Bulletin of the *Transilvania* University of Braşov • Vol. 2 (51) - 2009
Series VI: Medical Sciences

DETERMINATION OF THE LEVEL OF MICROBIAL FOOD CONTAMINATION IN BRAŞOV

A.M. MOLDOVAN[1] M. IDOMIR[1,2] N. TAUS[2]

Abstract: *The aim of our study has consisted in the determination of the level of microbial food contamination. The prelevation of the food samples has been performed according to the national program "Monitoring the health state of the population related to food". A microbiological qualitative and quantitative examination has been performed in the Laboratory of Microbiology from the Public Health Autority of Braşov, during a 4 years period (2005-2008). The interpretation of the results has been made according to the actual standards. A higher percentages of non - conform samples have been obtained in case of meat and meat products (30.1%), milk and milk products (29.6%).The study results sustains the importance of financing the programs for the monitorization of the level of microbial contamination in foods. The study has also demonstrated the importance of unexpected sanitary inspections for all analyzed products.*

Key words: *food contamination, environment, food-borne diseases.*

1. Introduction

A primary challenge of this century is to minimize food safety risk to consumers.

According to World Health Organization, the surveillance of food-born diseases is becoming an increasingly high priority of public health in many countries [5].

Foodborne diseases remain responsible for high levels of morbidity and mortality in the general population, but particularly for at-risk groups like children, young, elderly and the immunocompromised [6].

In order to address and to manage food safety, it is very important today to know the current situation and trends regarding the occurrence and the spread of human pathogens in the food production and food distribution chains.

This knowledge needs to be continuously updated, in order to prepare and to take the appropriate reaction [3].

The microbiological control is mandatory in the surveillance of the environment in production and distribution food chains, in the control of the aliments to be consumed and for the determination of the human food-born diseases [4].

The main foodborne pathogens that are considered emerging because of the role of food in their transmission are Escherichia coli, Listeria monocytogenes, Salmonella, Campylobacter etc. [1], [2].

In the last decade, all over the world, governments and agencies are intensifying their efforts to improve food safety as a response to the increasing number of food safety issues [6].

The worldwide travel, the globalization of trade in food, urbanization, changes in life-styles changes, pollution, natural and man-made disasters, deliberate contamination are other modern challenges which need to be addressed [6].

[1] Clinical County Emergency Hospital of Braşov.
[2] *Transilvania* University of Braşov, Faculty of Medicine.

2. Material and Method

The objective of our retrospective study has consisted in the evaluation of the level of microbial food contamination.

The prelevated food samples were analyzed in the Laboratory of Microbiology from the Public Health Authority of Braşov, during a 4 years period (2005 – 2008).

The food samples analyzed in this study have been prelevated while carrying out the national program "Monitoring the health state of the population related to food" or during the sanitary inspections.

A microbiological qualitative (presence of pathogen germs) and quantitative (total number of germs in food samples, number of aerobe mesophile germs, number of yeasts /molds) examination has been performed. The interpretation of the laboratory results has been performed according to the actual Romanian standards.

3. Results and Discussions

The first aim of our study has consisted in the evaluation of microbial contamination for the main food categories. We have first analyzed this aspect for the prelevated meat and meat products, as shown in figure 1.

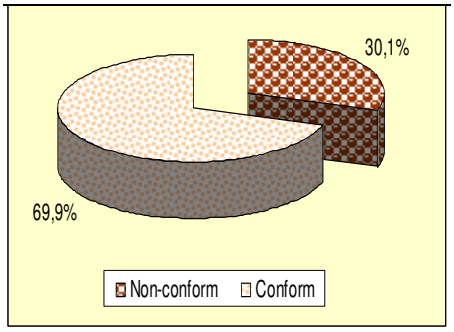

Fig. 1. *The level of microbial contamination in meat and meat products*

We observed that 30.1% of the samples prelevated while carrying out the national program have been considered to be non-conform according to the standards.

We have also analyzed this parameter for milk and milk products too. Figure 2 shows that 29.6% of the milk and milk products samples were declared as being non-conform according to the national standards.

