

Actual situation in the area of implementing quality assurance systems GMP, GHP and HACCP in Polish food production and processing plants

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Abstract

The survey was carried out in 16 provinces of Poland. Its objective was to collect information on the actual situation in the area of implementing Good Manufacture Practice (GMP), Good Hygiene Practice (GHP) and Hazard Analysis and Critical Control Point (HACCP) in food production and processing plants. The survey demonstrated that 91% of the surveyed plants are familiar with GHP rules and 95% with HACCP. 34% of the plants have already implemented the system, 35% are in the process of implementing it, 28% are thinking of its adoption and 3% do not intend to implement the system as long as possible. The advancement of the surveyed plants in GMP, GHP and HACCP implementation can be regarded as satisfactory.

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1. Introduction

Poland is a candidate country to the European Union. The scheduled date of Poland's accession to the EU is May 2004 and all the activities to harmonise regulations by law with EU requirements are highly advanced at present.

Ensuring full safety and high health quality of food in compliance with international standards is of crucial importance for the society due to the public health aspect, for consumers and the industry (Szponar et al., 2002). It is a significant element of measures taken in agriculture and food economy as well as of Poland's efforts to join the EU structures.

One of the tools to ensure safety of food is duty to implement Hazard Analysis and Critical Control Point (HACCP) system into Polish food–nutrition companies. In the EU the HACCP system is laid down in Directive 93/43/EEC on the hygiene of foodstuffs. In Poland the obligatory application of the system is introduced by

virtue of the Law of 11 May on health conditions of food and nutrition.

The Law provides for the obligatory use of the system in large and medium food production and processing plants as from 1 January 2004, and for the application of Good Manufacture Practice (GMP) and Good Hygiene Practice (GHP) in small enterprises. The draft amendment of the Law lays down the obligation of the HACCP system implementation in small plants as well.

The Polish Law defines HACCP system as “undertakings aimed at ensuring food safety through identification and assessment of the hazard scale from the point of view of health quality and the risk of hazard during all phases of manufacturing and trade of food; this system is also intended to specify the methods of reducing hazards and developing corrective actions”. According to the Codex Alimentarius documents the HACCP system in Polish Law covers the rules and procedure of actions as follows:

- (1) identification and assessment of the dangers for health quality of the food and the risk of their occurrence as well as establishing the means of control and methods of counteracting these dangers,
- (2) specifying of the critical control points in order to eliminate or minimize the occurrence of dangers,

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- (3) establishing requirements (parameters) for each critical control point which should be fulfilled and specifying the tolerance range (critical limits),
- (4) development and implementation of the system of monitoring of the critical control points,
- (5) specifying the corrective actions if the critical control point does not meet the requirements mentioned in point (3),
- (6) developing verification procedures in order to confirm that the HACCP system is efficient and complies with the plan,
- (7) developing HACCP system documentation, related to the phases of its implementation and specifying the system of data registration and storing and filing of the system documentation.

With the view to the approaching date of Poland's accession to the EU an initial survey was carried out to check how far the activities related to practical implementation of HACCP and application of GMP and GHP rules have been advanced in food establishments in Poland. This paper is devoted to the survey.

2. Methods

The survey was carried out in 2001 based on the questionnaire specially developed for the purpose. The questionnaire was sent by mail to 400 food production and processing plants selected at random from the food businesses directory. The questionnaire was anonymous, i.e. the name of the plant and its address were not required, and it was filled in on a voluntary basis.

The questionnaire was composed of 25 well-arranged questions. With the view to the coding of the results under elaboration and the tabular form of the data collected as well as easy and uniform understanding by all respondents, the closed questions dominated (22). The remaining three questions were open-type questions.

The results obtained from the survey were presented as graphs, tables and in a descriptive form. The description of the survey results was broken down into the six following areas:

- The period of plants' existence and operation and their size in terms of the number of employees.
- Production profile of the surveyed plants and their location and major outlets for their products.
- A knowledge of hazards to health safety caused by food produced in the surveyed plants.
- A knowledge of GHP/GMP rules and application of such rules in the surveyed plants.
- A knowledge of the HACCP system and practical aspects of its implementation.
- Benefits and difficulties resulting from the HACCP system implementation.

