

# Total food chain safety: how good practices can contribute?

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Consumer concern about treats associated with food is growing. Due to recent food crises in Europe, food quality and food safety have become a hot topic in mass media. "Food safety" is a broader term, which means an assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use. Today we master food safety with different good practices which are the consequence of human culture, history and lifestyle. If we analyse good practices in the broad spectre of food area we could arrange them in three categories. First category of good practices is directly connected with food technology (i.e., Good Manufacturing Practice – GMP). Second category is indirectly connected with food issues (i.e., Good Research Practice – GRP, Good Educational Practice – GEP, Good Training Practice – GTrP). Third category deals with all the activities regarding consumers' food handling (Good Housekeeping Practice – GHKP). Consumers are not connected to food supply chain according to chain principles. Consumer behaviour and attitudes toward food safety have shown that the levels of understanding, motivation and trust need to be further cultivated. It has been shown that present maintenance of food safety in food supply chain can be easily broken down, because of different kind of barriers or simple misunderstanding. Therefore a new approach called "Good Nutritional Practice" (GNP) was coined to manage food safety. It is important to reconstruct the existent food safety system with GNP which includes consumers, and is based on a model that covers

subsystems from other good practices. Food safety point of view should be focused on knowledge, constant education and exchange of information. "From Farm to Table" approach is a philosophy with an important goal: safe and healthy food for all consumers. With this aspect in mind, we are building foundation for Good Life Practice.

## Background

Time scarcity, the feeling of not having enough time, has been implicated in changes in food consumption patterns such as a decrease in food preparation at home, an increase in the consumption of fast foods, a decrease in family meals, and an increase in the consumption of convenience or ready-prepared foods (Jabs & Devine, 2006). Traditional understanding of foodstuffs supplying system is changing constantly as well as incidence of foodborne diseases (Raspor, 2004). New hazards that could affect human health are continuously being identified (Nguz, 2007). Analysis shows an increase of viral infections in comparison with classical bacterial infections (Raspor, 2004). Consumers have become very critical about food safety and food quality due to a number of food affairs which have received a great deal of media attention (Käferstein, Motarjemi, & Bettcher, 1997; Redmond & Griffith, 2003; Rocourt, Moy, Vierk, & Schlundt, 2003; Sun & Ockerman, 2005). The globalization of food trade and increasing problems world wide with emerging and re-emerging foodborne diseases have increased the risk of rapid spread of infectious agents (Käferstein *et al.*, 1997; Redmond & Griffith, 2003). Foodborne diseases present a serious challenge to public health in developed countries. In less developed countries, neglect of the problem can constitute a major threat to health and development itself (Ehiri, Morris, & McEwen, 1997). Motarjemi and Mortimore (2005) emphasized that ensuring food safety in today's complex world is a daunting task and is possible only with a concerted effort of all sectors including government, consumer organizations and industry (a concept that the WHO describes as *shared responsibility*).

Federal and international agencies are acting to encourage better public health protection. One of the principal actions has been the development of HACCP based regulations or by federal agencies and the United Nations Codex Alimentarius Commission (Sperber, 1998). New European Union Food Hygiene Regulations require that all food

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businesses (except primary producers) implement food safety management procedures based on HACCP principles from 2006. The principal objective of the new general and specific hygiene rules is to ensure a high level of consumer protection with regard to food safety (Regulation EC, 2004).

Lately, authors of technical and scientific articles (Azanza & Zamora-Luna, 2005; Henroid & Sneed, 2004; Taylor & Taylor, 2004a, 2004b; Vela & Fernández, 2003) started to doubt about the efficiency of HACCP system, especially in small and medium sized enterprises (SMEs) and began to search for potential causes for potential failures and reduction of system efficiency. Meta-analysis of barriers during HACCP implementation has shown that among 21 elements, we can allocate seven elements (training, human resources, planning, knowledge and competence, documentation, resources, management commitment) representing almost 50% (47.8%) of all identified barriers. The influence of each element on HACCP efficiency was ranked according to frequency of their citation in analysed studies (Jevšnik, Hlebec, & Raspor, 2006). Practical experience and a review of food safety literature performed by Taylor and Kane (2005) indicate that success in developing, installing, monitoring and verifying a successful HACCP system depends on overcoming a complex mix of managerial, organisational and technical hurdles. Even the largest and well equipped food companies with significant resources of money, technical expertise and management skills face a difficult challenge; while the SMEs often feel that the difficulties of HACCP are potentially insurmountable (Taylor & Kane, 2005). The fact that a person is and will be responsible for HACCP implementation and further control calls for an in-depth analysis and understanding of individual's reaction to received information (Jevšnik *et al.*, 2006). This can be approached from different perspectives as was indicated already in 2001 for complex behavioural barriers in food safety area (Gilling, Taylor, Kane, & Taylor, 2001).