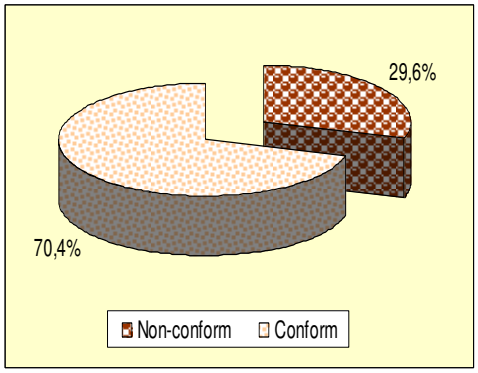

Fig. 2. *The level of microbial contamination in milk and milk products*

During the study we have also analyzed other food products (non-alchoholic drinks, bread) from the point of view of microbial contamination.

The results obtained for this category of products are shown in figure 3.

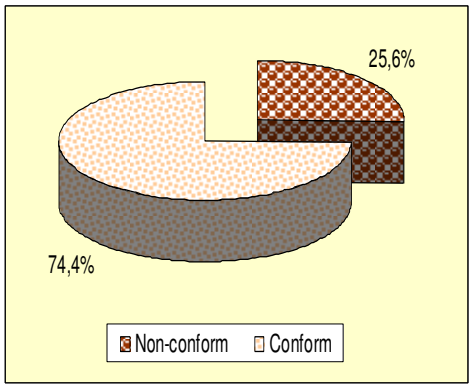

Fig. 3. *The level of microbial contamination in other aliments*

Another aim of our study has consisted in the evaluation in dynamics of microbial food contamination. For the majority of the products, it has been registered a decrease of the percentage of non-conform samples.

As shown in figure 4, in the case of the meat and meat product, the trend was of a small decrease in the first 3 years of the study, but in the last year of the program we have observed an increase of the percentage of non-conform samples despite the performed inspections.

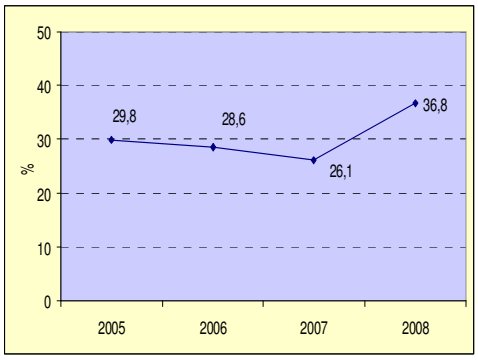

Fig. 4. *The evaluation in dynamics of microbial contamination in meat and meat products*

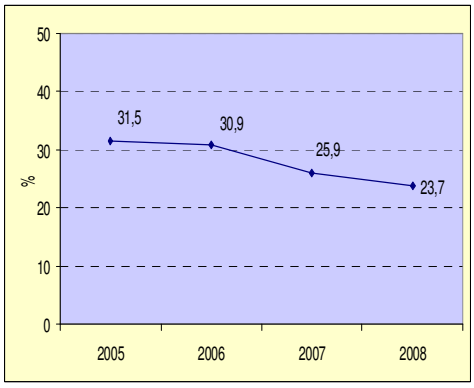

Fig. 5. *The evaluation in dynamics of microbial contamination in milk and milk products*

Figure 5 shows that in the case of milk and milk product samples, the decrease of the percentage of non-conform samples was progressive during the 4 year period of the program. The decrease of the percentage of non-conform samples was bigger in the case of other categories of aliments, as shown in figure 6.

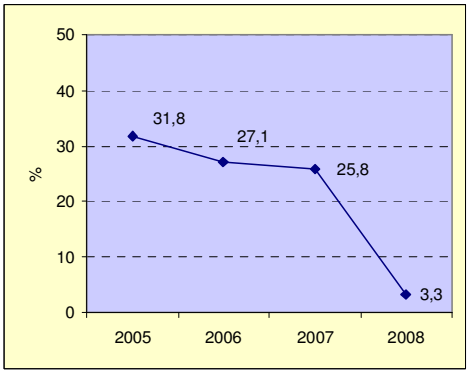

Fig. 6. *The evaluation in dynamics of microbial contamination in other aliments*

During the 4 year period of the national program designed to monitor the health state of the population related to food, there have performed inopinated sanitary inspections, aside of the periodic controls, in different production units designed to prepare and sell alimentary products.