3. Results

Twenty percent of the questionnaires were filled in correctly. As regards the percentage of the questionnaires received, the highest was sent from wielkopolskie (20%), lubelskie (11%), małopolskie and pomorskie (10% each) provinces and the lowest—from świętokrzyskie, warmińsko-mazurskie and zachodnio-pomorskie provinces (3% each). No feedback responses were sent from lubuskie and podlaskie provinces (Fig. 1).

3.1. The period of plants' existence and operation and their size in terms of the number of employees

According to the information gathered, 68% of the plants that responded to the questionnaire carried out their operations for over 15 years, 21% for 8–15 years and the remaining 5–8 years (10%) and 1–3 years (1%).

Fifty percent of the evaluated plants employ over 150 people. 10% employ from 100 to 150 people and 6% from 81 to 100 people. Overall, they account for almost two thirds of the total number of the surveyed plants. The remaining one third are smaller plants employing from 1 to 10 people and from 31 to 50 (4% each), from 11 to 30 (15%) and from 51 to 80 workers (11%).

As for the size of surveyed plants in particular provinces, including employment levels, the situation is as follows: large plants which returned the questionnaires (over 101 employees) were mainly situated in opolskie, podkarpackie, świętokrzyskie and warmińsko-mazurskie (100% of questionnaires from each of these provinces). Smaller plants that responded to the questionnaire, employing from 1 to 50 people, were mainly located in dolnośląskie (80%) and łódzkie (60%) provinces. The biggest number of questionnaires from



Fig. 1. The administrative division of Poland.

medium-size enterprises, employing from 51 to 100 people, was sent from zachodnio-pomorskie (50%) and małopolskie (38%) provinces.

3.2. Production profile of the surveyed plants and their location and major outlets for their products

The biggest number of questionnaires was received from plants of the following production profile: fruit, vegetables and processed products thereof (11.2%), non-alcoholic beverages (10.3%), deep-frozen foods, meat, poultry and processed products thereof (9.5% each). The smallest number of questionnaires was received from plants producing edible oil and fats (0.9%), ice-cream, bakery products, food additives (1.7% each). No response was sent from establishments producing corn flakes, beer, eggs and processed products thereof.

Resulting from the analysis of the questionnaires, the products manufactured in the surveyed plants are most often sold to wholesalers (25% of respondents), to supermarkets and small shops (18%) and to hypermarkets (15%). The least frequently mentioned customers are open (11%) and close (10%) catering facilities.

This is confirmed by the responses to the questions concerning the order of product recipients from those ordering goods most frequently to those ordering goods least frequently in particular plants. The respondents most often indicated wholesalers (43% of the respondents) as the first customer, supermarkets (57%) as the second and wholesalers and supermarkets (mentioned by 32% of the plants) and small shops (18%) as the third customer. Open and close catering services were mentioned as the least frequently buying entities. Closed catering services listed as the seventh, last customer, was mentioned as the only one.

Out of the surveyed plants 65% export their products and the remaining 35% are not involved in exports.

3.3. Knowledge of hazards to health safety caused by food produced in the surveyed plants

In their response to the question concerning the type of hazards to health safety caused by the foodstuffs produced, most plants claimed that they were micro-biological and biological hazards (38.7%), among which mould was most frequently indicated (9.7%) and viruses least frequently (0.2%). Out of physical hazards (34%) metal particles and parts of timber were most often mentioned and out of chemical hazards constituting 27.3%—heavy metals (5.2%).

3.4. Knowledge of GHP/GMP rules and application of such rules in the surveyed plants

As for the knowledge of the GHP and GMP rules, 91% of the surveyed plants declared the familiarity with

the rules and a practical knowledge in this respect. This share includes all the surveyed plants from lubelskie, małopolskie, mazowieckie, opolskie, podkarpackie, pomorskie, śląskie, świętokrzyskie, warmińsko-mazurskie and zachodnio-pomorskie provinces. The remaining 9% of the plants which admitted that they were not fully aware of the GMP and GHP rules and did not fully implement them were located in dolnośląskie province—40% of the total number of respondents, kujawsko-pomorskie, łódzkie and wielkopolskie—20% of the total number of the surveyed plants in each of these provinces. It must be emphasised that larger enterprises, i.e. those employing from 51 to over 150 people, demonstrated a better knowledge of the GHP and GMP rules, whereas small plants, in particular those employing from 1 to 10 people (67%) were not fully aware of the rules. The situation related to the awareness of GMP and GHP rules depending on the production profile is shown in Fig. 2.