Owners or managers are mostly not convinced that HACCP is either effective or practical for their businesses (Taylor, 2001); they also have insufficient knowledge of

food safety requirements and mostly they are not competent to educate their employees. Wallace (2001) emphasized that it is important to consider the different levels of HACCP training needed for an organization. Selection of competent food safety educators seems to be the most important thing to achieve proper attitude of people and performance of technical solution required to implement HACCP. Clayton, Griffith, Price, & Peters (2002) found that an increase in the knowledge of a food handler does not necessarily change their food handling behaviour and it depends upon their attitude. These are some of the main reasons that FBD still occur despite the widespread use of HACCP approach.

Food contamination creates an enormous social and economic burden on communities and their health systems. In the USA, diseases caused by the major pathogens alone are estimated to cost up to US \$35 billion annually (1997) in medical costs and lost productivity. The re-emergence of cholera in Peru in 1991 resulted in the loss of US \$500 million in fish and fishery product exports that year (WHO, 2007). Redmond and Griffith (2003) assembled the annual data of foodborne diseases and food related illnesses in some countries. The results showed that 130 million Europeans, 2.1–3.5 million Great Britons from England and Wales, 76 million Americans, and 4.7 million Australians have been affected. Direct comparison of incidence data is not possible because of differences in national surveillance systems; however, it has been suggested that Australia, the United Kingdom, and the United States appear to have similar incidences of FBD. Fielding, Ellis, Beveridge, and Peters (2005) cited that food poisoning outbreaks usually occur from SMEs in the UK food manufacturing industry.

Foodborne disease is a public health problem, which comprises a broad group of illnesses (Tucker, Whaley, & Sharp, 2006). From the available data reported by WHO (Rocourt *et al.*, 2003), time/temperature abuse appears to be the most frequent contributing factor in 11 OECD countries. Factors involved in foodborne diseases (Fig. 1)

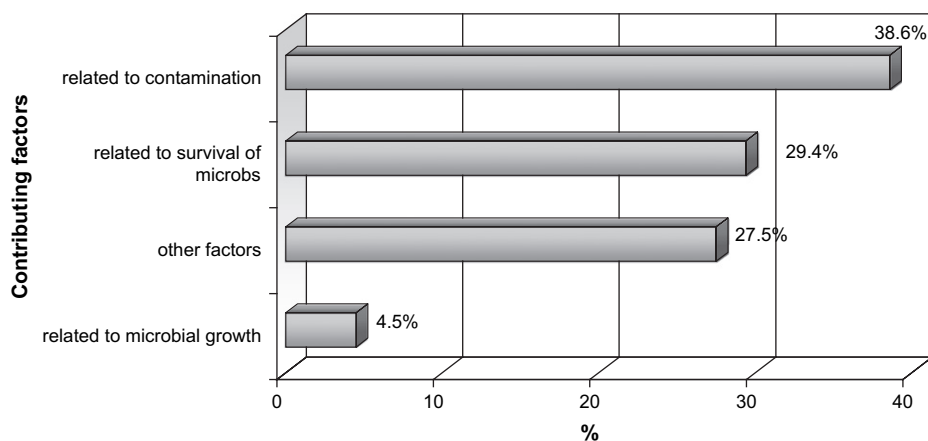


Fig. 1. Contributing factors to foodborne diseases outbreaks.

represent four main groups of contributing factors, related to contamination, to survival of microorganisms, to those related to microbial growth that can contribute to outbreaks and other factors, mostly of unknown source.

However, in daily practice most of the critical points are hanging on particular person on particular place. If we do not perform adequate training, appropriate education within human resources we can not expect to have professionals with highly developed skills or high knowledge what makes relevant control and documentation.

We are facing on one side with insufficient knowledge and awareness of food safety issues among food workers and on the other side we have insufficient informed consumers about food safety principles at home. Clayton and Griffith (2003) cited that foodborne diseases caused by microbiological hazards is a large and growing public health problem in Europe and worldwide. They resumed that between 50% and 87% of reported foodborne disease outbreaks in various countries throughout the world have been associated with the home. Epidemiologic surveillance summaries of foodborne diseases clearly indicate that consumer behaviours, such as ingestion of raw/undercooked foods and poor hygienic practices, are important contributors to outbreaks of foodborne diseases (Patil, Morales, Cates, Anderson, & Kendal, 2004). Raspor, Jevšnik, and Hlebec (2006) found out some discrepancies between actual food handling practices and consumers knowledge about food safety principles (Fig. 2). It was shown that

half of respondents think that short time of transport is important for raw meat, while only a third of them follow the cold chain principles of perishable foodstuffs. The results of the study by Raspor *et al.* (2006) as some other similar studies (Badrie, Gobin, Dookeran, & Duncan, 2006; Medeiros *et al.*, 2004; Patil *et al.*, 2004) have shown that consumers are aware of and are thinking about food safety, but there are also gaps in food safety knowledge which may result in foodborne diseases. Authors suggest that a significant proportion of inappropriate handling of food could be prevented through an integrated approach in which knowledge of home food practice is promoted (Bloomfield & Scott, 2003; Kendall *et al.*, 2004; Kennedy *et al.*, 2005; Li-Cohen & Bruhn, 2002; Raspor *et al.*, 2006; Redmond & Griffith, 2003; Unusan, 2007). Home food preparers need knowledge and skills for effective food handling but also they have to be motivated to act upon that knowledge as preconditions to behaviour change (Medeiros *et al.*, 2004). It is obvious that consumers are not provided with sufficient, processed and easy-to-understand information (Banati & Lakner, 2006).

