounts which we have established the table of counting results ‘TCR’ corresponding to the different charges directly related to the milk manufacturing. The analysis of spending data showed that for this factory, the cost price of one liter of pasteurized milk was estimated at 27.06 DZD/L compared to fixed selling price at the dairy factory level (23.20 DZD/L), which reveals a deficit of -3.86 DZD/L (-16.63%), while produced fermented milk showed a profit of +14.65 DZD/L representing a margin of distribution equivalent to (+60.16%) of the cost price that was estimated at 24.35 DZD/L. This study provides a platform which can be used, not only, to define the ability of dairy factory to overcome competitive market challenges, but also the pre-requisite programs (PRP) installation challenges required to implement a quality system promoting the quality of milk and dairy products.

Key words: Bechar (Algeria), Cost price, Dairy factory, Milk sector, PRP, Quality system, Regulatory texts, Value added product.

INTRODUCTION
Milk and dairy products occupy a prominent place in the food supply of Algerians, whose needs in milk and dairy products are considerable, with an average consumption of 140 liters of milk per inhabitant/year 2017 (Benyagoub et al. 2018). However, Algeria is considered as the largest consumer of milk in the Maghreb. Despite the evolution of production, Algeria remains dependent on the world market for its supply of powdered milk for consumption and processing (Ghaoues, 2011).

Various factors explain this situation of deficit, among others: the feeding and the mode of driving of the dairy herds. Moreover, failures at the level of the chain links determine the sanitary quality of the finished product. According to (Cerf, 2002), 5 to 7% of epidemic infectious diseases transmitted by food are caused by milk and dairy products. If we apply this percentage to the number of annual deaths attributed to all infectious diseases transmitted by food, less than 10 deaths would be related to the consumption of milk or dairy products. Over the last ten years, several international institutions ‘Codex Alimentarius, WHO and FAO’ have established many regulations to help industrialists to establish a quality management methodology and food security (Benyagoub and Ayat, 2014).

Thus, the objective of the present work is the investment challenges in the dairy sector between, the strong national demand, the local productive potential and the fluctuation of the world prices of the raw material on the one hand, and satisfaction with regulatory requirements for hygiene on the other hand.

ALGERIAN HYGIENE REQUIREMENTS IN AGRIFOOD INDUSTRY
In recent years the agri-food sector has made great strides, but this boom has been accompanied by threats and diseases (food poisoning), which are termed “food-borne diseases” caused by dangerous microorganisms, physical or chemicals toxic, affecting most cases and indirectly consumers.

To this end, the establishment of a Health Control Plan (HCP) based on good hygiene and manufacturing practices (GHP/GMP) and the HACCP method as a quality system, is a regulatory obligation for agribusiness industries. Algeria, like all other countries, is obliged to ensure the upgrading of its industrial structure agribusiness.

However, maintaining a good level of basic hygiene in the agribusiness industries reduces the risk of contamination. In practice, this basic hygiene is established by the implement of what could be called various prerequisite
programs: the cleaning and disinfecting program, the pest control program, the staff training program ...etc where the term “pre-requisites” indicates that the proper implementation of these programs is not only essential but also prior to any other aspect of food quality and safety management.

The analysis of the aspect and the elaborated legal level by the Algerian legislator made it possible to organize, in chronological order, the principal incentives to the respect of the hygiene of the food recommended to agribusiness professionals. These main regulations are given as follows:

1. Official Journal of the Algerian Republic OJAR n. 009 (1991), Executive Decree n. 91-53 of 23 February 1991 on hygiene conditions in the process of the release of foodstuffs (OJAR n.009, 1991);
2. Official Journal of the Algerian Republic OJAR n. 87 (1999), Interministerial Order of 21 November 1999 on temperatures and processes for preservation by refrigeration, freezing of foodstuffs (Ministry of trade, 1999);
3. Official Journal of the Algerian Republic OJAR n. 15 (2009), Law n. 09-03 of 25 February 2009 on consumer protection and the prevention from fraud (Ministry of Trade, 2009);
4. Official Journal of the Algerian Republic OJAR n. 17 (2010), Executive decree n. 10-90 of 10 March 2010 supplementing executive decree n. 04-82 of 18 March 2004 laying down the conditions and procedures for the health approval of establishments whose activity is related to animals and animal products and their transport (Ministry of Trade, 2010) Supplementing Decree 2004-82 and making HACCP mandatory;
5. Official Journal of the Algerian Republic OJAR n. 69 (2016), Executive decree n. 16-299 of 23 November 2016 laying down the conditions and procedures for the use of articles and materials intended to come into contact with foodstuffs and cleaning products of these materials (Ministry of Trade, 2016 a);
6. Official Journal of the Algerian Republic OJAR n. 24 (2017), Executive decree n. 17-140 of 11 April 2017 laying down the conditions of hygiene and sanitation during the process of human consumption of foodstuffs (Ministry of Trade, 2017);
7. Draft article proposed by the President of the Algerian Association for the Protection and Orientation of the Consumer and its Environment (APOCE) Dr. Mustapha ZEBDI where he estimated the role of consumer protection associations as a complementary tool to the Administration in front of the members of Economic Affairs, Development, Industry, Trade and Planning Committee of the National People’s Congress (NPC) as part of the review of Law 09 -03 of February 25th, 2009.