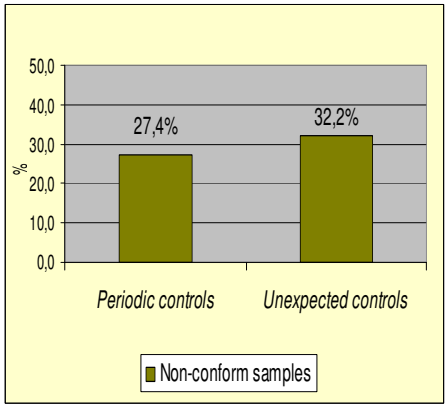

Fig.7. *Comparative evaluation of non-conform samples in meat products*

Figure 7 includes a comparative evaluation of the percentages of non-conform samples obtained while carrying out the program and during sanitary inspections, in the case of meat and meat products.

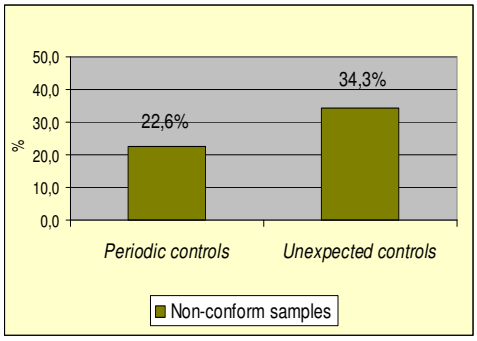

Fig. 8. *Comparative evaluation of non-conform samples in milk products*

The results obtained in case of the other analyzed alimentary products are shown in figure 9.

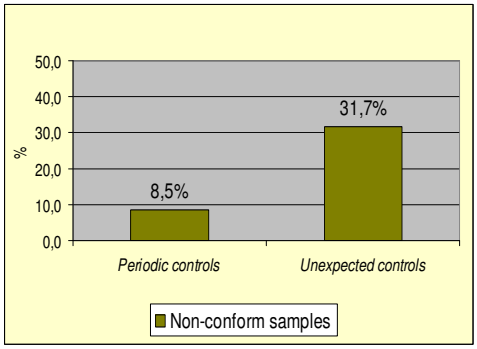

Fig. 9. *Comparative evaluation of non-conform samples in other foods*

4. Conclusions

1. A higher percentages of non - conform samples have been obtained in case of meat and meat products (30.1%), milk and milk products (29.6%).
2. For other products (non - alchoholic drinks and bread), the percentage of non-conform samples was lower.
3. For the majority of the foods, it has been registered a decrease of the percentage of non-conform samples during the study.
4. The study results sustain the importance of financing of national programs for the monitorization of the level of microbial contamination in foods.
5. The study has demonstrated the importance of unexpected sanitary inspections for all categories of analyzed products, the registered percentages being higher in this case than for the samples prelevated during periodic controls.

References

1. Centers of Disease Control and Prevention: *Salmonellosis.* Available at: www.cdc.gov/nczved/dfbmd/disease_listing/salmonellosis_gi.html
2. Crépet, A.; Albert, I.; Dervin, C.; Carlin, F. Estimation of microbial contamination of food from prevalence and concentration data: application to Listeria monocytogenes in fresh vegetables. In: *Applied and Environmental Microbiology*, vol. 73, no.1, 2007, p. 250-258.
3. Food and Agriculture Organization of the United Nations: *National food control systems assuring food safety*. Available at: http://www.fao.org/docrep/meeting/004/ab528e.htm
4. *U. S. Food and Drug Administration Performance Plan 2002*. Available at: http://www.fda.gov/ope/fy02plan/partner.html
5. Wong, L. F.; Andersen, J.; Norrung, B.; Wegener, H. *Food Contamination Monitoring and Food Borne Disease Surveillance at National Level*. Available at: http://www.fao.org/docrep/meeting/008/j3140e/j3140e00.htm
6. WHO: *Food-borne diseases.* Available at: http://www.who.int/foodsafety/foodborne_disease/en/