As regards the question about implementation of the programmes related to personal hygiene, washing and

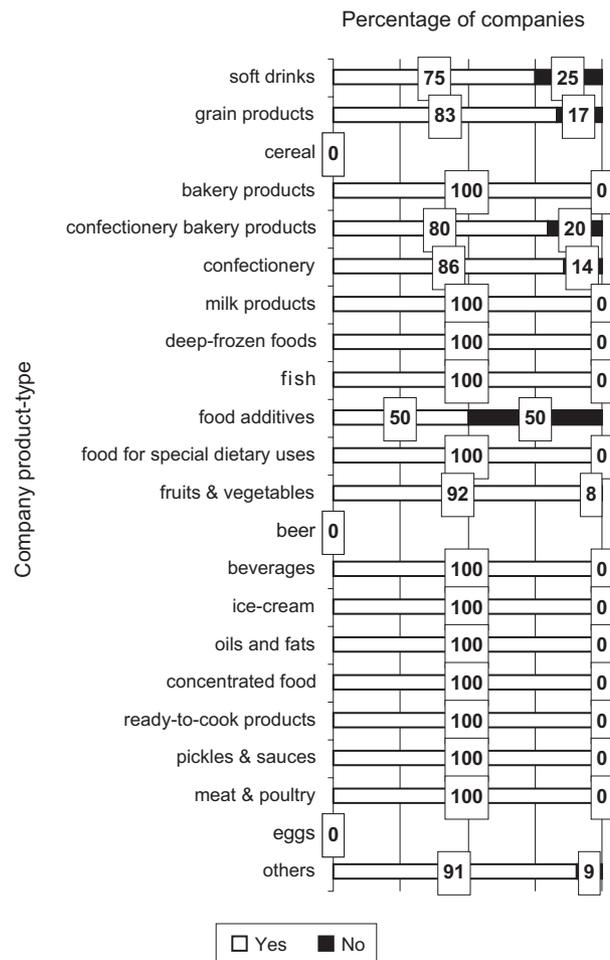


Fig. 2. Percentage of companies which claim either to have GMP and GHP systems, or not have it, versus company product-type.

disinfection procedures, water purity testing, removal of solid and liquid waste in the manner that protects against contamination of foodstuffs, regular control of pest presence, health condition, an initial and periodical medical check-up of the personnel and employees' qualification and training, the dominating majority of the plants declared that they had such programmes developed, over 60% of them employing more than 100 workers, i.e. larger enterprises.

The extent to which the programmes concerning particular aspects were implemented depending on the production profile is presented in Table 1.

The dominating majority of plants (84%) admitted that they provide training in GHP for their employees. These are mainly plants operating from 5 years (67%) to more than 15 years (98%) and from 1 to 3 years (100%). The correlation between training provision and the plant size was observed; the bigger the plant employing a large number of workers, the more often training in GHP is organised for the employees.

3.5. Knowledge of the HACCP system and practical aspects of its implementation

Familiarity with HACCP is confirmed by as many as 95% of the respondents. They claim that they familiarised themselves with the system mainly thanks to training (41%) and scientific and professional publications (35%). In the respondents' opinion colleagues from the industry, mass media and other sources of information played a less important role in disseminating the knowledge about the HACCP system (22%).

Almost all respondents (98%) who declared their familiarity with HACCP rules admitted that the system is necessary in the Polish food industry and as little as 3% thought that they could operate without it and the remaining 7% of plants had no opinion about it. 34% of the respondents implemented the system and 35% are in the process of implementing it. The plants which intend to implement HACCP constitute 28%.

The situation of the HACCP system implementation with regard to the plant size, province, production profile is shown in Figs. 3–5 respectively.

Older plants, operating for over 15 years, already have the system in place (75%) or are in the process of implementing it (67%).

There are no essential and noticeable regularities as regards the extent to which the system was implemented depending on the customer, however, the majority of those plants that export their products either implemented the system (88%) or are in the process of implementing it (67%), whereas those selling their output exclusively on the domestic market do not intend to implement HACCP (100% of the respondents who marked this response are plants not exporting their products).