### Assuring acceptable food safety

During the years, several scientific and technical recognitions have developed and formed principles and techniques how to achieve acceptable food safety in certain surroundings. Considering differences of environmental wealth, cultural differences and ways of work, many

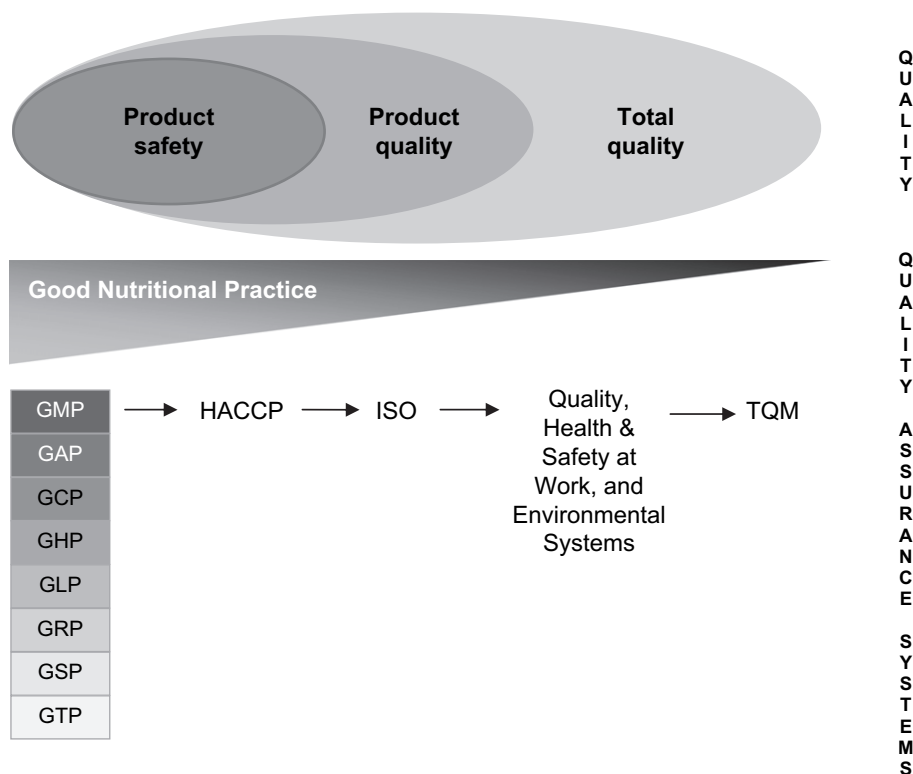


Fig. 2. Integration of good nutritional practice in quality systems.

ways of production, breed, preservation and preparation of food have developed, that offer people relatively safe way to survive. During many decades in former century all this knowledge has been systematically included into regulation on one side and forming some of the practical principles of work on the other side, that have been later included into regulation. The HACCP system represents the most intelligible example of this development (Raspor, 2002).

At the same time, producers started to think about integrity control of individual stage and activity in production chain. Positive experiences have developed and today we call it “Good Manufacturing Practice” (GMP). From its first rules and principles in year 1968, the World Health Organization (WHO) set the course about meaning of enacting standard procedures dealing with personal, building, equipment, documentation, production and quality control (Zschaler, 1989).

Concerning fact is that some food industries do not understand the concept of good practices or even worse, they are afraid that they will weaken the effectiveness of HACCP system. The question appears: “Pre-requisites: a help or a hindrance to HACCP?” (Wallace & Williams, 2001) or how to restore effective foundations to link food safety chain into concluded circle, which will be based on trust between particular units. From the reports about food poisoning, we can see the need to search for the cause for this uncontrolled part and other drawbacks of the system. Motarjemi and Käferstein (1999) asked: “Is the number of increasing food poisoning, paradox or failure of HACCP system?” We get more and more evidences about its incorrect interpretation (Untermann, 1999), complexity (Sperber, 2005b) and fast establishing, without preliminary establishing of supporting systems of good practice that work, and are groundwork for its reinstatement. Food safety is not a synonym for HACCP system (Sperber, 2005a), so dilemma about effectiveness of the existent system is justified. The system itself without adequate support of appropriate good practice is not a guarantee for food poisoning prevention (Mortimore, 2001; Motarjemi & Käferstein, 1999).