The association has formulated ten practical proposals to the law on consumer protection with a view to boosting and expanding the areas of intervention for consumer protection associations (APS, 2018).

MATERIALS AND METHODS

The present study aims to assess the profitability of a small dairy factory in Bechar (Algeria) in terms of profit or loss in relation to its main manufacturing activity of bagged reconstituted milk and fermented milk by calculating their cost price from the expenses given by the general balance.

Presentation of the dairy factory: The dairy factory is located in Bechar city (Algeria), a private investment inaugurated in November 2016, in which the inter-professional national office for milk and dairy products ‘INOM’ devotes a quantity of 60 tonnes of milk powder per month, with two production lines, a daily production of 15 500 liters of partially skimmed pasteurized milk, which can reach up to 40 000 L/day as the maximum capacity, and 5000 L/week of fermented milk, depending on local market demand and the availability of the raw material.

This industry includes an administrative block, a manufacturing workshop with two cold rooms and a steam room, three basins for liquid discharges collection issued from industry. The commissioning of the dairy complex initially generated 31 direct jobs and as many other indirect jobs in the form of contracts.

Cost price of manufactured products: The industry being studied is a small dairy in Southwest of Algeria whose total annual production of the year 2017 for bagged pasteurized milk was 4 822 081 L/year, and was 20 859 L/year for fermented milk. An amount less than what was expected by the industrialist because of the supply disruption in raw material.

We analyzed the industry spending over the general balance which presents all the movements of accounts, namely; the stock account, product account, account of purchases, supplier account (stock and service), customer account and charge account, which we have extracted the table of counting results ‘TCR’.

The TCR of 2017 has made it possible to calculate the cost price of one liter of pasteurized milk and fermented milk in relation to the total quantity produced, to the variation of stockpiles, to sales and related products, and therefore to assess the profitability of the company in terms of beneficiary or deficit.

Knowing that the cost price is composed of several categories of direct or indirect expenditure, which is
The cost price calculated for one liter of pasteurized milk is lower than the factory-selling price (27.06 DZD/L against 23.20 DZD/L), a loss equivalent to -16.63%. This result corroborates the estimation of the profitability of two other dairy industries located in Adrar and Bechar (Southwest of Algeria) whose calculated loss was in the range of -13.64% and -81.55% respectively for the BPM (bagged pasteurized milk) (Benyagoub et al. 2018; Benyagoub, 2018).

It should be noted that this product is subsidized by the state where the INOM distributes imported raw material at a fixed and subsidized price (159 DZD/Kg), a price that remains independent of fluctuations in world prices.

State-targeted subsidies were not included in production unit cost calculations, but production costs were compared with sales revenue and subsidies per unit of product sold (Rebane et al. 2016).

In addition, the dairy industries are obliged to respect the fixed selling price at the dairy factory level (23.20 DZD/L) (Ministry of Trade, 2016 b). Moreover, the selling price made the product retailer set at 24.10 DZD/L with a wholesale distribution margin set at 0.90 DZD/L for the subsidiary and the retailer; so that the selling price of BPM to be fixed according to the same regulation at 25 DZD/L for the consumer. However, the fermented milk and its raw material that are not subsidized by the State (the taxes have increased by two percent from 17 to 19 % pursuant to the provisions of articles 26 and 27 of the Finance law for 2017 having amended articles 21 and 23 respectively of the turnover tax code (CTCA) (Ministry of Finance, 2017) whose company has the right to base the selling price according to the market to have the expected distribution margin where their calculated cost was 24.35 DZD/L, while the quay selling price was 46.41 DZD/L.

This shows that the dairy has a profit of +14.65 DZD per liter, with a distribution margin of + 60.16% against a profit of +37.56% and +30.43% for the same product manufactured by two others dairy industries in Adrar and Bechar (Algeria) respectively (Benyagoub et al. 2018, Benyagoub, 2018). However, the profit generated is not included the VAT.

