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Quality Control of Milk in the Dairy Industry

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Abstract: The quality has always been a requirement of safety in the modern economy in Algeria; it is also an ongoing concern, if not a priority or a necessity as well and foremost for the consumer and for the producer and the processor, activating within the chain of production and marketing of milk and dairy products. Series of analyzes were performed on milk powder as raw material and the reconstituted milk pasteurized and packaged in one-litter bag as a finished product to determine quality health and hygiene. In addition, further analyses were also performed on the water incorporated in the reconstitution of milk on equipment surfaces and finally the atmosphere to determine and assess the degree of potability and hygiene at the central dairy. The test results showed that of the 31 samples of milk powder made, we have found no microbiological, radioactive and antibiotics contamination. Regarding physical chemistry, 04 samples showed a slight acidity between 16 and 17° D. While the humidity and solubility index of milk powder were consistent with the regulations. Microbiological results of reconstituted milk and pasteurized showed that out of 35 samples, no contamination by germs alteration or contamination was found, but the physico-chemical analyzes showed the presence of a wetting caused by low content of total solids and density on selected samples. The fat content in all samples was consistent with the regulations and it was between 1.5 and 1.7%. No changes did affect the organoleptic quality of the milk powder and reconstituted milk, on the point of view taste, odour and colour. The microbiological analyzes of the 16 samples of water recovery showed that 07 of them were of poor quality, given the presence of aerobic bacteria and aerobic coliforms in their level, which are probably due to poor maintenance of the piping which carries water to the interior of the central dairy. The control of local atmosphere and surface equipments revealed the presence of many of total germs within the powder, recovery and packaging rooms, among others with little yeasts and moulds, which explains that air can be suspected to play the role of particles spread milk powder into the atmosphere and deposited on the floor of the rooms or areas. The results also showed the absence of Salmonella, yeasts and moulds and the presence of some tolerable total germs on surfaces of equipment used in the process of manufacture of reconstituted milk, after the operation of cleaning and disinfection.

Key words: Milk · Reconstitution · Germs · Quality · Radioactivity · Antibiotics · Hygiene · Pasteurization

INTRODUCTION

In the dairy industry, changes, defects, contamination and pollution of milk are numerous and their causes are diverse and varied:

They may be of microbial origin, caused by organisms of contamination, which exist in two types:

- The spoilage flora responsible for putrefaction, fermentation reaction, acidification and others, which generally affects the organoleptic aspect of the product (change in texture, colour,...).
- Pathogen flora that may be responsible for different diseases.

Thus, in the case of food poisoning, bacteria involved in producing "toxin", responsible for gastrointestinal disorders. Germs of contamination are present in the air, soil, surfaces, clothing and other equipment and in favourable conditions, these germs can grow and make the product unfit for human consumption. They may be of drug origin, especially antibiotics and antiseptics, which are often administered to animals suffering from various pathologies encountered in farms,

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such as mastitis, diarrhoea and respiratory diseases. Residues of these inhibitory substances can remain in the milk, which may have adverse consequences on the health of the consumer. They can also be a radioactive source and are mainly due to radioactive fallout caused by nuclear explosions, which emit these elements accumulate on the soil and contaminate subsequent water, plants, animals and humans. They can be of pesticide origin that are mainly used in the treatment of local barns and storage of food, pesticides used in plants for animal feed and finally therapeutic products used in animals with ectoparasites.

The objective of this study was to establish a hygienic and order health that allows the protection of public health in order to prevent potential risks of milk for consumer health and therefore ensure its quality.

MATERIALS AND METHODS

In this Experiment, the Samples Analyzed in a Legal Manner, Are Summarized as Follows: 31 samples of powder milk were collected at the Oran seaport, in the purpose of microbiological and physicochemical analysis and for an eventual research of gamma radionucleids and antibiotics. A 35 other samples of reconstituted milk, pasteurized and packaged in bags of one litter (n = 5) were carried out at the Dairy center of Bir El Djir, in the perspective of their microbiological and physico-chemical analysis. A16 samples of reconstituted water were performed at the same dairy center to determine its potability by mean of a microbiological analysis. Finally, swabs were performed on the surfaces of the materials used in the process of manufacturing reconstituted and pasteurized milk at the dairy center, to determine the effectiveness of the cleaning of the equipment on the one hand and to qualify the status of the local atmosphere at the other. Transportation and shipment of these samples were done in a correct and appropriate manner to prevent their deterioration.