Good practices are described in several different Codes of Practice designed by producers’ organizations (e.g., Europe/Africa–Caribbean–Pacific Liaison Committee – COLEACP), importers and retailers consortia (e.g., British Retail Consortium – BRC, Food Policy Council – FPC, Commission for Instruments and Methods of Observation – CIMO, Euro-Retailer Produce Working Group – EUREP) and Government bodies representing consumers (e.g., UK Food Standards Agency). In general, good practice means activity of the quality assurance which ensures that food products and food related processes are consistent and controlled to assure quality procedures in food systems. Quality can be divided into several quality aspects (Fig. 2). Each quality assurance system is focused on particular one (i.e., food safety includes GMP, HACCP, BRC; food quality is

focusing on International Standards Organization – ISO, BRC, etc.; organization quality link together more standards, that is, ISO and BRC; Environmental quality, Safety at work also include systems; total quality act from management aspect – Total Quality Management). As it was written by Mayes and Mortimore (2001), the future of HACCP must take into account the roles played by several other food safety management systems.

Good practices support development in the last 50 years, with constant rate, enabling integration into all activities, which are important in food industries specific for each individual branch (Heggum, 2001; Raspor, 2004). Definition by Food and Agriculture Organisation (FAO) described good practice as any collection of specific methods that produce results that are in harmony with the values of the proponents of those practices. In agriculture, it applies to available knowledge to address environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products (FAO, 2006).

Precise analyses of good practices showed that they are introverted and they are limited within their own frame of activity and they do not generally show intention to be fused with neighbouring or related good practice. However, it has to be stressed that all good practices have intention to provide consumers with safe and quality products. Each good practice has its own primary issues forming basis for other elements, which together determine the extent of particular good practice (Raspor, 2006).

If we analyse good practices in the broad spectre of food area we could arrange them in three categories. First category of good practices is directly connected with food technology (i.e., Good Manufacturing Practice – GMP). GMP connects all factors that assure quality, safety and effectiveness of food, according to its specification and purpose. Clearly set principles and success of GMP have set foundation to develop many other good practices. Good practices directly connected to food issues are presented and explained in Table 1.

Second category is indirectly connected with food issues (i.e., Good Research Practice – GRP, Good Educational Practice – GEP, Good Training Practice – GTrP). In addition to this, we can allocate third category which in our view would be needed but it is not present. This practice should deal with all the activities regarding food in our home places (i.e., Good Housekeeping Practice – GHKP).

The importance of restoring the systems based on analysis of all relevant practices contributing to food safety has been stressed along the principles: “From stable to table”, “From farm to fork”, “From spring to drink” (Raspor, 2004; Raspor, 2006). In classical food chain strategy all relevant activities are taken for benefit of human being but locating consumer outside the system. Consumer should be integral part of food safety systems because it is a vital link between retail and home. We expected that well developed consumer would start to obey “Good Housekeeping

Table 1. Good practices in food supply chain	
Type of practice	Explanation
GAP	Good Agricultural Practice is selection of the methods of land use which can best achieve the objectives of agronomic and environmental sustainability in primary food production.
GCP	Good Catering Practice consists of practical procedures in catering. The Guidelines concentrate on the essential steps needed to ensure that the food served is always safe and wholesome.
GHP	Good Hygiene Practice consists of practical procedures and processes that return the processing environment to its original condition (disinfection or sanitation programmes); keep building and equipment in efficient operation (maintenance programme); control of cross-contamination during manufacture (usually related to people, surfaces, the air and the segregation of raw and processed product).
GLP	Good Laboratory Practice consists of a qualitative system governing organisational processes and conditions of planning, implementing, controlling, recording and reporting. The principles which consist of GLP are intended to identify the GLP requirements for test facilities (laboratories) which perform studies for regulatory purposes.
GMP	Good Manufacturing Practice consists of practical procedures and processes that ensure quality system, provide consistent manufacture and control of products by qualitative criteria and conformity assessing criteria with intended purpose as required by the marketing authorisation and specification of the product. It is part of the quality assurance which ensures that food products are consistently produced and controlled to the quality standards appropriate to their intended use.
GRP	Good Retail Practice consists of practical procedures and processes that ensure the right products are delivered to the right addressee within a satisfactory time period and at required conditions. A tracing system should enable any faulty product to be found and there should be an effective recall procedure.
GSP	Good Storage Practice consists of practical procedures and processes that ensure appropriate handling of foods, regarding implementation and control of product storage in accordance with a defined regime prior to their use.
GTP	Good Transport Practice consists of practical procedures and processes that ensure a qualitative system governing the organization, implementation and control of transport of food products from the producer to the final user.

Practice” (GHKP). GHKP is selection of the principles and techniques of food storage and preparation at home performed directly by consumer. According to considerable number of foodborne diseases occurring in domestic food preparation, it is obvious that we do not have GHKP and we neglect fact that consumer makes crucial link in food system chain.