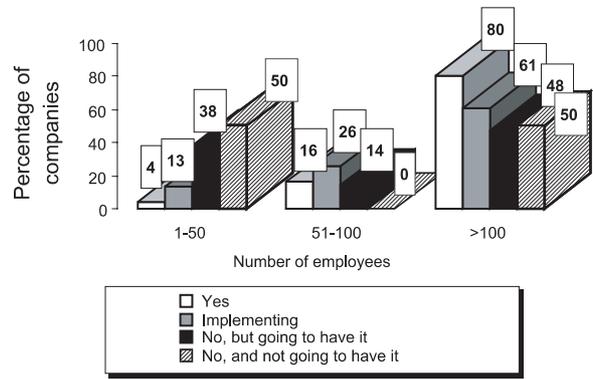


Fig. 3. Percentage of companies which claim either to have HACCP, or to be in the process of implementing one, or not to have it now, but going to implement it in the future, or not to have one and not going to have it ever, versus number of employees.

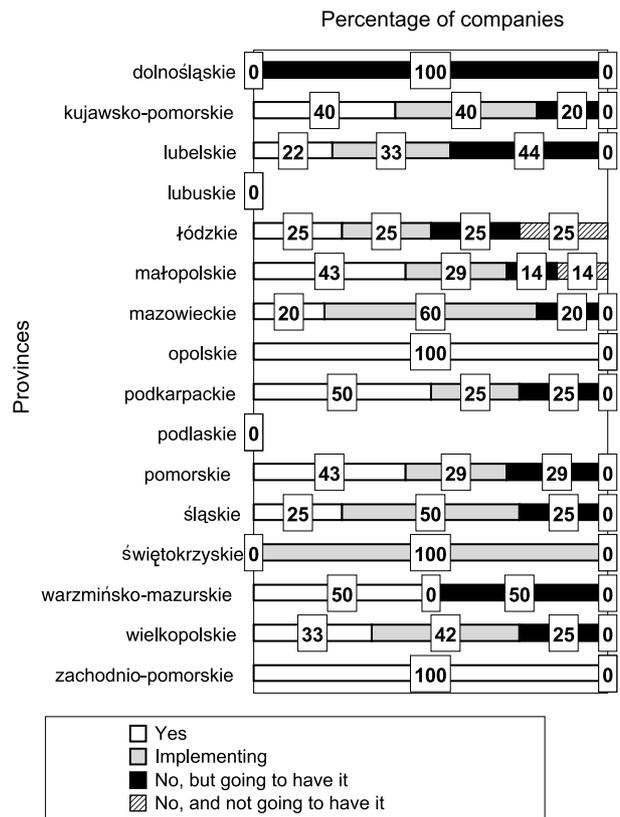


Fig. 4. Percentage of companies which claim either to have HACCP, or to be in the process of implementing one, or not to have it now, but going to implement it in the future, or not to have one and not going to have it ever, versus type of provinces.

Most of the plants, i.e. as many as 53% of all the enterprises that agreed to take part in the survey and are either in the process of implementing the system or already implemented it, declared that they reached stage 16, i.e. they are pursuing activities to maintain HACCP, 18%—stage 15, i.e. they are introducing the developed system and 12%—stage 14, i.e. they are elaborating