The equipment used in the samples was perfectly clean and sterile, for to not have any influence on the properties and composition of the taken products. Given to the diversity of products to be analyzed, we used sampling techniques depending on the material of the product, according to regulatory standards, as the standards outlined by the Algerian Ministry of Commerce and ISO standards.

The Samples Were Carefully Labelled and Stored in the Following Manner:

- For milk powder imports, it is removed and stored below 15°C, protected from moisture and light.
- For pasteurized milk in a bag of one litter, the storage temperature never exceeds 10°C.
- The samples of reconstituted water are preserved at optimum temperature between 4 and 6°C.

The time between sampling and analysis (especially with regard to microbiological analyses) should not exceed 24 hours.

Microbiological Analysis: The dilutions prepared from reconstituted milk powder are: 10^{-3}, 10^{-2} 10^{-1} and 1. The diluent's is formed with TSE (Tryptone Salt Water). Isolation and enumeration of bacteria, were made in two classes according to their importance:

The Alteration Flora: It concerns the total bacteria, coliforms, yeasts and moulds.

The Pathogenic Flora: It relates to *Staphylococcus aur*eus, *Salmonella* and *Clostridium* sulphite-reducing. Sampling done on surface of the used equipments in the manufacturing process of reconstituted milk was made after cleaning and disinfection, by the swab method. The control of the atmosphere in the manufacture is carried out by exposing Petri dishes containing culture medium in ambient air for ten minutes. The main selective media (liquid and solid) used for research of germs and their incubation are described in Table 1.

Note that the microbiological analyses are performed according to standards set by the Algerian Ministry of Commerce and ISO.

Physicochemical Analysis: In the milk powder, the solubility (or solubility index) is determined by the method of ADP1; the acidity is performed by the method of sodium hydroxide in the presence of 1% phenolphthalein, moisture by drying method and then the fat is determined by the method of Teichert on graduated butyrometer.

In the pasteurized reconstituted milk packed in bags of one litter, the acidity is determined by sodium hydroxide in the presence of phenolphthalein and the determination of the total solids based on the principle of evaporative drying water in an oven and the fat is determined by the method of Gerbert.

Table 1: The main selective media used in research of germs.

Nature of samples	Number of samples	Searched Germs	Selected Media	T°	Temps of Incubation
Imported powder milk	31	Aerobic Germs at 30°C	PCA Agar	30°C	72 hours
		Total Coliforms	Desoxycholate Agar	37°C	24-48 hours
		Faecal Coliforms	Desoxycholate Agar	44°C	24-48 hours
		Sulphite-reducing clostridia	Meat-Liver Agar	37°C	24-48 hours
Reconstituted and pasteurized	35	Aerobic Germs at 30°C	PCA Agar	30°C	72 hours
milk (bags of one litter).		Total Coliforms	Desoxycholate Agar	37°C	24-48 hours
		Faecal Coliforms	Desoxycholate Agar	44°C	24-48 hours
		Staphylococcus Aureus	Giollitini Cantonoii Media	37°C	24-48 hours
			(seeding on Agar Chapman and isolation)	37°C	24-48 hours
Reconstituted Water	16	Aerobic Germs at 37°C/ml	PCA Agar	37°C	72 hours
		Aerobic Germs at 22°C/ml	PCA Agar	22°C	72 hours
		Aerobic Coliforms at 37°C/100 ml	Green Shined Lactose Broth (VBL)	37°C	24-48 hours
		Faecal Coliforms/100 ml	Kovacs Reagent	44°C	24 hours
		Streptococcus D/50ml	Roth selected Media D/C (Presumption Test)	37°C	24-48 hours
			Evalytski Media (Confirmation Test)	37°C	24 hours
		Sulphite-reducing clostridia 46°C/ml	Meat-Liver Agar	46°C	72 hours
		Sulphite-reducing clostridia 46% 20ml	Meat-Liver Agar	46°C	72 hours
Surfaces (Swab)					
- Triblenders	8	Total Germs	OGA Agar	30°C	72 hours
- Recovery tank	8	Yeasts and moulds	OGA Agar	22°C	5 days
-Conditioner	8	Salmonellas	Peptoned and buffered Water (Enrichment)	37°C	18 hours
			Hektoen Agar (Isolation)	37°C	24 hours
Atmosphere					
- Powder Room	32	Total Germs	OGA Agar	30°C	72 hours
- Reconstitution Room	32	Yeasts and moods	OGA Agar	22°C	5 days
- Packaging Room	32				