It has been shown that present maintenance of food safety in food supply chain can be easily broken down,

because of different kind of barriers or simple misunderstanding. Therefore, a new approach is needed. In Fig. 3 is presented new concept called “Good Nutritional Practice” (GNP) which consists of good practices interlinked with GHKP.

### Consumer – neglected link in food chain

Food science and technology as a profession is responsible for all technical aspects of development of food products, food processes, and distribution of these products to consumers. Understanding food safety term along the food supply chain has various dimensions. In the food safety programme, we should be able to identify all hazards, analyse them, evaluate the likelihood of their occurrence and identify measures for their control (Raspor, 2004).

Since the ultimate target of these efforts is the satisfaction of the consumer, it is essential to consider not only the objective consumer needs (e.g., nutrition, safety, affordability), but also subjective aspects of consumer satisfaction (e.g., sensorial properties and consumer attitudes). We have to analyse comprehensively this issue and react in accordance with knowledge and skills of current technology. We have to educate consumer to be able to cope with this novelties simultaneously (Raspor, 2006). The meaning of the term “Food Safety” is well known and defined in expert circles, but when we are analysing how it is interpreted by consumers new dimensions are opening. Jevšnik *et al.* (2006) have analysed consumer interpretation of term food safety and classified statements in six categories (Fig. 4).

Ensuring safe food for the consumer is in the period of globalization, responsibility and constant task in developed and developing countries. Slovenia is trying, as all other EU countries, to homogenize legislation and set control over food production and trade. In our overview article, we uncovered the fact that there is no shared definition and understanding of food safety globally due to good practices. We found a variety of dictionary items and interpretation from different perspectives, but the point is, that we do not treat food safety as a food safety cycle “from the farm to the table” (Raspor & Jevšnik, *in press*). That is why GNP must be a link in the global vision of safety control, which begins and ends in the concern for consumer. But consumer is the one that is not informed enough on ensuring safe food (Marklinder, Lindblad, Eriksson, Finnson, & Lindqvist, 2004; Reid, Wood, & Kinney, 1998).

### New food safety concept

In all of mentioned practices are HACCP elements that compose HACCP system as main system in food practice today. All practices are partial and are not connected in comprehensive system. For solving the existing barriers in implementing and maintaining food safety system in all steps in food chain, it is necessarily to link-up of all relevant good practices to the one, named Good Nutrition Practice (GNP), which could solve many issues since it

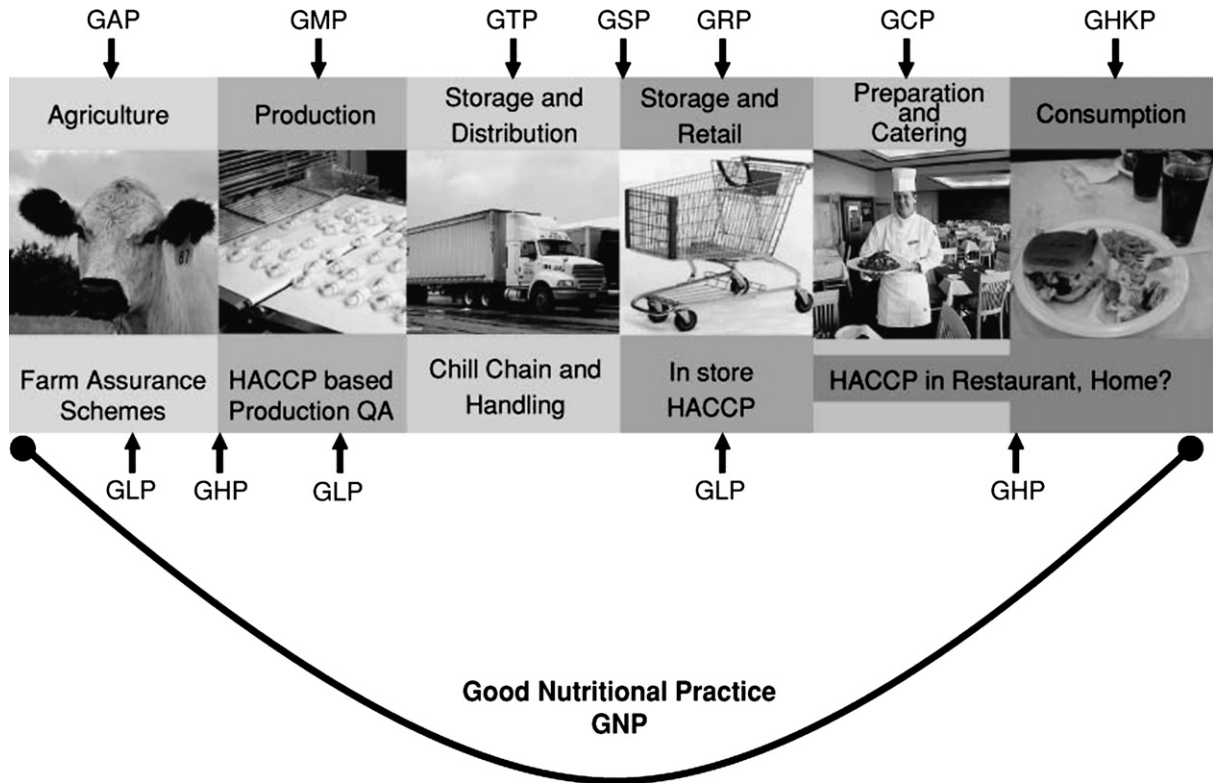


Fig. 3. Good Nutrition Practice (GNP) interlinking relevant good practices in food supply chain.

