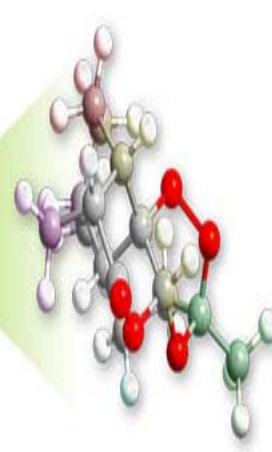


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Microbiological level control of contaminating microorganisms in the production of milk at a state dairy industry Southwest Algerian

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Abstract- This study is a contribution to the adaptation of a system of quality control of processed namely HACCP (Hazard Analysis Critical Control Point) to master the microbiological hazards encountered in the manufacture of food products reconstituted milk and pasteurized milk acidified following an investigation that drive to establish a plan HACCP hazard Analysis with determination to master critical point (CCP, critical Control Point). Microbiological control of contaminating microorganisms namely coliform and thermo-tolerant coliform test performed in duplicate and concern reconstituted pasteurized milk, acidified 'The Lben, milk powder, which serves to close the preparation of the Lben, rinse water and drinking water. Microbiological parameters analyzed for the reconstituted pasteurized milk and water rinsing showed that pasteurization and quality cleanup and disinfection are effective and respected by the industry. A correlation of microbiological point of view was made between the quality of milk powder, reconstituted pasteurized milk and the quality of cleaning and disinfection. This judged by microbiological control of the rinse water. However, the quality of the ferment and then acidified milk product is unsatisfactory. A significant correlation was found for these two products. This results from the operation of indirect inoculation after preparing the closing due to lack of hygiene and cleaning and disinfection of hard fermenter. A HACCP plan together the key information of the study revealed the existence of seven critical points at different stages of the manufacturing process it is imperative to master through preventive and corrective measures that the company must undertake to prevent the end of better the frequency of occurrence of microbiological the likely origin of food borne hazards to consumers.

Keywords: Pasteurized milk; acidified; HACCP; Hygiene; Quality Assurance

Introduction:

For many years, the quality control was to verify the safety of the finished product, that is to say, their microbiological and chemical compliance with legislation. The dangers of food safety can occur at any stage of the food chain and therefore require control over the entire chain (Guy et Elizabeth, 2007).

Security becomes a shared responsibility between all actors in the chain and food-borne diseases have a direct impact not only on the health of the consumer but also on development. Therefore, capacity building in food safety is essential in most countries, particularly in developing countries.

By its biochemical composition carbohydrate, fat, vitamins and minerals (Aggad *et al.*, 2009; Ahmed *et al.*, 2010), milk is a favorable environment for the growth of microorganisms especially pathogens (Ahmed *et al.*, 2010). These products have always been considered one of the main causes of food poisoning (Gran *et al.*, 2002).

To this end, this work aims to study the possibility of establishing a system of quality control namely the HACCP plan with determination to master critical points. A quality control operations pasteurization, cleaning and disinfection was also studied.

Location of milk in Algeria, a product of mass consumption:

In Algeria, milk plays an important role in the diet of everyone, regardless of income because, on the one hand, as a product rich in nutrients, milk can substitute for other expensive products such as meat and, secondly, it is subsidized by the state (Amellal, 1995).

The amount of the grant awarded by the State dairy offices, under the support price of milk, which was 4,8 million dinars in 1982, has grown from 252 million DA in 1992. In the space of a decade, the state has paid instead of some consumers 13,3 billion dinars.

This high consumption is favored by the pricing policy by the Algerian, which encourages consumption compared to production status. Coupled with an extremely large population, this policy has led to an increase in demand, with more than two thirds of dairy consumption is covered by imports (Mezani, 2000; Bourbouse *et al.*, 1989; Yakhlef, 1989).

Milk intake per capita has improved during the same period as it was raised from 34 to 130 liters per year. While lower than the ration in the countries of Europe, where it is an average of 400 liters per year, it remains much higher than the average in Tunisia (87 liters) and Morocco (50 liters) (Boumghar, 2000).

A rate insufficient coverage needs milk and milk products:

The dairy industry happens to currently cover about 40% of milk requirements and derivatives. Indeed, for an estimated 2,6 billion liters milk equivalent in 1992 global demand, production of dairy units was only 1,1 billion liters milk equivalent.

The production deficit is compensated by importing milk. Between 1982 and 1992, imports of milk (for infants and adults) have reached the level of 1,6 million tons and cost the government 2,4 billion \$, one-tenth the amount of the debt (Amellal, 1995).

Methodology:

The samples were made in the die SUDLAIT *Igli-Bechar* in the year 2012 where the physico-chemical and microbiological analyzes were performed in duplicate testing and involved the following samples "milk powder, reconstituted pasteurized milk, acidified milk, closed, the rinsing water and the water consumption. Our goal is to enjoy the one hand, the hygienic quality of the analyzed products, on the other hand, identified critical issues and develops a plan or a manual of standard quality for channels visited western Algeria. For this we conducted according to a standardized destructive methodology, analysis of some physico-chemical and microbiological parameters.