Qualitative Research of Antibiotics in Milk Powder [method of Flavigny, 1980 [1] and Lecoq, 1965 [2]]: This is a qualitative research on a seeded environment containing a nutrient agar culture of 14 hours, of a strain of *Staphylococcus aureus* (with the reference 209. DJC1 FDA) and to highlight the presence or absence in milk powder of inhibitors of microbial germs such as antibiotics. The inoculated medium is distributed in Petri dishes divided into three series, of 20 ml each. After solidification (cooling):

- We have placed on nutrient agar seeded in the first series of Petri dishes, 7 encoded antimicrobial disks belonging to the family of beta lactams and macrolides: Oxacillin (code 66848), Gentamicin (code 67546), ampicillin (code 66126), Penicillin G (code 67216, Amoxicillin (code 66132), Erythromycin (code 66442) and bacitracin (code 66152) for determining the sensitivity and / or the resistance of the strain of Staphylococcus aureus cultured in the medium, regarding to these antibiotics).
- On the Petri dishes of the second series, containing the inoculated medium, we have put 4 discs impregnated with antibiotics: Erythromycin (code 66442), oxacillin (code 66848) Ampicillin (code 66126) and Penicillin G (code 67216) and in the presence of another disk impregnated only by distilled water (control disc) and
- Finally, we have removed the last 4 boxes of the third series, containing the inoculated medium, five antimicrobial disks, as: oxacillin (code 66848), Gentamycin (code 67546), Ampicillin (code 66126), Penicillin G (code 67216), Erythromycin (code 66442); two paper disks are initially impregnated with the tested milk (and DiL b DiL A).

We have incubated all boxes in an oven at 37°C for 24 h, to allow the diffusion of both milk, proliferation of seeded germs and the action of antibiotics. We must remove them later to make their reading and of course to evaluate them qualitatively (presence or absence of antibiotics in milk).

Searching of Gamma Radio active's in Milk Powder: Samples of milk powder were sent to the Laboratory of Nuclear Research of Algiers, for an eventual search of gamma isotopes or "Radionuclids", by "gamma spectrometry" method.

RESULTS AND DISCUSSION

The interpretation of the results of bacteriological analyzes performed on powder milk, reconstituted and pasteurized milk and reconstituted water, is currently under Interministerial decree of 24 January 1998 amending and supplementing the Decree of July 23, 1994, on microbiological specifications of certain foodstuffs.

These Results Are Expressed According to 3 Criteria:
Satisfactory: it means that it is in accordance to the standards imposed by legislation

Unsatisfactory: It means that the acceptability threshold is exceeded.

Acceptable: To which the ratio c/n is less than 2/5.
With:

c : The number of units of sample giving values between m and M.
n : The number of units per sample.
m : Minimum number of micro organisms found (lower limit).
M : Maximum number of micro organisms found (upper limit).

The microbiological results of powdered milk, reported that all samples show no contamination by germs alteration and / or pathogens, except the presence of some mesophilic total flora, between 10 and 300. Compared to the regulations, we can say that the milk powder is considered of good quality health and is prepared and stored in satisfactory conditions. According to Broutin [3], imported milk powder is in the majority of cases of good quality as it is manufactured in very satisfactory conditions. They also said that if they added water that has a preventing activity on multiplication of micro organism on the one hand and if the bactericidal action of the process used is reliable on the other hand, a recomtamination due to micro organisms such as *Salmonella, staphylococci, E. coli, yeast* and mould can occur later, especially in poor storage conditions (humidification storage), because the growth of bacteria is dependent on the water activity.

In Table 3, the results of the 35 microbiological samples of reconstituted and pasteurized milk, packaged in bags of one litter, showed the absence of pathogens and spoilage organisms, except the presence of an insignificant number of aerobic germs at 30°C, which varies between 50 and 2 x 10^4. The microbiological contamination confirms that the operation of pasteurization is done in a proper manner and is respected in time, that is to say 80°C / 20s, because it eliminated even mundane and pathogen flora.

