

INVESTMENT CHALLENGES IN MILK SECTOR (CASE OF A DAIRY FACTORY IN SOUTHWESTERN ALGERIA): DEVELOPMENT PROSPECTS

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Abstract: In this work, we are interested in studying the investment challenges of packaged reconstituted milk in Southwestern Algeria with respect to the high demand for this strategic consumer product. To reach this objective, we have calculated the cost price of two products (partially reconstituted milk and fermented milk) which present the main production line of the dairy factory of Bechar (Algeria) to assess the profitability of the company in terms of benefit or deficit. The cost price of milk is calculated from the general balance and 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 given by the TCR showed that for this factory, the cost price of one liter of pasteurized milk is estimated at 27.06 DZD/L compared a quay-factory fixed selling price at 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. 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. 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 installation challenges required to implement a quality system promoting the quality of milk and dairy products.

Key words: Milk sector, cost price, dairy, quality, regulatory texts, Bechar (Algeria),

DÉFIS DE L'INVESTISSEMENT DANS LE SECTEUR DU LAIT (CAS D'UNE LAITERIE DANS LE SUD-OUEST DE L'ALGÉRIE): PERSPECTIVES DE DÉVELOPPEMENT

Résumé : Dans ce travail, nous sommes intéressés à étudier les défis d'investissement du lait reconstitué en vrac dans le sud-ouest de l'Algérie face à la forte demande pour ce produit de consommation stratégique. Pour atteindre cet objectif, nous avons calculé le prix de revient de deux produits (lait partiellement reconstitué et lait fermenté) présentant la principale ligne de production de l'usine laitière de Béchar (Algérie) afin d'évaluer la rentabilité de l'entreprise en termes d'avantages ou de déficits. Le prix de revient du lait est calculé à partir du bilan général et montre l'ensemble des mouvements des comptes sur lesquels nous avons établi le tableau des résultats de comptage 'TCR' correspondant aux différentes charges directement liées à la fabrication du lait. L'analyse des données relatives aux dépenses fournie par le TCR a montré que, pour cette usine, le prix de revient d'un litre de lait pasteurisé est estimé à 27,06 DZD / L par rapport à un prix de vente fixé à l'usine de quais à 23,20 DZD / L, ce qui révèle un déficit de -3,86 DZD / L (-16,63%), alors que le lait fermenté enregistrait un bénéfice de + 14,65 DZD / L représentant une marge de distribution équivalente à (+ 60,16%) du prix de revient estimé à 24,35 DZD / L. D'après les résultats obtenus, il semblerait que les industries laitières en Algérie et ailleurs, reposent principalement sur le lait en poudre en tant que matière première pour la fabrication de lait reconstitué à un prix fixe subventionné dans le cadre d'une politique laitière à caractère social privilégiée par l'État, peuvent avoir des marges bénéficiaires importantes générées principalement par les produits laitiers qui peuvent être vendus à un prix gratuit. Cette étude fournit une plate-forme qui peut être utilisée, non seulement pour définir la capacité d'une usine laitière à surmonter les défis concurrentiels du marché, mais également les défis préalables à l'installation de programmes nécessaires à la mise en œuvre d'un système de qualité promouvant la qualité du lait et des produits laitiers.

Mots clés : Secteur laitier, prix de revient, laiterie, qualité, textes réglementaires, Bechar (Algérie),

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 [1].

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 [2]. 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. 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 [3].

According to [4], 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.

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 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

raw material on the one hand, and satisfaction with regulatory requirements for hygiene on the other hand.

1. Algerian hygiene requirements in agri-food 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 food recommended to agribusiness professionals.

These main regulations are given as follows:

1. Official Journal of the Algerian Republic OJAR n. 009 (1991), [5] Executive Decree No. 91-53 of 23 February 1991 on hygiene conditions in the process of the release of foodstuffs.
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 [6].
3. Official Journal of the Algerian Republic OJAR n. 15 (2009), Law No. 09-03 of 25 February 2009 on consumer protection and the prevention from fraud [7].
4. Official Journal of the Algerian Republic OJAR n. 17 (2010), Executive Decree No. 10-90 of 10 March 2010 supplementing Executive Decree No. 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 [8] Supplementing Decree 2004-82 and making HACCP mandatory.
5. Official Journal of the Algerian Republic OJAR n. 69 (2016), Executive Decree No. 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 [9].
6. Official Journal of the Algerian Republic OJAR n. 24 (2017), Executive Decree No. 17-140 of 11 April 2017 laying down the conditions of hygiene and sanitation during the process of human consumption of foodstuffs [10].
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 [11].