involves the last step in food chain – the consumer. This term should not be confused with Total Diet Study (TDS) which has completely different goal. TDS is ongoing activity of U.S. Food and Drug Administration adopted with some other countries and recommended by WHO and covers ingestion of excessive amounts of contaminants *via* food supply chain which can have determinative effect on human health (Pennington & Gunderson, 1987). In our case consumer behaviour and attitudes toward food safety show that the levels of understanding, motivation and trust need to be further cultivated and raised. It has been shown

that present maintenance of food safety in food chain can be easily broken down, because of different kind of barriers or simple misunderstanding. GNP should be adopted to balance food safety. It is important to reshape the existent food safety systems with GNP which would cover subsystems from other relevant good practices (Raspor & Jevšnik, in press).

If we do not perform adequate training and appropriate education within human resources we can not expect to have professionals with highly developed skills or high knowledge what makes relevant control and documentation.

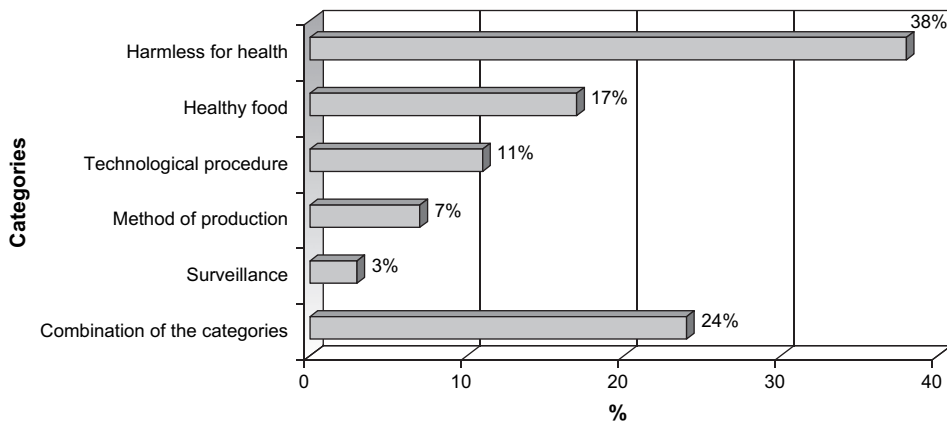


Fig. 4. Understanding consumers' interpretation of term "Food Safety" (content analysis of 920 consumers answers).



Fig. 5. Good Nutritional Practice as basis for launching Good Life Practice (GLifeP) principles.

The goal can be achieved only with global co-operation with all who are involved in different kind of food activities like government, teachers and professors, controllers, producers, food processors, transporters and trade, catering and ourselves – consumers who stand at the end of the chain.

Development of food safety perception and food awareness perception with integration of all relevant practices in GNP is creating solid bases for further holistic integration of human. Consequently, it can be expected that harmonization of some cultural, religious and food habits will establish principles of Good Life Practice (Fig. 5).

However, this process will not proceed very fast due to culture and other differences, but also due to the fact that we permanently stick to traditional values which are not always in accordance with new findings in natural and social sciences. It would be immature not to face obvious development in this field. In last 100 years, we experienced partition of food supply chain to single elements and we deeply analysed them but we have not been able to solve the problem of food safety and quality. It is obvious that atomization is not universal key to manage food supply chain. It looks that holistic approach which integrates the findings to proper element in food supply chain will be proper solution for human needs and it is embedded in GNP. We do not see last 100 years development as misinvestment of time and energy, but continuation of partitioning will not add value as clustering and integration of findings to traditional values, considered by educated and consciousness consumer.

### Future trends

Food safety is a result of several factors: legislation should lay down minimum hygiene requirements; official controls should be in place to check food business operators' compliance and food business operators should establish and operate food safety programmes and procedures. In theory it seems that we manage food safety completely but practical experiences show some deviations. For that reason we have to proceed to new solutions which are based on

synthesis of all relevant key factors included in food supply chain. Cluster of good practices enriched with Good House-keeping Practice is presented as Good Nutritional Practice and shall be novel proactive approach for food safety in human nutrition. Food safety platform with consumer as an active partner in the GNP will function when GHKP will actually enter our daily life. We should not forget human proactive approach in nutrition, which will bring consumer in the future to the next level of development, where Good Life Practice will support human needs.