1. Physico-chemical-analysis:

Studied the physicochemical parameters are: temperature, titratable acidity ° D, density, IS; MSD rates and fat. The titratable acidity and is determined by the determination of lactic acid with sodium hydroxide, using phenolphthalein as a color indicator in (NA 678, 1994), the density was measured by the method of according lactodensimètre (AFNOR, 1986), the fat content measured by acid-butyrometric method called Gerber (NF V 04-210). EAST (Total Solids) is determined after drying in an oven at 102 ° C (NA 679, 1994) and fat-free dry matter (MSD) of milk is calculated by taking the difference between the IS and the fat milk.

2. Microbiological analysis:

Sampling was carried out in accordance according to (NA 676, 1994 ISO 707, 1994). Microbiological analysis included after preparing decimal dilutions according to (ISO 8261.2001), the detection and enumeration of bacterial indicators of fecal contamination or hygiene whose parameters are analyzed following defects sum: count the total aerobic mesophilic flora (FAMT) by (NF V 04-016, 1985) on standard agar count, Plate Count agar (PCA), detection and enumeration of coliforms and thermo-tolerant coliform organisms according to (ISO 4832, 1978) on the agar Biliee crystal violet and neutral red (VRB), research and count in liquid fecal streptococci (Afif *et al.*, 2008), detection and enumeration of yeasts and molds on agar with chloramphenicol (NA 5911, 1996). The criteria for the microbiological quality were adopted from the publication on milk and its derivatives published in the Official Journal of the Algerian Republic of 27 May 1998 No. 35, which is based on a 3-class plan following benchmarks m as shown in Table 1 and 2.

3. Development of a HACCP plan:

Two approaches are used throughout the world to ensure food safety: that of the United States of America where the control and sterilization predominates, and the European Union that emphasizes quality management and security throughout production chains. Given the situation observed in the South and results in Europe, it seems appropriate to use this approach to ensure the safety of dairy products in developing countries (Faye et Loiseau, 2000). The quality management through the analysis of risks or potential hazards associated with a product or process (HACCP) must be applied to the entire chain from the cow to the consumer (Guy et Elizabeth 2007). Hazard identification was based on the method of five M (material, labor, environment, method, field) following the "cause-effect diagram" (Gouri Djaaboub, 2010, White, 2007) while the risk by approaching Zurich Hazard Analysis which includes assessing qualitatively and semi-quantitatively the risk, severity and frequency (Codex Alimentarius, 2003). At each of the identified potential risks relate relevant and control plans corrective actions. The quantitative assessment of risk is to know the probability that exposure to a particular risk causes a disease in a given individual. The quantitative risk measurement is used to calculate an acceptable risk and thereby help establish standards and quality criteria adapted to different situations (Faye et Loiseau, 2000).

Results:

1. Physico-chemical-analysis:

The results of the physico-chemical analysis of the samples do not reflect any abnormal physicochemical point of view and quality are consistent with Algeria (No. 87 standards of 8 December 1999, No. 80 of 14 November 1999, 94 of 16 December 1998) and international (CODEX STAND 207-1999). The density is between 1030 to 1034. Samples analyzed had reconstituted pasteurized milk fat contents ranging from a minimum value of 1,5% and a maximum of 2%. The value of titratable acidity and is between 15 and 17°D, and the IS and MSD were using 99 and 84g / l respectively. The product temperature at the exit of the plant does not exceed + 8,5°C.

2. Microbiological analysis:

Milk powders examined showed a variable load of aerobic germs, between $0,3 \times 10^3$ to $1,2 \times 10^3$ ufc/g. The analysis also showed that the flora of faecal contamination (total and fecal coliforms) was absent, while the average burden of fungal flora was $0,3 \times 10^3$ à $1,2 \times 10^3$ ufc/g (Figure 1). The drinking water used in the reconstitution of milk has also suffered for

microbiological analyzes, the results found are consistent with the rules under the JORA 35, 1998 (Figure 2) summarized in Table 1 and 2.