2. 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 activity of producing packaged reconstituted milk and partially skimmed fermented milk by calculating their cost price from the expenses given by the general balance.

This study can constitute a platform, on which one can define not only the capacity of the dairy industry to overcome the competitive challenges in the domestic market, but also the challenge of installing the prerequisite programs necessary to establish a quality system to promote the quality of dairy products.

2.1 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

'INOM' devotes a quantity of 60 tons of milk powder per month, with 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 5 000 L/week of fermented milk, depending on 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.

2.2 Cost of manufactured products

The industry being studied is a small dairy in southwestern Algeria whose total annual production of the year 2017 for packaged 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 of 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 (Table 1) 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, 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 calculated on the basis of four elements: purchasing and supply costs, production costs, distribution costs and administrative costs [12], which the TCR formed specifies all charges that each one assigned an account from 61 to 72 as their equivalent cost in Algerian dinars (DZD).

Table 1- Expenses of the studied dairy factory of Bechar-Algeria (TCR-Exercise of 2017)

Account	Cost in DZD
61	89 481 910.76
62	7 778860.29
63	18 768 377.49
64	54 242.51
65	854 345.18
66	954 034.22
68	15 287 165.64
70	112 914 343.43
72	1 260 280.40

Source: *Studied Dairy factory*

3. Results and discussion

Through the main legal texts published in the official journal on hygiene recommended for the agro-food industries, the professionals must meet not only the regulatory requirements but also the customer requirements. It should be noted that the state through a control structure that it has, and whose obligation to protect consumers, has put in place regulations to ensure these objectives.

Moreover, in comparison with the European Union which has set up a set of regulatory texts applied since 2006, called the "hygiene package", and well before in 2005 via Regulation 178/2002 [13] called "Food Law" which lays down the general principles of food law, and defines both the food safety procedures and the obligations specific to the operators of the sector, so a harmonization of different regulations developed by the Algerian legislator relating to the food hygiene of the agri-food sector proves to be necessary today for professionals.

However and in the same sense, a profitability study of the studied company is intended to evaluate the company's ability to implement a platform relating to the conditions and hygiene measures necessary for the implementation of a quality system.

The cost price calculated for a 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* (southwestern Algeria) whose calculated loss was in the range of -13.64 % and -81.55 % respectively for the LPC (pasteurized milk packaged in bag) [14].

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.

In addition, the industrials are obliged to respect the quay-factory fixed selling price so that the selling price of LPC to be fixed according to the regulation at 25 DZD/L for the consumer. However, the fermented milk that is not subsidized by the State 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 ([1], [14]). The profit generated is not included 19% VAT where these taxes have increased by two points 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) [15].

It should be noted that 117 dairy units in Algeria use powdered milk for the production of skimmed milk packaged at a regulated price, and that 139 dairy units use raw cow's milk 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 [16], 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, Ghardaia, El-Oued, Tamanrasset, Illizi, Adrar, Tindouf and Bechar [17]. This has led professionals to really think about the valorization and exploitation of raw camel milk, well known for its exceptional nutritional

Conclusion

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 pasteurized reconstituted milk circuit limits this type of investment except that in the case where the manufacturer is oriented towards free-priced milk products with a reduction of certain load categories to improve the cost of the company, and

quality, as a raw material for pasteurized/sterilized raw milk manufacturing or for its transformation into dairy products.

But above all, a study of the market and its investment cost must have first, knowing that a liter of raw camel milk is expensive, more than 300 DZD/L, twelve times the selling price of one liter of pasteurized milk packaged in a bag subsidized by the state.

may even create a new production line for pasteurized/sterilized camel milk which characterizes a potential of the southern region of Algeria.

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Conflicts of interest

This study represents part of two dairy factories studied in southwestern Algeria, in the region of *Bechar* and *Adrar* (Algeria). We're interested in this arid zone, because it is among the regions which have a very important potential in camel breeding where camel milk can constitute a supply of raw material for the dairy units. The first part of this work has been published in FOOD ECONOMY / ECONOMIA AGRO-ALIMENTARE.

For this purpose, the author declares that we've no conflicts of interest in relation to this article.

In memoriam

Article dedicated to the memory of my Professor Dr. Hamid KADI died on August 31st, 2017.

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