### Acknowledgment

The author would like to express his gratitude to Ms Mojca Jevšnik for her help during preparation of this manuscript.

### References

- Azanza, M. P. V., & Zamora-Luna, M. B. V. (2005). Barriers of HACCP team members to guideline adherence. *Food Control*, 16(1), 15–22.
- Badrice, N., Gobin, A., Dookeran, S., & Duncan, R. (2006). Consumer awareness and perception to food safety hazards in Trinidad, West Indies. *Food Control*, 17, 370–377.
- Banati, D., & Lakner, Z. (2006). Knowledge and acceptance of genetically modified foodstuffs in Hungary. *Journal of Food and Nutrition Research*, 45(2), 62–68.
- Bloomfield, S. F., & Scott, E. A. (2003). Developing an effective policy for home hygiene: a risk-based approach. *International Journal of Environmental Health Research*, 13, S57–S66.
- Clayton, D. A., & Griffith, C. J. (2003). An investigation of the factors underlying consumers' implementation of specific food safety practices. *British Food Journal*, 105(7), 434–453.
- Clayton, D. A., Griffith, C. J., Prize, P., & Peters, A. C. (2002). Food handlers' beliefs and self-reported practices. *International Journal of Environmental Health Research*, 12, 25–39.
- Ehiri, J. E., Morris, G. P., & McEwen, J. (1997). A survey of HACCP implementation in Glasgow: is the information reaching the target? *International Journal of Environmental Health Research*, 7, 71–84.
- FAO. (2006). Glossary. <[http://www.fao.org/ag/wfe2005/glossary\\_en.htm](http://www.fao.org/ag/wfe2005/glossary_en.htm)>
- Fielding, L. M., Ellis, L., Beveridge, C., & Peters, A. C. (2005). An evaluation of HACCP implementation status in UK small and medium enterprises in food manufacturing. *International Journal of Environmental Health Research*, 15(2), 117–126.