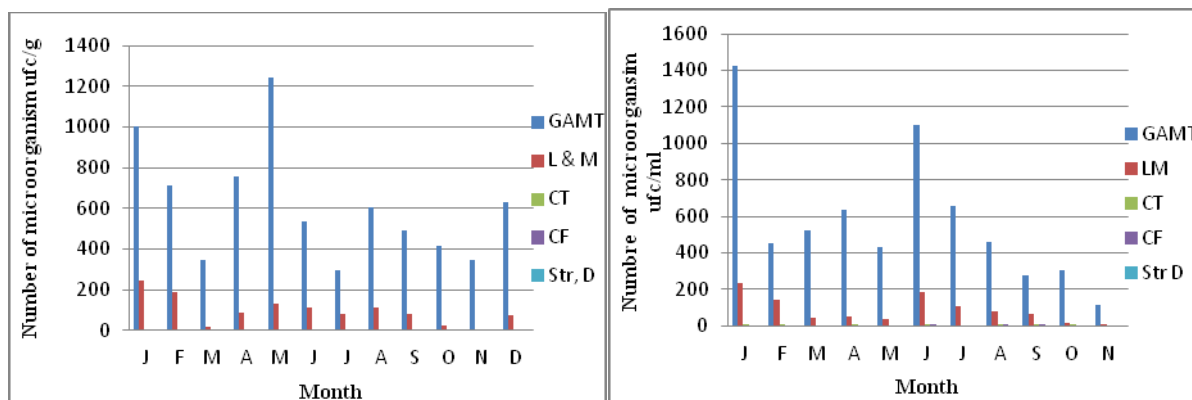


Fig. 01 : Microbiological testing of raw materials « Milk Powder » **Fig 02 :** Microbiological testing of raw materials « Consummated water »

Table 1: Criteria for microbiological quality of dried milk and milk acidified (Official Journal of the Algerian Republic No. 35 of 27 May 1998).

PRODUITS	n	c	m
Lait déshydraté destiné aux industries alimentaires:			
— germes aérobies à 30° C	1	—	2.10 ⁵
— coliformes	1	—	1
— clostridium sulfito-réducteurs à 46° C	5	2	absence
— antibiotiques	1	0	absence
Laits acidifiés :			
— coliformes	5	2	3.10 ⁴
— coliformes fécaux	5	2	30
— <i>Staphylococcus aureus</i>	5	2	3.10 ²
— <i>Salmonella</i>	5	0	absence

Table 2: Criteria for microbiological quality of treated water distribution (Official Journal of the Algerian Republic No. 35 of 27 May 1998).

PRODUITS	n	c	m
1. Eaux de distribution traitée :			
— germes aérobies à 37° C/ml	1	—	20
— germes aérobies à 22° C/ml	1	—	< 10 ²
— coliformes aérobies à 37° C/100 ml	1	—	< 10
— coliformes fécaux/100 ml	1	—	absence
— streptocoques D/50 ml	1	—	absence
— clostridium sulfito-réducteurs à 46° C/ml	1	—	absence
— clostridium sulfito-réducteurs à 46° C/20 ml	1	—	< 5

The average load of different bacteriological parameters determined for partly skimmed milk are summarized in Figure 3. Aerobic germs of all samples analyzed present levels that fall within the standards according to Table 3, and ranging from $0,7 \times 10^3$ ufc/mL and $1,8 \times 10^3$ ufc/mL. The origins of fecal contaminants "total and fecal coliforms" were almost negligible.

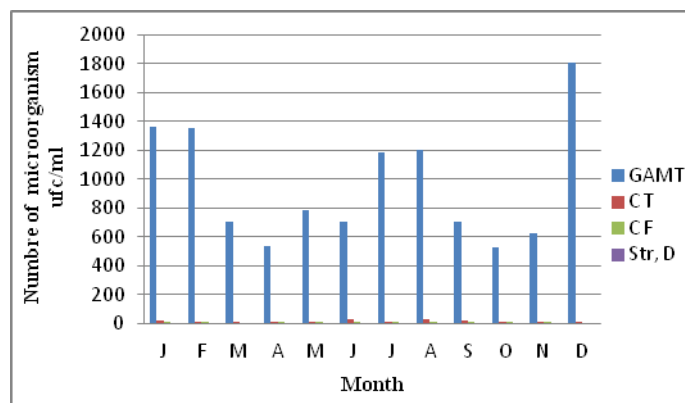


Fig. 03 : Microbiological control reconstituted pasteurized milk packaged in bags.

Table 3 : Criteria for microbiological quality of packaged pasteurized milk (official Journal of the Algerian Republic No. 35 of 27 May 1998).

PRODUITS	n	c	m
Lait pasteurisé conditionné :			
— germes aérobies à 30° C	1	—	3.10 ⁴
— coliformes :			
* sortie usine	1	—	1
* à la vente	1	—	10
— coliformes fécaux			
* sortie usine	1	—	absence
* à la vente	1	—	absence
— <i>Staphylococcus aureus</i>	1	—	1
— phosphatase	1	—	négatif

Bacteriological analysis of acidified milk shows a strong contamination by heavy load of fecal coliform had an average of $1,53 \times 10^4$ ufc / ml during the period when the temperature is higher from the months of May to September (Figure 4), and for the month of January, the contamination was moderate but remains above the norm and had an average of $5,6 \times 10^2$ ufc/ml fecal coliform. While for the months from February to April, the load coliform and fecal coliform organism was consistent with the Algerian legislation (Table 2).

