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THE CONTAMINATED MILK AND INFLUENCES ON HUMAN HEALTH

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Abstract

Milk product is the essential for new born babies and has an important influence in human daily food. It's important to know that quality milk directly influences the human health. This paper presents the effects of contamination milk on human health. Controllable factors that either positively or negatively influence the finally product are referred to the quality control. The use of good raw material is the primary importance for the achievement of the required finally product quality.

Key words: milk, pathogenic microorganisms, pesticides, antimicrobial.

INTRODUCTION

In industrialized countries, the percentage of the population suffering from food borne diseases each year has been reported to be up to 30%, while less well documented developing countries bear the brunt of the problem due to the presence of a wide range of food borne diseases, including those caused by parasites. The high prevalence of diarrhea diseases in many developing countries suggests major underlying food safety problems. The global incidence of food borne disease is difficult to estimate, but it has been reported that more 1.8 million people died from diarrhea diseases. A great proportion of these cases can be attributed to contamination of food and drinking water. Additionally, diarrhea is a major cause of malnutrition to infants and young children. Each year millions of people become ill and thousands die from a preventable food borne disease [16].

Quality control is the sum of all those controllable factors that ultimately influence positively or negatively the product quality e.g. selection of raw materials, processing methods, packaging, methods of storage distribution etc. Quality is defined as any of the features that make something what it is or the degree of excellence or superiority [7, 8].

MATERIALS AND METHODS

The milk is an alimentary product, of animal origin essential to the human alimentation. The milk quality is very important for the health of the new born babies and of humans. By milk, there may be brought many substances harmfully for human body, with negative effects upon human health.

This work paper presents the most important contaminating agents, which can be found in milk, the effects of these ones have upon animal and human organism, as well as the law foresights.

Proper food preparation can prevent many food borne diseases. As part of its global strategy to decrease the burden of food borne diseases, WHO identified the need to communicate a simple global health message, rooted in scientific evidence, to educate all types of food handlers, including ordinary consumers. In developed countries, surveillance of food borne disease is a fundamental component of food safety systems. Surveillance data are used for planning, implementing and evaluating public health policies. There is therefore a strong need to strengthen surveillance systems for food borne disease [12, 15].

RESULTS AND DISCUSSION

Selenium organic are found in the milk from the animal with have been feed with plants harvested from soils rich in selenium. The selenium is gathered in the plants and it replaces the sulphure from the molecule of the sulphure amino-acids. The selenium-methzonin, methyl-selenium-cistein. Within the digestive tube, the amino-acids liberate selenium which speeds in the organism and enters in the structure of muscle proteins and organs [3, 4].

The selenium content in milk and meat may reach the level of about 17,8 mg Se/kg product. The foods rich in selenium produce troubles in the human body: yellow colors of skin, nails defaults, cronical arthritis. The selenium passes easily in the placenta, negatively acting upon the body, it is secreted in the milk, send the lack of selenium leads to a sensitivity growth of the body against cancerigenic factors.

Toxic pollution and chemical contamination substances. Pesticides are toxic chemical substances used in agriculture. The pesticides may penetrate into the animal body on respiratory, oral or skin way. Feeding animals, with feeds which contain small doses of organically processed insecticides determine a significant gathering of residues during 1-2 months [4].

The organic processed insecticides are selectively accumulating in the animal body: in the fat mesenterical tissue, the fat deposited tissue, the fat perinneal tissue and the muscle tissue.

The concentrated feeds (grains, oil grist's) and the root plants are responsible with the accumulation of some pesticides residues in big amounts.

Inside the organism, these organically processed substances may be absorbed by tissues without undertaking significant changes in chemical or toxic structure. A part of them is eliminated by milk, this being the main way of detoxification for females. These substances concentrate themselves in the milk fat. The quality varies between 2-20 mg/kg in butter; we may reach quantities of 65 mg/kg. The skimmed milk and the whey comprise insignificant qualities. The pesticides in milk can be found in fresh cheese. The milk pasteurization has no effect upon the diminution of pesticides quantity, in exchange, the maturation process produce an important decrease of initial concentration.

The danger of being exposed to the pesticides, residues presents a close connection with the growth: the brain and nervous system development may be easily affected, especially during the new born babies uterus life, whose brains are incompletely developed and they may be also vulnerable to getting ill of cancer [4, 6].

According to the Order no. 147/2004 of ANSVSA for the approval of sanitary-veterinary norms and for the aliments safety concerning. The pesticides residues in animal and non-animal origin product and the veterinary use medicines, residues in the animal origin products, the highest toxic potential pesticides in milk are presented in table no. 1.

Table 1 Maximum pesticides residue limits for milk

Pesticide residue	MRL (mg/kg or ppm)
	Cow milk and cream
Aldrin, exprim in dieldrin (HEOD)	0.006
Chlordane	0.002
DDT	0.02
Endrin	0.0008
Heptachlor	0.004
Hexaclorbenzen	0.01
Hexaclorciclohexan (HCH)	Isomer alfa- 0.004 Isomer beta- 0.003 Isomer gama (Lindan)- 0.008
Deltametrin	-
Methidathion	0.02

In 2011 it was published a new Regulation (EU) No 1274/2011 that coordinated multi-year control programme of the Union for 2012, 2013 and 2014 to ensure compliance with maximum residue levels of pesticides and to assess the consumer exposure to pesticide residues in and on food of plant and animal origin and aims to reduce levels of pesticides in food.

Nitrites and nitrates are soil natural components coming from the mineralization of nitrous substances of vegetal and animal origin. Although, the animals may ingest nitrites quantities, from feed and water, the nitrites content is reduced. In milk, it can be excreted a small quantity of nitrates and their concentration doesn't surpass 40-50 mg/liter. The nitrites are practically absent in the milk.