Our results are in accordance with those of other authors as Vignola [4], who explains: pasteurized milk, means to destroy in it, by the use of proper heat, almost all of its commonplace and its entire pathogenic flora when it exists, while trying to touch a minimum to the physical structure of the milk, to its chemical equilibrium and its biochemical elements (vitamins).

Results presented in Table 4 reflect the microbiological analyzes of water incorporated in the reconstituted and pasteurized milk. Of 16 samples taken, nine of them have a good bacteriological quality, by cons 07 of the other samples exhibit unsatisfactory bacteriological quality, whose 3 have aerobic germs at 37°C, over 20 and 4 present aerobic coliforms at 37°C over 10. This poor bacteriological quality shows the inadequacy and ineffectiveness of cleaning and disinfection of the piping that carries water inside the central dairy. Therefore, the water used in this central dairy is actually unsuitable for use in food industry.

Water used for washing food and equipment must not be contaminated by unwanted germs. However, the water used in the manufacture must not only meet this requirement, but must submit a satisfactory chemical purity [5]. He also showed in his research among the phenomena of water pollution exist the biological pollution caused by undesirable micro organisms or pathogens at different levels of the chain of distribution of water, including pipes and supply networks, because water is more easily contaminated when pipes are old and of poor quality, while water cuts and in case of improper installation of the pipes.

The tests performed on the surfaces of the used materials in the process of manufactured, pasteurized and packaged milk, such as: triblenders, the recovery tank and the conditioner, allowed having the results shown in the Table 5, to assess the levels of contamination of equipment after cleaning and disinfection.

The absence of the total flora, yeasts, *moulds and Salmonella* proves that the material is in direct contact with the product [powder milk and reconstituted milk] throughout the production chain is maintained, is cleaned and disinfected, this also explains the proper use of disinfectants by staff. Petranxienne and Lapied [6] explain that in the process of dairy processing, handling areas and materials in contact with the milk keep traces of milk which micro organisms can grow and clean up and disinfection after each production is essential, that the material must be both dry and tidy, to be well protected from contamination. According to Leveau and Bouix [7], the equipment used for various manipulations represents a major risk of contamination (before pasteurization) and recontamination (after pasteurization), due to its regular

Table 2: Detection and enumeration of spoilage and pathogenic bacteria in imported powder milk (CFU / ml).

	Microbiological counts			
Number of samples	Aerobic Germs at 30°C	Total Coliforms	Faecal Coliforms	Sulphite-reducing clostridia
31	10 - 3.10^2	00	00	00

Table 3: Detection and enumeration of pathogens and spoilage germs in the reconstituted, pasteurized and packaged milk (CFU / **ml).**

	Microbiological counts			
Number of samples	Aerobic Germs at 30°C	Total Coliforms	Faecal Coliforms	Staphylococcus Aureus
35	50-2.10^4	00	00	00

Table 4: Detection and enumeration of pathogens and spoilage germs in reconstituted water (CFU / ml).

Sample	Aerobic Germs at 37°C/ml	Aerobic Germs at 22°C/ml	Aerobic Coliforms at 37°C /100 ml	Faecal Coliforms x/100 ml	Streptococ. D/50	Sulphite-reducing clostridia at 46°C/ml	Sulphite-reducing clostridia at 46°C/20ml
9	< 20	< 10^2	< 10	Abt	Abt	Abt	Abt
7	> 20	< 10^2	> 10	Abt	Abt	Abt	Abt
Total : 16							

Table 5: Results of microbiological analyzes of surfaces (CFU / ml).

Number of samples	Total Germs	Yeast	Mould	Salmonellas
24	< 10	Abt	Abt	Abt

Table 6: Results of microbiological analyzes of the atmosphere (CFU / ml).

Number of samples	Total Germs	Yeast	Mould
96	uncountable	< 50	< 30

Table 7: Results of the physicochemical analysis in imported milk powder.

Number of samples	Moisture (%)	Acidity (°D)	Density	Index of solubility (%)	Odour	Colour
31	< 4 %	12 - 17	630	> 99,9	Normal	Normal

Table 8: Results of the physicochemical analysis of reconstituted, pasteurized and conditioned milk.