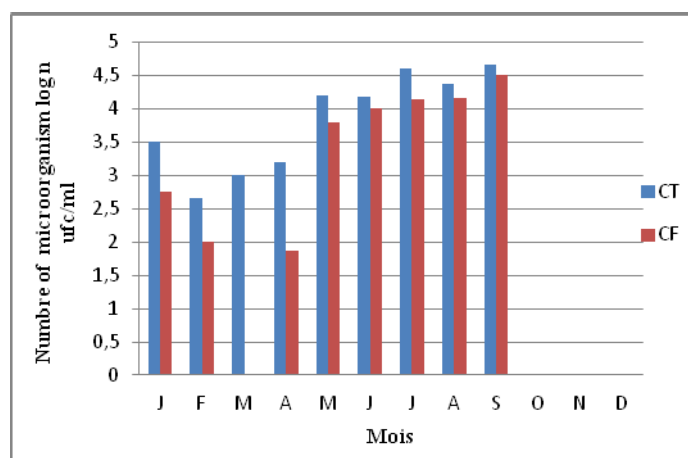


Fig. 04 : Microbiological control acidified milk "the Lben"

In parallel, the analysis of enzyme used in the preparation of the bin also has a heavy load of fecal coliform in the same months of May to September (Figure 5), while for the months from February to April the load total and fecal coliforms was consistent with the standards set (Table 2).

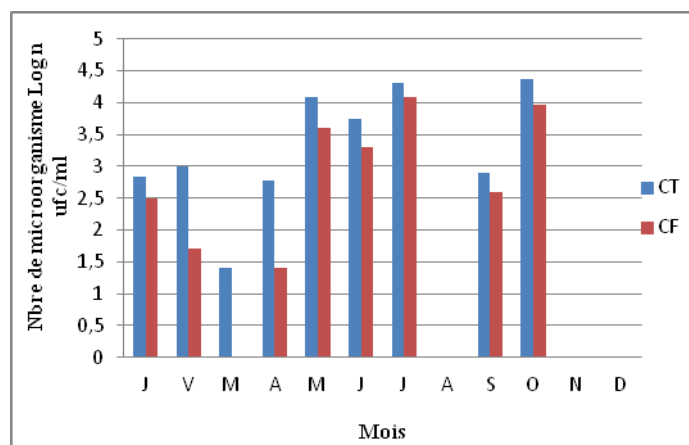


Fig. 05 : Microbiological controls close "Fermentation".

The rinse water showed significant load aerobic germs with an average of $0,75 \times 10^3$ ufc/ml, a minor contamination by coliform and fecal coliform organism whose average load was less than $0,54 \times 10^4$ ufc/ml.

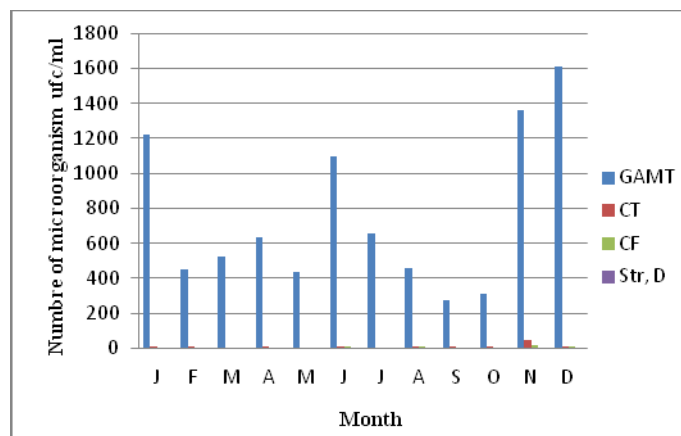


Fig. 06 : Microbiological Control rinse water

Bacteriological parameters analyzed for the reconstituted and pasteurized milk rinse water showed that the heat treatment (pasteurization) and quality of operation of cleaning and disinfection are effective and respected by the manufacturer. Figure 7 shows a correlation of microbiological point of view between the milk powder, reconstituted pasteurized milk and the quality of the cleaning and disinfection 'rinse water' that was significant for the desired parameters because contamination of milk during production is also present in the rinse water, and bad cleaning and disinfection of the pipes 'closed circuit' certainly contaminate milk.