In our country, it is allowed the nitrites addition to the milk meant for the cheese preparation, in order to prevent the early deterioration (produced by coliform bacteria's) and the swelling of maturate cheese (hard cheese) by the development of germens in the clostridium groups [2, 9].

In the powder milk, there were found nitrosamines in average of 1.9µg/kg in milk, yoghurt, kefir and fresh cheese, cream, butter and some cheese types were found nitrosamines.

The level of nitrates and nitrites present in the human body will depend upon the intake of

alimentary products which contain nitrates/nitrites.

The nitrates ingested once with the aliments reach the stomach and the intestines where they are is a less or bigger measure turned into nitrites. This nitrite formed in the stomach is a risk factor in the stomach cancer beginning. The nitrates are less toxically, having a local irritating action upon the digestive tube, causing congestions and blooding as well as kidney congestions.

The nitrites are a lot more toxically then nitrates. The nitrites inhibit the mitochondrial breathing and the oxidation phosphorus process, the effect being stronger in the case of a low pH. They diminish significantly the absorption of proteins and lipids. In case of toxic doses, the nitrites action taken place at the level of digestive system and of kidneys, leading to vomiting, colic's, diarrheas, poliuries and collapse. In combination with amines, the nitrites form nitrosamines with toxic mutagens, has a cancer action [9]. In some case, the nitrosamines content in cheese depends upon the nitrites content, the cheese kind and the preserved conditions. The forming of nitrosamines in cheese depends in great measure on the maturation process. The *Penicillium camemberti* and *Mucor ssp.* moulds present the capacity of favoring the nitrosamines formation. The nitrosamines content when cheese is maturated may increase from 5 to 20 μg/kg but it is estimated that it doesn't present any danger for the consumer's health.

Metals with toxic potential are the metals which present a toxically effect upon human body. The heavy metals belong to this category. These ones may get in the milk, but more ways: either by animal's intake of some aliments which contain maximal level of metals or by the milk transport or the equipments and devices corrosion.

Table 2 Maximum heavy metal residue limits

Aliments	MRL (mg/kg humid mass)						
	As	Cd	Pb	Zn	Cu	Sn	Hg
Cow milk	0.1	0.01	0.02	5	0.5	-	0.01
Dry milk	0.25	0.05	1.0	25	3.0	-	0.05
Cheese	0.15	0.05	0.5	25	2.5	-	0.05
Molten cheese	0.3	0.05	0.4	40	3.0	-	0.05

Radionuclide The aliments radioactivity represents an important reason of concern for consumers but also for the manufacturers of agro-food products. We find natural and artificial radionuclide in nature. The contamination sources are: the experimental nuclear explosions, exploded electral-nuclear centrals, radioactive mines exploitations [4].

Antimicrobial agents are administered in therapeutic treatment of cattle and constitute a common cause of the presence of chemotherapeutic drug residues in milk. Mastitis is the most prevalent disease of milk-producing cattle which requires antimicrobial treatment [5, 10].

The presence of certain antimicrobial agent residuals in milk constitutes a potential hazard for the consumer and may cause allergic reactions, interference in the intestinal flora, and resistant populations of bacteria in the general population, thereby rendering antibiotic treatment ineffective. Important losses are also provoked in the fermented products, by inhibiting the bacterial processes involved in the elaboration of cheese and cultured milk products [4, 11].

Biological pollution toxic substances: micotoxins. The molds may produce in a great measure, a series of toxin substances which are called micotoxins and they are very harmful to the human body [1, 3, 14].

Micotoxins are chemical substances, with a little analyzed chemical structure, having toxic effects upon the animal and humans, being synthesized by molds. The micotoxins may be comprised by the mold spores, by the whole fungus and they may also be excreted in the foods which represent a growing substratum for moulding. We can find the aflatoxins in milk.

Aflatoxins are secondary metabolites of mold *Aspergillus flavus*, contaminating diverse food and feed materials. In consideration of the carcinogenic properties of aflatoxin B_1, human exposure should be reduced to levels as low as reasonable achievable. Milk is contaminated with the aflatoxin M_1, following exposure of lacting animals to aflatoxin B_1, albeit its lower carcinogenic potency, maximum levels for aflatoxin M_1 have been st for consumable milk at 0.05 μg/kg, and 0.025 μg/kg for infant formulae, respectively, aiming to reduce human exposure to the lowest achievable level.

Table 3 Maximum aflatoxin M_1 limits

Cur. No.	Products	MRL (µg/kg)
1	Milk (raw milk, milk for the manufacturing of dairy products and the thermical treatment)	0.05
2	Infant formulae and the continuation formulae, including the milk for sucklings and the continuation of formula)	0.025

The toxic effects depend upon the dose, the administrating way, the exposure period, the feed quality, the breed and the animal age. The most frequent locations of tumor process are: the liver, the esophagus, the glandular stomach, the colon, the kidney, the duodenum and the skin. There is no specific treatment for the aflatoxins [13].

CONCLUSIONS

Presences of the residues in milk is very dangerous for human health and that's why there is a lot of norms and directives what try to impose some minimum residual level for all the substances, natural and synthesis substances, and in time to reduce this level at minimum. Each country establishes a MRL for every toxic substance for human body. That's way there is small different concerning this MRL. It is important to make a strategy to decrease the number of foodborne diseases, WHO identified the need to communicate a simple health message, rooted in scientific evidence, to educate all types of food handlers, including ordinary consumers. In developed countries, surveillance of foodborne disease is a fundamental component of food safety systems. Surveillance data are used for planning, implementing and evaluating public health policies. There is therefore a strong need to strengthen surveillance systems for foodborne disease.

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