Number of samples	Total solids	Acidity (°D)	Density	Fats (%)	Odour	Colour	Taste
35	8,31-11,8%	13-18	1025-1032	1,5 - 1,7	Normal	Normal	Normal

contact with the material. This risk becomes higher when the material is unsuitable, poorly or inadequately washed and disinfected, as it is likely to harbour micro organisms such as yeasts and moulds.

Based on the Results Obtained and Listed in Table 6, We Have Got a General Idea of the Atmosphere:

- A total invasion of germs in all workshops, namely the powdering, reconstitution and conditioning rooms.
- Presence of yeasts and moulds, in almost all the rooms where the product is handled.

The presence of these micro organisms proves indeed that the atmosphere at the central dairy is contaminated and may be the result of several factors that could adversely affect the quality of the product:

- The lost particles of the powdered milk and their deposit on the ground, on the clothing of personnel and equipment, promote the growth of micro-organisms.
- Contamination of air by staff moving from one workshop to another can induce a "cross-contamination" inside the plant.

For Bonfoth [8], areas and spaces of transformation are always potential sources of product contamination. One of the major causes is the lack of hygiene of floors, walls, ceilings and the other surfaces of contact. Dust in ambient air as well as ground organic debris may harbour pathogenic strains which then pass into the milk during various manipulations. He also adds that the receipt and installation of inadequate local contact surfaces and ambient air are all factors of microbial contamination of milk.

The results of the physicochemical analysis of milk powder and of the reconstituted and pasteurized milk are included in Tables 7 and 8 and construed in accordance with the ministerial decree of 18 August 1993, concerning the specifications and presentation of certain milk consumption:

- These results showed that the water content in the milk powder is less than 4%, which implies that the storage conditions of the raw material have been met and are therefore consistent with the regulations. Challel [9] explains that the water content has a significant influence on the storability of the powder and also adds that the reduced moisture can inhibits firstly the chemical and microbiological revolutions and on the other hand the formation of lumps affecting the solubility. Then, the latter has a solubility index greater than 99.9% in all of our samples and confirms the fact that the particles of milk powder constituents have high affinity to the aqueous phase. Regarding acidity, 4 samples of the 31 showed acidity between 16 and 17° D, while the value of the lactic acid in normal milk powder ranges from 11 to 15° D. This slight increase in acidity can be explained by protein degradation probably caused by the enzymatic activity of certain microbial mesophilic germs, or the degradation of the lactose in the milk powder into lactic acid.

As for as physico-chemical analyses of the reconstituted and pasteurized milk, the latter showed the following:

5 out of 35 samples showed a density ranging between 1025 and 1027; the latter is slightly lower compared to normal that normally ranges between 1028 and 1032. This means that these samples have undergone a slight wetting, which remains insignificant. It was also found that 19 samples showed a total solids content of less than 10%, that is to say, between 8.31 and 9.98% and the other a content higher than 10%.

All samples analyzed showed a fat content of between 1.5 and 1.7%, showing that the type of milk included in the process of reconstruction clearly belongs to the class of partially skimmed milk. Regarding the acidity, the results showed that all samples analyzed ranged from 13 to 18° D, that is to say, in accordance with the regulations that determines between 14 and 18° D. The results regarding the organoleptic characteristics of milk powder and reconstituted milk showed no change that can affect the taste, odour or colour; this also proves that no physico-chemical or microbiological alteration has occurred in the products in question.

According to FAO [10], the evaluation of the organoleptic quality is a subjective operation, because it focuses on the following characters: appearance, colour, texture, consistency and flavour, which are the properties of milk. These depend on many microbiological and technological factors. The factors that are affecting the consistency of the milk are especially the dry extract, the heat treatment and the homogenization.

Qualitative research on nutrient agar to highlight the presence or absence in imported powder milk of inhibitory substances (as antibiotics), helped to highlight the results shown in Fig. 1, 2 & 3 as follows:

- Photo n° 1 of the first series of Petri dishes containing nutrient agar seeded with *Staphylococcus aureus* "strain reference FDA209.P.JC-1", after incubation, shows the development and proliferation of the strain (S.a) in question, except nutrient agar around discs impregnated with antibiotics thus forming transparent areas visible to the naked eye, with diameters varying transparency; it says that the antibiotics contained in these discs pushed *Staphylococcus aureus* germs do not grow and this as a result of the formation of the inhibition spectrum. So, these antibiotics have caused an inhibitory effect on *Staphylococcus aureus* bacteria and then have proven their sensitivities in regards to these antibiotics.
- Photo n° 2 of the second series of Petri dishes containing 04 discs impregnated with antibiotics in the presence of a witness disk moistened with distilled water only (TEM) showed the proliferation and development of the bacteria