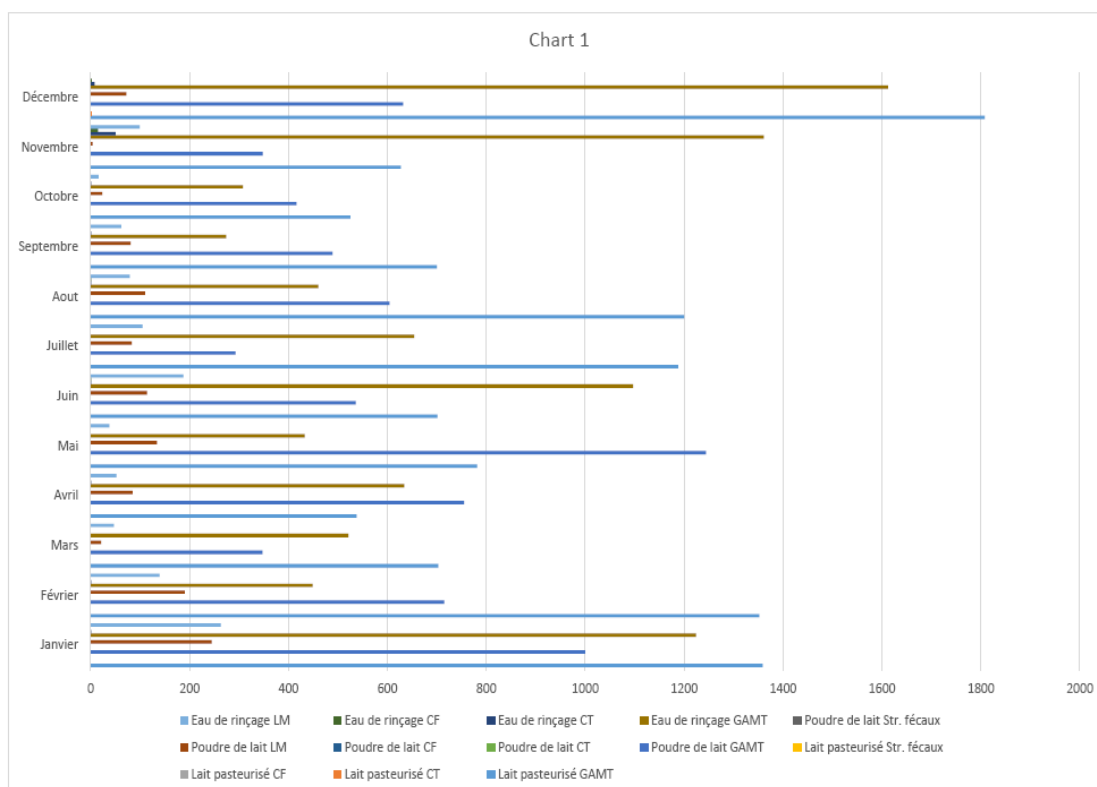


Fig. 07: Microbiological quality of reconstituted milk powder, pasteurized milk and rinse water.

However, the quality of the ferment and then acidified milk product was unsatisfactory. A significant correlation was found for both products (Figure 8).

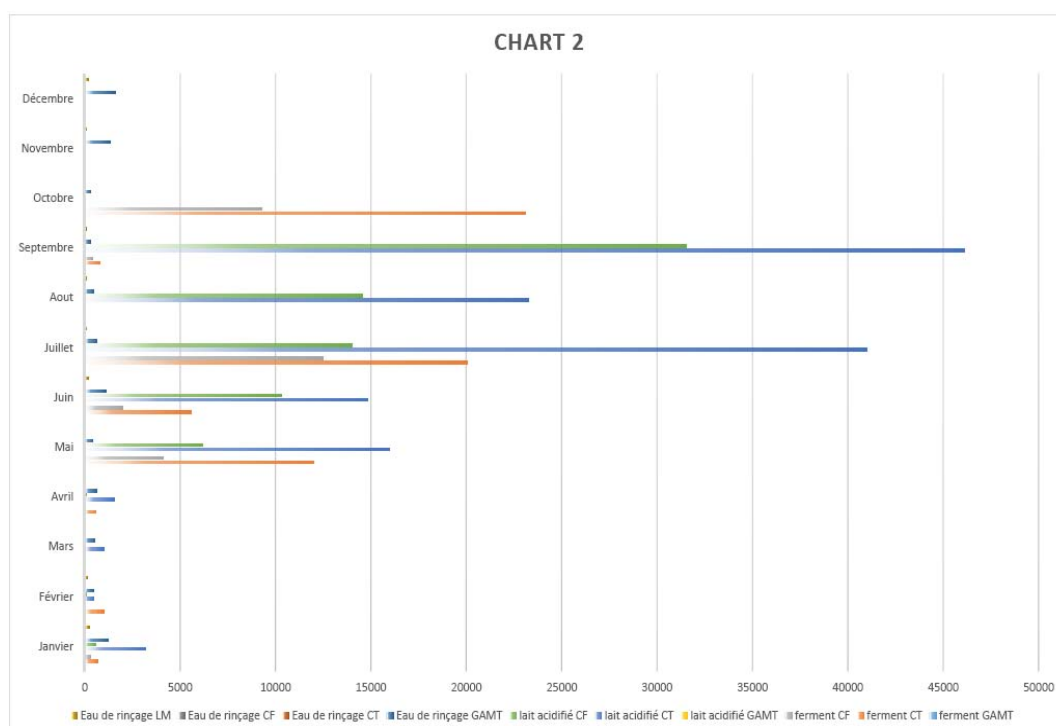


Fig. 08 : Microbiological quality of ferment - acidified water and rinse milk.