According to the obtained results, it appears that the dairy industries in Algeria, and elsewhere which are based mainly on milk powder as raw material for the manufacturing of reconstituted milk at a fixed price subsidized in a dairy policy of social character privileged by the state, can have significant profit margins generated primarily by dairy products that can be sold at a free price. However, the findings of cost calculation could help producers and policy makers in Algeria to make better decisions in future investment, develops strategies of the competitiveness in the field of dairy sector.
It should be noted that 117 dairy units in Algeria use powdered milk for the production of bagged pasteurized milk at a regulated price, and that 139 dairy units use raw cow’s milk (bovine) as raw material for the production of raw pasteurized milk and dairy products (cheese and yogurt) with a cattle population estimated at more than 1 million head including 300,000 dairy cows reserved solely for the production of raw milk (ITELV, 2012), in a situation where Algeria still has a very significant camel breeding potential with a population of 354,465 heads confined to three main breeding areas (East, Southwest and South) and distributed through 17 wilayas, which a rate of 83% are confined to eight (8) Saharan wilayas: Ouargla, Ghargaia, El-Oued, Tamanrasset, Illizi, Adrar, Tindouf and Bechar (Senoussi et al. 2017).

This has led professionals to really think about the valorization and exploitation of raw camel milk, well known for its exceptional nutritional quality, as a raw material for pasteurized or sterilized raw milk manufacturing or for its transformation into dairy products.

But above all, a study of the market and its investment cost must be done first, knowing that 1.5 liter of raw camel milk is expensive, between 200 and 300 DZD/L, five to eight times the selling price of one liter of bagged pasteurized milk (subsidized by the state), where does the necessity come from that the state invest in information on the improved breed of the animals through 17 wilayas, which a rate of 83% are confined to eight
(8) Saharan wilayas: Ouargla, Ghargaia, El-Oued, Tamanrasset, Illizi, Adrar, Tindouf and Bechar (Senoussi et al. 2017).

Given the role that can be played in food security, the Algerian government should reconsider again the camel milk and continue to aim for sustained growth.

In order to increase the amount of produced camel milk compared to what we have as a potential, the breeding of more productive camel species will be necessary. Even if it’s not the same studied animal breed, we can cite the study conducted by Suresh et al. (2009) on the production of milk by rearing buffaloes that was more profitable than that of cows. A difference rate of 21.35 and 45.70% was revealed as gross income and net income respectively for buffalo per year, significantly higher compared to cow per year, with benefit-cost ratio difference of 5.83%. The study pointed out the importance of the improved breed of the animals and the role of feeding that could be useful for increasing opportunities (more milk production, reduce production cost, increase income and employment) and promote the rural economy.

**CONCLUSION AND RECOMMENDATIONS**

Algerian dairy policy has helped to meet the needs of the national market in that packaged milk subsidized by the state to be accessible and addressed only to Algerian families and not to industrial or commercial activities other than dairies, represents an objective through the intervention of the state at various stages from the farmer to the consumer, through the processor. The latter as a key economic player, seeks more profit margins in the obligation to meet the requirements related to the hygienic quality of milk and to even integrate into a system of quality assurance while respecting the conditions of GHP/GMP still called prerequisite program.

These programs represent additional costs that require investment, and moreover, the low profit margin or even the deficit revealed for reconstituted pasteurized milk circuit limits this type of investment except that in the case where the manufacturer is oriented towards free-priced dairy products with a reduction of certain load categories to improve the cost of the company and other loads recommended through the work of Santos et al. (2018) by studying cleaner production techniques in a dairy industry (Southern Bahia-Brazil) based on four axes: Environment and workplace safety; water resource; energy resource; effluents, emissions and wastes, which possible measures to be applied are as follows:

- Receiving control of raw materials and auxiliary products;
- Reduction in loss of milk;
- Use of continuous system for milk pasteurization;
- Preventive maintenance to avoid shutdown costs, production and quality losses;
- Recovery of cleaning products (CIP);
- Adopt best practices for reducing water consumption;
- Adopt best practices for reducing energy consumption;
- Adopt best practices for waste management;
- Adopt best practices for sales and distribution;
- Create sales outlets;
- Control the company expenses by establishing an analytical accounting system; and
- Training and qualification especially of production staff in good hygiene and manufacturing practices; thus, may even create a new production line for pasteurized or sterilized camel milk which characterizes a potential of the southern region of Algeria.

These recommendations could help to minimize their losses and further promote economic gains.

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