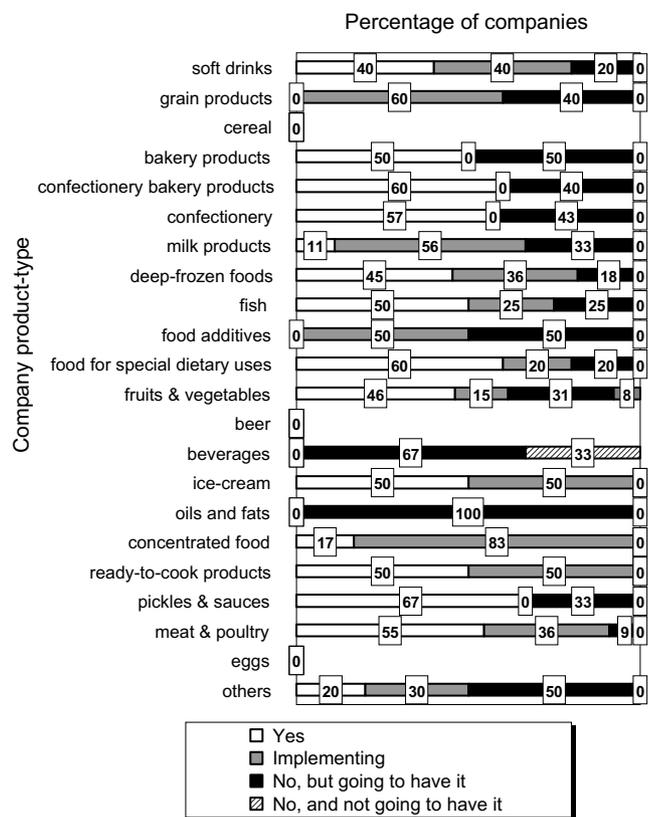


Fig. 5. Percentage of companies which claim either to have HACCP, or to be in the process of implementing one, or not to have it now, but going to implement it in the future, or not to have one and not going to have it ever, versus companies product-type.

model documents, provisions and rules for keeping documentation. Out of the plants that are in the process of implementing the system (35% of all the enterprises which have an orientation of the HACCP system), 36% are at stage 15 and 24 at stage 14.

3.6. Benefits and difficulties resulting from the HACCP system implementation

The respondents evaluated benefits resulting from the system implementation on a 5-point scale, the biggest benefits scoring 5 points and the smallest—1 point.

It turned out that the biggest benefit of the HACCP system implementation was the meeting of clients' expectations of the guarantee that the product they buy is safe and of high quality. Harmonisation of Polish legislation with that of the EU was also greatly appreciated (4 points) and the HACCP role in facilitating international trade and reducing the product defect rate, thus the enterprise financial losses, played a little less significant role (a little less than 4 points).

As regards major problems upon the system implementation, they include additional costs of equipment purchases, the requirement of professional management,

organisation and keeping the documentation (4 points each).

The last question of the questionnaire was whether the surveyed plants agree with the statement: "The HACCP system is the most effective tool to assure food product quality and safety and it is advisable to implement it in all sub-sectors of the food processing industry". Ninety-four percent of the surveyed plants responded positively to this question.

4. Discussion

The survey is an initial analysis aimed at determining to what extent Polish production plants are advanced in performing tasks concerning quality assurance systems such as GMP, GHP and HACCP. Majority of the surveys used in this research came from medium or large companies functioning on the market, therefore a complete picture of implementing quality assurance systems in the whole food producing and processing industry in Poland could not be established.

On the basis of gathered data it can be said that the surveyed had greater than the average awareness of the quality assurance systems and implemented the HACCP system or are interested in its implementation.

A very important fact is that these companies are able to indicate the hazards carried by the process of production and put them into an appropriate category. It is well known that correct and full identification of hazards is the fundamental aspect in the HACCP system implementation and maintenance (Witkowski, 2000).

Good Manufacture Practice and Good Hygiene Practice are prerequisites. Each company which is going to implement the HACCP system has to meet all the requirements concerning hygiene, included in adequate legal regulations as well as in the General Principles of Food Hygiene Codex, Codex Code of Practice (Orris & Whitehead, 2000). Only after bringing them into effect together with the superior rule that each work has to be well done first time, one can think about implementing HACCP system (Witkowska, 2000; Turlejska, Szponar, & Pelzner, 2000). As the research indicates, familiarity with the preliminary conditions is declared by 91% of the plants and the knowledge of these issues and practical implementation of the rules is better in large plants and employing more workers and those operating for a long period of time. The data were compared with the official control results as presented in special statistical forms MZ-48. The information obtained slightly differs from the assessments made by official food control bodies. This fact is confirmed by the survey carried out in 809 small and medium-size enterprises in European countries. The research proved that small enterprises invest much less in food hygiene than large enterprises (Gormley, 1995). That is why, on the threshold of the

entrance into the European structures of Poland and other candidate countries any help from the government and other organizations for the entrepreneurs should be aimed at small and medium companies (e.g., SAPARD, PHARE, Leonardo da Vinci).