3. Insurance safety and hazard identification "HACCP"

The following tables (Table 4) provide an illustration of the value chain approach to hazard identification for the dairy sector in West Algerians - raw milk, pasteurized milk, partly skimmed milk packed in bag and acidified 'The lben'.

Discussion:

The good quality of the physicochemical plan samples indicates not reflect mastery and control continuous replenishment and pre-pasteurization, which meet the physicochemical standards regulations. The results of the microbiological analysis of raw materials (milk powder and water for reconstitution) indicate the excellent microbiological quality of milk powder (low in total aerobic microflora and no coliforms). These results fully meet the standards recommended by the IDF (1974). Obtaining reconstituted milk of good hygienic quality is the first result of the excellent quality of the raw material, the pasteurization step and compliance with rules and hygiene measures at the premises of manufacturing involving the ongoing maintenance of optimum cleanliness, respect for the individual handlers hygiene and prevention of recontamination exogenous (Hamama *et al.*, 1995), as well as the effectiveness of the cleaning and disinfection through CIP "Clean in place "before and after manufacture of pasteurized milk. Results are consistent with the work of (Ould Moustapha *et al.*, 2012) which has the operational and technological origin centerpieces for a milk of good hygienic quality. The presence of coliform bacteria is generally used as an indicator of poor hygienic practices in the handling of milk (Labioui *et al.*, 2009 ; El-zyney *et al.*, 2007 ; Chye *et al.*, 2004). The enumeration of the flora for samples showed that there is significant faecal contamination of the ferment and then acidified milk 'The ben during periods when the temperature is high. This results from the operation of indirect inoculation after preparing the closing due to lack of hygiene and bad cleaning and disinfecting fermentation tank, knowing that the high temperature promotes the growth of contaminating microorganisms.

The strict adherence to general hygiene at production and processing have to eliminate the massive consequences of microbial contamination and obtaining final products meet microbiological standards regulations (Hamama *et al.*, 1995) and we must also educate producers by setting up a training program with good manufacturing practices (Katinan *et al.*, 2012). A HACCP plan together the key information of the study revealed the existence of seven critical points at different stages of the manufacturing process (trafficking for raw milk "farm", collection and transportation, receipt and storage of raw materials "raw milk and milk powder, "pasteurization, inoculation and maturation of acidified milk, refrigeration and storage of finished cleaning and disinfecting product). It is imperative to master through preventive and corrective measures that the company must take to prevent the better end of the frequency of occurrence of microbiological the likely origin of food borne hazards to consumers.

Conclusion:

The physicochemical analysis of the reconstituted pasteurized milk taken at the state dairy subsidiary showed no abnormality. From a microbiological perspective, there is the presence of extremely low levels of total coliforms, fecal coliforms and no other contaminants such as fecal streptococci.

The consumption of sour milk "The lben" could be a risk to public health, especially in the summer season when the warm climate promotes microbial growth. The lack of good hygiene practice, bad cleaning and disinfection of fermentation tanks, the high values of the titratable acidity recorded explain the proliferation of fecal contaminants observed in the acidified milk in our study.

The imperative control of raw materials, finished products and control of the manufacturing process including schedules pasteurization, good hygiene and rapid cooling of the packaged product and practices could help provide consumers with high quality dairy products in terms microbiological. To do this, however, must establish a quality policy "HACCP" as privileged methodological tool in the search for ways to control the relevant risk-adjusted, with the popularization of good production practices and hygiene.

Table 4 : Hazard Analysis of reconstituted milk and raw milk pasteurized packaged in bag and acidified 'The lben'.