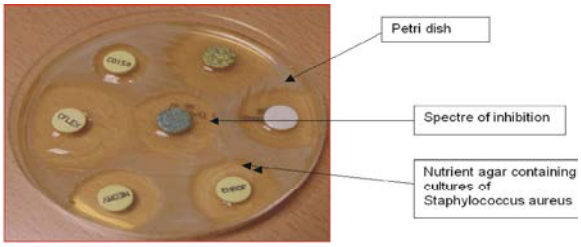

Photo 01: Action of antibiotics on the inoculated medium (nutrient agar culture of a strain of *Staphylococcus aureus,* bearing the reference FDA 209.DJC-1).

Discs impregnated with antibiotics:

- Oxacillin (Oxa) code 66.848.
- Gentamycin (Gen) code 66.546.
- Ampicillin (Amp) code 66.126.
- Penicillin G (Pen) code 67.216
- Amoxicillin (Amo) code 66.132
- Erythromycin (Ery) code 66.442.
- Bacitracin (Bac) code 66.152.

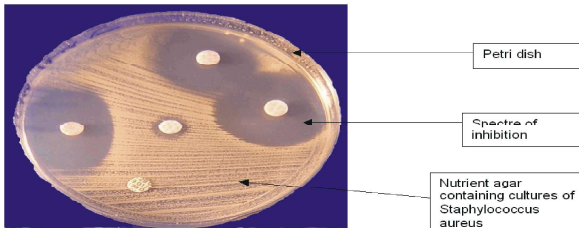

Photo 02: Action of antibiotics on *Staphylococcus aureus* (with reference FDA 209.DJC-1) in the presence of a witness disk (TEM) moistened with distilled water.

Discs impregnated with antibiotics:

- Erythromycin (Ery) code 66.442.
- Oxacillin (Oxa) code 66.848.
- Ampicillin (Amp) code 66.126.
- Penicillin G (Pen) code 67.216.
- Witness disk impregnated with distilled water (TEM).

"Staphylococcus aureus" throughout the agar, including adjacent parts of the control disc (TEM) impregnated with distilled water, except in the vicinity of the 4 discs of antibiotics by forming an inhibition spectrum visible in diameter. This indeed explains the sensitivity of *Staphylococcus aureus* found in nutrient agar to these antibiotics and therefore their inhibition, however, we noticed the

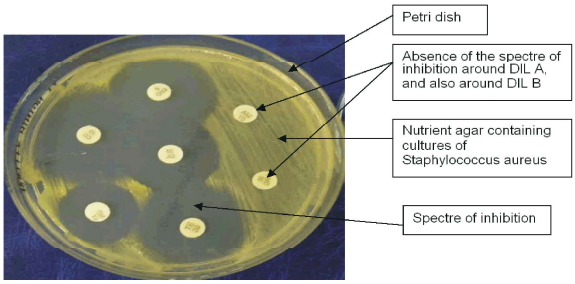

Photo 03: Highlighting in milk powder of the inhibitory substances (antibiotics) of *Staphylococcus aureus* (reference FDA 209.DJC-1).

a) Training spectrum of inhibition around the discs of antibiotics.

b) Lack of spectrum of inhibition around disks impregnated with milk (DIL A and B).

Discs impregnated with antibiotics:

- Oxacillin (Oxa) code 66.848.
- Gentamycin (Gen) code 67.546.
- Ampicillin (Amp) code 66.126.
- Penicillin G (Pen) code 67.216.
- Erythromycin (Ery) code 66.442.
- Discs impregnated with a mother solution of milk (DIL A and B).

absence of the spectrum around the disk witness (TEM), which proves the inexistence of antibiotics in the disk.