The research showed that the companies have the most problems with working out a program of waste removal. This issue is particularly demonstrated in fish processing (Table 1). It is a hint for research institutions to draw up appropriate instructions in this field.

Experience from cooperation with the processing plants and from previous years' surveys (1998/1999) indicated that nearly all plants had had an incomplete knowledge of GMP and of the development and implementation of the HACCP system rules. It should be added that certain plants were not aware of the fact that HACCP could only be implemented when GMP rules covering production, food safety and hygiene were applied and when technological and technical requirements as well as those relating to personnel qualifications were met (Witkowska, 2000). The present survey demonstrates a significant progress made in the Polish food sector within the last three years. The progress proves that a change took place in Polish manufacturers' awareness of the approach to the safety of the products they manufacture and of the effectiveness of such knowledge dissemination through training, publications, media etc. Our research proved that training and publications are the most effective method of knowledge transmission.

According to Directive 93/43/EEC on the hygiene of foodstuffs, an establishment manufacturing food products must ensure that solely foodstuffs non-harmful to health are supplied on the market and the responsibility for delivering products safe for consumer is assumed by the producers (Thorpe, 1989). Also Polish legal regulations stipulate that it is the food manufacturers that bear responsibility for the safety of foodstuffs they produce (Article 5, paragraph 2 of the Law of 11 May, 2001 on health conditions of food and nutrition). The Law and an implementing regulation to it imposes on the producers the obligation to carry out internal control in the plant including the activities related to GMP and GHP and the evaluation of the HACCP system correctness and effectiveness based on its seven rules. The results of our survey demonstrate that almost all the surveyed plants (99%) are involved in internal control measures aimed at the safety and health quality of the manufactured foodstuffs, which proves that Polish plants adapted themselves to the EU requirements in this respect.

Persons involved in food production should take part in training in food hygiene at the level adequate for the tasks they perform (Kroll, 2000), (Kołożyn-Krajewska & Sikora, 2000). According to the current Polish law it is a duty of each new employee to go into training in the field of basic hygienic and sanitary requirements. After each

training the official control of food conduct the obligatory final exams. In addition entrepreneurs train their employees independently and make a record of each workshop on a special card with a signature of both the employer and the employee. The survey indicated that over 84% of the surveyed plants provide training in GHP/GMP rules for their employees. The remaining plants, which admitted that they did not provide training in GHP/GMP rules for their workers, are small enterprises. Thus, the earlier thesis, that small companies do not invest as much into realization of hygiene principles as the medium and large companies is confirmed.

A very positive fact is that 95% of the surveyed plants declared the familiarity with the HACCP system. The respondents admitted that main source is training and professional and scientific publications. Similar were the results of the survey carried out in 175 enterprises in the UK in which the main source of the knowledge about the system turned out to be articles from trade magazines and information from independent consultants (Panisello, Quantick, & Knowles, 1999). Hence, within the confines of help for the Polish food industry a great emphasis is put on GHP/GMP training as well as HACCP system training, which are aimed at individual categories and lines of food–nutrition companies and publishing of appropriate practical guides. Currently there are 16 such guides in Poland and still new ones are published.

Almost 90% of the surveyed plants are of the opinion that HACCP implementation in the Polish food industry is necessary. The respondents who were of a different opinion on the issue are from the plants which think of introducing the system or do not intend to implement it as long as possible, i.e. the enterprises which face the dilemma of a great deal of work ahead of them and the problem of funds to be spent on the system implementation. Such plants do not see HACCP benefits. This is due to non-full understanding of the system and the need of its application. This fact shows that there is still a need to provide training, consultation, to organise scientific conferences and to publish documents on the subject.

Thirty-four percent of the surveyed plants declare that they implemented the HACCP system and 35% are in the process of implementing it. The survey proved that the extent to which the HACCP system is implemented depends on several factors:

- regionalisation—province,
- production profile,
- the size of a plant and the period of its operation,
- exports to European countries.

As regards the HACCP system implementation in particular provinces, the most satisfactory situation is observed in opolskie and zachodnio-pomorskie provinces,

whereas the worst situation in plants in małopolskie and łódzkie provinces (where fruit and vegetable processing plants and beverage enterprises dominate) and dolnośląskie province. This implies that the situation must be improved in these provinces.