Steps	Dangers	preventive measures	CCP	Critical limits	Super intendence		corrective Actions
					proceedings	frequency	
trafficking	Cross-contamination (human, germ of the environment) -Contamination by chemical residues -Lipolysis and rancidity raw milk	-Respect strict hygiene rules ' hands, clothing, walls and floors of the place of treatment' -Do not allow the milk to air during milking. -Control and monitoring of veterinary cows -Cleaning and disinfection of milking, storage tank for raw milk -The milk must be refrigerated at least 2 hours after treatment at 4 °C maximum. -Respect the hygienic conditions of sampling raw milk. -Avoid numerous and brutal transfer. -Denying the milk collection mastitis.	yes	- Good personal hygiene and dress -Healthy cows and healthy. -Cleaning and disinfection/drying equipment for collection and storage of raw milk must be effective, applied before and after milking	-Visual Control -Framing health livestock -visual control of practice cleaning and disinfection of equipment, facilities, vehicles, places of sale	-Daily and before trafficking -Follow treatment program cows (every 03or 06months) -Daily	-Review the contract company/producer collector -Repeat the cleaning.
Producer "farm"	-Cross contamination (human ,germ of the environment) -Contamination by chemical residues -Lipolysis and rancidity raw milk	Control ; -Wash equipment -Orderly and sanitary trafficking healthy cows. -Avoid milk collection of animals treated with antibiotics and mastitis milk. -the water of good quality	Yes	-T° of less than + 6°C -Hardware trafficking and clean storage. -Absence of antibiotic in milk -The water used for cleaning must be good quality.	-Cool the milk after milking later than 2 hours maximum at + 4-6 °c. -Visually check -Collection of samples for the detection of antibiotic. -Control of physico-chemical and microbiological water quality	-After trafficking -Before and after milking -At each milking -Regularly	-Have a thermometer and more -Repeat the cleaning with drawal -treated cows -Used-water distribution network "treated water of good quality"
Expert tester "farm"	Contamination of chemical and /or microbial origin.	-Check physical characteristics of milk. -Avoid milk collection of animals treated with antibiotics and mastitis milk.		-Good personal hygiene and dress Raw milk normal physical character :	-Visual control -Control; at farms	-Daily. -each collection	- -Refuse-milk so its

		-Check the cleanliness of the tank and its equipment.	Yes	-Color: matt white, yellowish white -Low-odor -Pleasant flavor -Consistency Homogeneous -Cleaning and disinfection/drying equipment for the collection, storage and transport must be efficient	-Analysis of the physical characteristics of milk with sensory tests (odor /flavor, appearance, Sediments, consistency, etc ...) -Measurement of T °. -Collection of samples for the determination of the components. At the factory ; Cleaning, disinfection and drying equipment (tank and equipment).	-each delivery	physical characteristics are abnormal -Repeat the cleaning
The raw material: raw milk, milk powder	Microbial contamination, chemical	-Check and control the health program and maintenance of premises, -storage conditions of the raw material, however, raw milk must be refrigerated at least 2 hours after treatment at +4 ° C maximum -Control of physico-chemical and microbiological parameters of the first raw at the reception -Respect the principle FI / FO powder -Monitoring and sanitary control cows.	Yes	-Storage temperature below +6 ° C / +30 ° C lower than for powdered milk raw milk. -Transfers of first raw in time as possible to the processing unit "isothermal tank" -Lack of antibiotic	-Store-milk powder in a suitable pot. -Performed microbiological and physico-chemical receipt of the first raw "T °, density, titratable acidity and lipidic raw Analyzes -Dosage of antibiotics.	-at the reception	-If the first raw does not conform to the standard, it must be rejected. -All milk contains antibiotics should be refused.

Transport	-Increase or proliferation of microbial flora -Contamination by material.	-Transporter raw milk as quickly as possible to the processing industry, especially in terms of adequate temperature -Cleaning and disinfection/drying "Isothermal tank and tank or storage tank" equipment.	yes	-Clean sampling equipment. -Acidity less than 18°D. Condition cold +4 to 6°c.	-Cleaning, disinfecting and drying equipment -Using the indicator of acidity "bromocresol" at the farm.	-Before and after each load. -For each sample.	-Repeat the cleaning -Refuse milk whose acidity is greater than 18°D.
Storage of the raw material : Milk powder	-cross contamination.	-Check and control the health program and maintenance of premises -Master the storage conditions of the raw material -Microbiological Control at the reception especially the "fungal flora" parameter -Respect the principle FI / FO powder	Yes	DLC: according to the manufacturer from 12 to 24 months -Storage temperature less than + 30°c. -The microbiological analysis of water must conform to the criteria for drinking water.	-Performed microbiological upon receipt of the first raw. -Precision thermometer "temperature measurement" -Ensure that the storage location of the First raw is sealed.	-At the reception -Serial	-If the raw material does not comply with the standard, it must be rejected.
Recombination/Reconstitution	-contamination of physico-chemical, and/or microbial origin	-Strict hygiene rules -Effective before and after the use of re-cleaning tanks. -Program effective maintenance.	No	-Good hygiene-dress and body.	-Visual control -Made physico-chemical analyzes	-Daily -After recombination	-Repeat the cleaning. -Standardization.
filtration	physical contamination	-Maintains regular-filter -Daily-cleaning filters	No	-	-Visual control of the condition of the filter	-in each filtration	- Change the filter