- Photo n° 3 of the 3rd series still showed the formation of inhibition spectrum, with a diameter as readable and transparent around the discs impregnated with antibiotics (oxacillin, Gentamycin, Ampicillin, penicillin G and erythromycin), synonymous of the sensitivity of this organism *"Staphylococcus aureus"* to these cited antibiotics and their absence around the disks DIL A and B, impregnated with the solution of powdered milk, placed on the same box. By cons, we noticed the proliferation of bacteria in the nutrient agar of the Petri dishes, around disks DIL A and B and even in adjacent parts. So, in this situation, we can confirm the total absence of antibiotics in the tested milk samples.

From these results, we can say that the tested milk powder was prepared from milk containing no antibiotic residues, that are harmful to human health, in accordance with the regulations and that it derived from healthy animals not treated with medication with antibiotics at the original stables.

Table 9: Results of isotopic research of gamma radionuclide in imported powdered milk.

		Radionuclide gamma					
Number of samples	Technical	Amer-241	Plu-239	I- 131	Str-90	Ces-134	Ces-135
31	Gamma Spectrometry	No trace	No trace	No trace	No trace	No trace	No trace

Regarding to the effect of antibiotics on the health of the consumer, Debry [11] have shown that the absorption of milk containing penicillin can cause relapsing eczematous eruptions in some people and can trigger the symptoms of shock allergic (anaphylactic shock). Today, under the current regulations, it is recommended to not tolerate any trace of antibiotics, however slight it in milk and food for human consumption. When animals are treated with antibiotics, residues may remain in the milk, which may have adverse consequences on the health of the consumer.

Table 9 presents the results obtained by gamma spectrometry, which are provided by the Nuclear Research Centre of Algiers; on 31 samples consisting of powdered milk, we have found no trace of radioactivity in these samples. These results demonstrate that the milk powder is imported from an area not contaminated with radioactivity and thus confirm the strict compliance of the monitoring plan applied in this matter by the exporting country.

Referring to the ministerial decree of 2 April 2000 amending and supplementing the decree of 27 October 1999 concerning the specifications of the milk powder industry and the terms and conditions of its presentation, possession, use and marketing, particularly in its seventh article, the maximum radioactive concentrations in the milk powder industry are set as following: Amercium-241: 1bq/kg; Plutonium - 239 1bq/kg Iodine - 131: 67bq/kg; Strontium - 90: 67bq / kg; Cesium - 134 202bq/kg and Cesium - 137 267bq/kg. In this sense, several researches and works have been done to determine the potential hazard of radioactivity in contaminated food. Seiberling [12] explains that the milk may be considered, like other foods, as a witness to the pollution of the environment and can be indicative of any locally pollution, especially when the milk is produced near a source of pollution. Michon [13], meanwhile, adds that the radioactive pollution is mainly due to the fallout caused by nuclear explosions. The same author adds that radioactive elements accumulate in the soil can contaminate water and plants that are able to assimilate these isotopes. This results in contamination of animals and milk pollution, to the extent that the radioactive products present in animals a metabolism comparable to that of the same radioactive products. Moreover, public opinion is now particularly sensitive to this aspect of quality of life. The absence of monitoring plans in this respect is very important.

CONCLUSIONS

Control of milk quality has become so regulatory and technological and, given its sensitivity. Therefore, we can say that the milk has become a good indicator of contamination of organic food chain (from production until its transformation, can under certain conditions contain contaminants at levels that could create problems detrimental to the health of consumers. Yet the series of analyzes performed in this work on the import of milk powder intended for processing on one hand and the reconstituted milk pasteurized on the other hand, has allowed us to determine their bacteriological and organoleptic quality and also confirm the absence of a radioactive and antibiotic contamination of milk powder. however, physico-chemical analyzes showed the presence of a slight acidity in milk powder and a low content of total solids and low density in some samples of reconstituted milk and becomes a "wet milk." That's what manufacturing units must be supplied with milk powder of good quality, in order to guarantee the quality of the finished product.

Water, because of its abundant use in the dairy industry, is a potential vector for microbial contamination, especially when the water piping system is old or poorly maintained or poorly cleaned. The design and installation of inadequate local contact surfaces and ambient air are all risk factors for microbial contamination of milk. The material used for various manipulations represents a major risk of contamination (before pasteurization) and recontamination (pasteurization) because of its regular contact with the product, which is likely to harbour micro-organisms. Finally, we must preserve the health and organoleptic quality while ensuring the hygienic quality of the reconstituted milk, which are an unavoidable in food bio-security and therefore a basic element in the development of the dairy industry in Algeria.

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