Amongst the plants that already have the system or are in the process of implementing it, larger plants and those with long-term tradition dominate. This situation is supported by the research published in literature (Panisello et al., 1999). This can be explained by the willingness to maintain consumers' confidence in the trade mark of the enterprise or product for which the enterprise has worked hard for years and which motivates the manufacturers to produce attractive foodstuffs safe for consumers' health and of the highest quality. Such correlation is confirmed by the survey described in this work as the respondents considered the meeting of consumers' expectations of safe and high quality products as the greatest benefit of the HACCP system implementation. Similar results were obtained by Panisello et al. (1999) and Henson, Holt, and Northen (1999) who proved that the greatest benefit for the enterprise from the HACCP system implementation is increased certitude about maintaining the clientele.

Certainly, the fact that a particular enterprise is involved in exporting its goods has impact on the HACCP system implementation. Those plants which export their products to the Western European markets are much more advanced in HACCP implementation, whether completed or in progress, than those not involved in exports to these countries. This is closely connected with the existing legislation in EU member states and therefore in order to maintain their customers, Polish plants have to manufacture their products in line with the HACCP rules.

On the other hand, no correlation was demonstrated between the application of the HACCP system and the type of Polish customers (e.g., wholesalers, supermarkets, hypermarkets). This can be justified as so far Polish customers have not required that the producers should document the manufacture of their products based on the system (Panisello et al., 1999).

The most serious problem upon the system implementation in the Polish reality turned out to be additional costs related to the equipment purchase and the requirement of the professional system of management, organisation and keeping the documents. Henson et al. (1999) argued that problem number one in the UK was labour consumption and no time for making entries and keeping the system documents as well as training for the personnel and Torres (2000) claimed that the reason for major problems in implementing the system for fish products in Cuba were the differences in the criteria of identifying the critical control points, the financing of the process and training for employees. The observation shows that Polish entrepreneurs are most anxious about

the costs of implementing the system. This false assumption grew on the lack of knowledge and understanding of the system's essence among entrepreneurs and mass media. It should be remembered that not in each case the expensive, professional electronic equipment is necessary for monitoring; an appropriate, cheaper thermometer is enough to measure the temperature by hand. Moreover, small and medium companies (that is the poorer ones) can apply for subsidies within help programs, which were mentioned earlier.

The carried out survey gave the picture of the GMP, GHP and HACCP implementation in the Polish food industry. Due to a small number of the questionnaires returned (20%), it is planned to monitor activities pursued for the sake of the quality systems GMP, GHP and HACCP in production plants as well as in catering facilities as such action will permit to compare the advancement level of activities in this respect in Poland and EU member states. The results thus obtained could be the basis for establishing motivation systems for plants and creating appropriate state policy vis-à-vis implementation of quality assurance systems.

5. Conclusions

- Unfortunately, the results are not representative for the whole country's food production and processing plants. It may be said that companies which responded to the survey constitute a more conscious part of those companies.
- Over 91% of the surveyed companies declare that they have knowledge and practically realize the principles of GHP. However, the number of set and implemented programs referring to the principles of GHP varies depending on the kind and size of a company as well as on its localization.
- The larger companies, employing over 50 people, realize programs referring to the main areas of GHP to a greater extent than the small companies, employing up to 50 people.
- Almost 9% of the surveyed companies admit that they do not fully know and implement the principles of GHP limiting them to processes of washing and disinfection, and personal hygiene of the employees.
- Over 84% of the surveyed companies give their staff trainings in realization of the principles of GHP. These trainings are conducted in both companies new on the market and companies with long-term traditions.
- Companies employing more people attach greater importance to professional training of their staff than small companies.
- The gathered information showed that the main reasons for implementing HACCP system among the companies which responded to the survey are meeting the client's expectations of guaranteeing a safe, high

quality and healthy product, conforming to legal regulations, and for economical considerations.

- This need is particularly seen in larger companies, with bigger numbers of employees, which are functioning on the market for a longer time. The driving force behind implementing HACCP system is export of the products or consumers' demands.
- The level of implementing the HACCP system in the surveyed companies is satisfactory.
- In the surveyed companies knowledge about hygiene of production and systems of quality assurance is most often gained in trainings and through professional literature reading.

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