Pretreatment : -pre-pasteurization -degassing, - Homogenization	Proliferation of micro-organisms	-Mastered and maintain the temperature of pre-pasteurization at 63-65° C. -Control of the physicochemical parameters of the reconstituted/or recombined milk. -Insured pre-cooling the 25-35° C for avoiding thermal shock which can degrade the material and the rapid cooling in the cooling section. -Cooling at + 4-6°c -Regular maintenance pre-pasteurizer.	No	-T $\geq 63^{\circ}\text{C}$ for the partial destruction of contaminating organisms -T $\leq +6^{\circ}\text{C}$ for the product to be stable. -Maintain closed storage tanks after cleaning "tank of rest"	-Make control thermometers. -Check the physico-chemical parameters of reconstituted or recombined milk, including product temperature.	-Regularly. -After the pre-pasteurization and tanks at rest.	-If the physico-chemical parameters are not in the standards must be corrected -Standardization, set the temperature of heating and cooling. -Always have a thermometer and more
Pasteurization	-Persistence of microorganisms "Pathogenic and alterations" -Microbial Development	-Check-scales pasteurization (time / temperature) -Regular maintenance-pasteurizer	Yes	85°c / 20-25sec -Plates in good condition	-Visual control panel and respect for couples time / temperature - Follow the thermograph. -Removing plates and regular deslagging -assured starting of alarm T° pasteurization system. -Analysis microbiological parameters to see the effectiveness of heat treatment.	-continuous -Quarterly -after each pasteurizing	-change the damaged plates pasteurizer Redo- pasteurization

Acidified milk (Iben)	Semi-direct /direct inoculation	-cross contamination (Human and germs from the environment).	control; -Use of selected cultures in sufficient numbers for the conditions of production(direct seeding in semi-direct location) -Cleaning and disinfection of equipment -Respect the time of lactic acidification, it should be sufficient	Yes	-A good cleaning tanks before and after preparation Iben -GHP -Ensure canopy closure Tank after inoculation - Follow the acidity of Iben, do not exceed 85°D.	-Check the temperature of the tanks -Follow-titratable acidity during the fermentation -Performed microbiological analysis of the product.	-Regularly. -After 15 hours of incubation -Before conditioning	-If the microbiological analysis is not compliant, the product must be rejected -the product is passed to slow thermiseur acidifying the product
	thermisation/ cooling	-Microbial Proliferation	-Check the product temperature at the exit of thermiseur before being packaged.	Yes	-T°c between +4°and +6°c. -Acidity below 85°D.	-Counter temp on the tank and the thermiseur. -Measure of acidity	-Every 30 minutes -Before heat treatment.	-Redo-cooling before packaging.
	Cooling / Storage	-Microbial growth. -Development of contaminants during storage and transport.	-Cleaning and housekeeping. -Maintain closed tanks after cleaning Rapidly cooling in the refrigeration section +4 to +6°c. -Check-thermometers -Avoid the wait.	Yes	- Store T at between +4° and +6°c. -Time 6h maximum storage	-Check-Temp tanks. -Perform microbiological testing of the product and rinse water to judge the effectiveness of cleaning tanks	Regularly.	-Product Recycling
	Recycling	Contamination and microbial growth	-Effective cleaning of premises -Training and Education -Reduce the storage time of milk in stores	Yes	-Premises clean and in good condition. -Storage 30mm max 22°D-Acidity -Good hygiene and dress-Body	-Visual-control. -Microbiological Monitoring of the atmosphere. -Monitoring of acidity -Visual control. -Medical Monitoring especially personal of manufacture.	- Daily -Weekly -Daily -Regularly.	-Review the cleaning -Works of repair of the premises. -Destruction of products. -Getting away from sick people and those not wearing a regulation uniform

Crating, storage and marketing	-re-contamination and microbial growth	-Cold storage room at +4-6°C. -Wash-boxes -Shelved damaged boxes. -Strict adherence to the cold chain (+4 to +6°C), business to consumer. -Loading and unloading to avoid prolonged.	Yes	-T° < +7 °C -Cash clean and in good condition -In good condition	-Temperature measurement -Visually check -Check temp truck distribution and level of detailing	-Regularly. - Up on receipt of funds - When loading	-Shelved damaged boxes. - Review the contract company / Clients
Cleaning and disinfection	-Microbial proliferation and biofilm formation, -chemical contaminants origin	-Checked the status and validity, and the dose of disinfectant used -Checked the correct operation of CIP	Yes	-Concentration 1% nitric acid and 2% sodium hydroxide. -Pressure and T° suitable for proper cleaning and disinfection. -Keep disinfectants in a dry place	-microbiological and physico-control rinse water	-Daily and before the manufacture	-Increase the concentration of disinfectant (sodium hydroxide and nitric acid) -Repeat the cleaning.
Consumer	-Food-borne infection : diarrhea syndrome -Tuberculosis, Brucellosis -Poor storage of milk	-Good preservation of milk -Avoid storage for an excessive duration consume milk-up three days later after its opening.	Yes	-Keep a T° from +4° to +6°C. -Strict adherence to the DLC	-Set the temp at + 4 to +6°C.	-	-Do not buy the wrong products which maintain or exceed its DLC. -Reject spoiling products and / or their sensory characteristics are abnormal.

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