- Gilling, S. J., Taylor, E. A., Kane, K., & Taylor, J. Z. (2001). Successful hazard analysis critical control point implementation in the United Kingdom: understanding the barriers through the use of a behavioural adherence model. *Journal of Food Protection*, *64*, 710–715.
- Heggum, C. (2001). Trends in hygiene management – the dairy sector example. *Food control*, *12*, 241–246.
- Henroid, D., & Sneed, J. (2004). Readiness to implement hazard analysis and critical control point (HACCP) systems in Iowa schools. *Journal of the American Dietetic Association*, *104*(2), 180–185.
- Jabs, J., & Devine, C. M. (2006). Time scarcity and food choices: an overview. *Appetite*, *47*, 196–204.
- Jevšnik, M., Hlebec, V., & Raspor, P. (2006). Meta-analysis as a tool for barriers identification during HACCP implementation to improve food safety. *Acta Alimentaria*, *35*(3), 319–353.
- Käferstein, F. K., Motarjemi, Y., & Bettcher, D. W. (1997). Foodborne disease control: a transnational challenge. *Emerging Infectious Diseases*, *5*, 607–625.
- Kendall, P. A., Elsbernd, A., Sinclair, K., Schroeder, M., Chen, G., Bergmann, V., et al. (2004). Observation versus self-report: validation of a consumer food behavior questionnaire. *Journal of Food Protection*, *67*(11), 2578–2586.
- Kennedy, J., Jackson, V., Blair, I. S., McDowell, D. A., Cowan, C., & Bolton, D. J. (2005). Food safety knowledge of consumers and the microbiological and temperature status of their refrigerators. *Journal of Food Protection*, *68*(7), 1421–1430.
- Li-Cohen, A. E., & Bruhn, C. M. (2002). Safety of consumer handling of fresh produce from the time of purchase to the plate: a comprehensive consumer survey. *Journal of Food Protection*, *65*(8), 1287–1296.
- Marklinder, I. M., Lindblad, M., Eriksson, L. M., Finnson, A. M., & Lindqvist, R. (2004). Home storage temperatures and consumer handling of refrigerated foods in Sweden. *Journal of Food Protection*, *67*, 2570–2577.
- Mayes, T., & Mortimore, S. (2001). The future of HACCP. In T. Mayes, & S. Mortimore (Eds.), *Making the most of HACCP. Learning from others' experience* (pp. 265–277). Cambridge: Woodhead Publishing Limited.
- Medeiros, L. C., Hillers, V. N., Chen, G., Bergmann, V., Kendall, P., & Schroeder, M. (2004). Design and development of food safety knowledge and attitude scales for consumer food safety education. *Journal of the American Dietetic Association*, *104*, 1671–1677.
- Mortimore, S. (2001). How to make HACCP really work in practice. *Food Control*, *12*(4), 209–215.
- Motarjemi, Y., & Käferstein, F. (1999). Food safety, hazard analysis and critical control point and the increase in foodborne diseases: a paradox? *Food Control*, *10*, 325–333.
- Motarjemi, Y., & Mortimore, S. (2005). Industry's need and expectations to meet food safety, 5th International meeting: Noordwijk food safety and HACCP forum 9–10 December 2002. *Food Control*, *16*, 523–529.
- Nguz, K. (2007). Assessing food safety system in sub-Saharan countries: an overview of key issues. *Food Control*, *18*(2), 131–134.
- Patil, S. R., Morales, R., Cates, S., Anderson, D., & Kendal, D. (2004). An application of meta-analysis in food safety consumer research to evaluate consumer behaviours and practices. *Journal of Food Protection*, *67*(11), 2587–2595.
- Pennington, J. A. T., & Gunderson, E. L. (1987). History of the Food and Drug Administration's Total Diet Study – 1961 to 1987. *JAOC*, *70*(5), 772–782.
- Raspor, P. (2002). *Handbook for establishment and conducting HACCP system*. Ljubljana: Slovenian Institute of Quality, Biotechnical faculty. 598 pp.
- Raspor, P. (2004). Opening ceremony. In Book of abstract. New tools for improving microbial food safety and quality. Biotechnology and molecular biology approaches, 12–16 September 2004, Portorož, Slovenia, (pp. 3–4).
- Raspor, P. (2006). Faces of foods on the world of food systems (Editorial). *Acta Alimentaria*, *35*(3), 247–249.
- Raspor, P. & Jevšnik, M. (in press). Good nutritional practice from producer to consumer inclusive. *Critical Reviews in Food Science and Nutrition*.
- Raspor, P., Jevšnik, M., & Hlebec, V. (2006). Consumers awareness of food safety from shopping to eating. In D. Bánáti (Ed.), *Nutrition and food safety* (pp. 112). Brussels: Consortium International Congress on Food Safety, The Safe Consortium.
- Redmond, E. C., & Griffith, C. J. (2003). Consumer food handling in the home: a review of food safety studies. *Journal of Food Protection*, *66*(1), 130–161.
- Regulation EC. (2004). No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the Hygiene of Foodstuffs. Official Journal of the European Communities, 18 pp.
- Reid, A., Wood, D., & Kinney, D. (1998). Food hygiene information: power to the people? *Nutrition & Food Science*, *3*, 138–144.
- Rocourt, J., Moy, G., Vierk, K., & Schlundt, J. (2003). *The present state of foodborne disease in OECD countries*. Geneva: World Health Organization, Food Safety Department.
- Sperber, W. H. (1998). Future developments in food safety and HACCP. *Food Control*, *9*(2–3), 129–130.
- Sperber, W. H. (2005a). HACCP and transparency. *Food Control*, *16*, 505–509.
- Sperber, W. H. (2005b). HACCP does not work from Farm to Table. *Food Control*, *16*, 511–514.
- Sun, Y.-M., & Ockerman, H. W. (2005). A review of the needs and current applications of hazard analysis and critical control point (HACCP) system in foodservice areas. *Food Control*, *16*, 325–332.
- Taylor, E. (2001). HACCP in small companies: benefit or burden? *Food Control*, *12*(4), 217–222.
- Taylor, E., & Kane, K. (2005). Reducing the burden of HACCP in SMEs. *Food Control*, *16*(10), 833–839.
- Taylor, E. A., & Taylor, J. Z. (2004a). Perceptions of the “bureaucratic nightmare” of HACCP. A case study. *British Food Journal*, *106*(1), 65–72.
- Taylor, E. A., & Taylor, J. Z. (2004b). Using qualitative psychology to investigate HACCP implementation barriers. *International Journal of Environmental Health Research*, *14*(1), 53–63.
- Tucker, M., Whaley, S. R., & Sharp, J. S. (2006). Consumer perception of food-related risks. *International Journal of Food Science and Technology*, *41*, 135–146.
- Untermann, F. (1999). Food safety management and misinterpretation of HACCP. *Food Control*, *10*, 161–167.
- Unusan, N. (2007). Consumer food safety knowledge and practices in the home in Turkey. *Food Control*, *18*(1), 45–51.
- Vela, A. R., & Fernández, J. M. (2003). Barriers for the developing and implementation of HACCP plans: results from a Spanish regional survey. *Food Control*, *14*(5), 333–337.
- Wallace, C. (2001). Effective HACCP training. In T. Mayes, & S. Mortimore (Eds.), *Making the most of HACCP. Learning from others' experience* (pp. 213–230). Cambridge: Woodhead Publishing Limited.
- Wallace, C., & Williams, T. (2001). Pre-requisites: a help or a hindrance to HACCP? *Food Control*, *12*, 235–240.
- WHO. (2007). Food safety and foodborne illness. <<http://www.who.int/mediacentre/factsheets/fs237/en/>>
- Zschaler, R. (1989). Good Manufacturing Practice (GMP) in the food industry. *Zentralblatt für Bakteriologie Mikrobiologie und Hygiene. [B]*, *87*(4–6), 546–556.