Establishment and Application of Food Defense Plan in Food Processing Enterprises

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Abstract We analyze the connotation and significance of food defense, and introduce the principles and steps of establishment and implementation of food defense plan. Finally, we prospect the development directions of food defense in China.

Key words Food Defense Plan; Food processing enterprise; Establishment; Implementation; China

With the worsening of environmental pollution, the instability of world political and economic situation, the change of social psychology, and the increase of terrorist acts and other insecurity factors in recent years, food safety has been seriously challenged. These factors of insecurity, on the one hand, are from the food itself and can not be eliminated during the production, processing, transportation and storage; on the other hand, they come from the external deliberate contamination of food. The former tends to be predictable, whereas the latter is unpredictable. And the latter has greater effect on economy, policy, society, psychology and health. There was a "Poisoned Dumpling Case" in China’s food exports to Japan in the early 2008. It was identified later that this case was not caused by pesticide residues in food. However, the credibility of China’s exports of foodstuffs was still seriously damaged. The "Melamine Case" in September 2008 showed that we should re-examine and research on the hazards of non-traditional food, and protect its food safety. Some problems have caused wide attention, such as preventing food from contamination or vandalism, and food protection from non-traditional safety hazards. Each county has paid wide attention to the establishment and implementation of Food Defense Plan in food processing enterprises.

1 Connotation of food protection

Affected by the "9.11" terrorism event, the United States issued the Public Health Security and Bio-terrorism Preparedness and Responses Act of 2002, namely the Bio-terrorism Act. It pointed out that both the "Safety" and "Security" of American food supply should be protected. Traditional "Safety" focuses on the accidental contamination by biological, chemical and physical hazards during food preparation and production processes. Non-traditional "security" emphasizes the dangerous reduction of food chain by intentional contamination or destruction. Control method for protecting the food "security" is food defense. Food Defense Plan is a series of institutionalized and procedural written documents, which are formulated to achieve the purpose of food protection. Food Defense Plan is set up on the comprehensive assessment of food safety protection. And it follows the principle of adapting to different types of products and businesses (1-3).

Food defense has taken preventive measures to stop the possible acts of destruction during the entire chain from production to consumption. For example, criminals might use biological, physical, chemical and other toxic and harmful substances to contaminate food. Thereby it causes harm to human health, achieves the purpose to disturb and undermine the social order. Criminals usually use the means of destruction anomaly, so it can not be predicted. This has brought tremendous difficulties and challenges for the jobs of food security. Therefore, understanding on this level, food protection and food safety have qualitative differences. Meanwhile, food safety and food defense are also interrelated, and the work of food safety is the basis of food protection.

2 Significance of the Food Defense Plan and the principles for establishment and implementation

2.1 Significance of the Food Defense Plan Food safety relates to people’s health and safety, to economic development and social stability, and to country image and international reputation. Food Defense Plan has great significances to the effective implementation of food protection and the protection of food safety, which are mainly showed in the following 3 aspects: (1) Food Defense Plan can help the enterprises to prevent an intentional attack, minimize the risk of intentional food contamination or damage, and reduce the external food-borne hazards. (2) Food Defense Plan can improve the coping ability of enterprises, and can make rapid and effective response to crisis. In dangerous circumstances, enterprises are facing enormous pressure but the time to deal with it is limited. Documentation program will help enterprises respond quickly, adjust quickly...
and regain the trust of consumers. 3 Food Defense Plan will help create a safe working environment for enterprises, provide customers with the products of quality and safety assurance, and maintain brand image of corporation as well as the harmonious and stable society.

2.2 Principle of the establishment and implementation of Food Defense Plan

2.2.1 Risk assessment principle. Vulnerabilities are identified through risk assessment on all the links of food production in order to make the effective and preventive operational plans, and to prevent the food production from intentional destruction. Risk assessment is the base of Food Defense Plan. The accuracy and comprehensiveness of risk assessment directly determine the effectiveness of Food Defense Plan.

2.2.2 Preventive principle. Food Defense Plan carries out assessment by pre-control measures before the status and seriousness of risk becoming completely clear. Thus the risk of intentional destruction will be minimized.

2.2.3 Confidential principle. Evaluation process of food defense and the protective details of the scheme should be kept confidential in order to prevent damage conducted by people with intention, and to prevent risks in food security.

2.2.4 Integrated principle. Food Defense Plan is an organic part of food safety management system in enterprise. When making the Food Defense Plan, enterprise should take full account of the compatibility with other system files in order to avoid conflicting or overlapping.

2.2.5 Communication principle. Communication includes internal communication and external communication. Communication can help to identify the possibility of deliberate contamination, and then to respond in time. It can also help to improve the pertinence of protective measures, to enhance the effectiveness of measures, and to prevent the major accidents of food safety.

3 Steps for the establishment and implementation of Food Defense Plan

There are mainly 4 steps from the establishment to implementation of Food Defense Plan. Fig. 1 illustrates that the four steps interact with each other and codetermine the implementation effect of Food Defense.

Fig. 1 Steps for the establishment and implementation of Food Defense Plan

3.1 Forming a Food Defense Team Members of Food Defense Team should not only have a sense of responsibility and integrity, but also have the necessary knowledge, experience and qualifications. The group includes staffs in food processing, health, safety, and site management, as well as the support of external experts when necessary. Members of Food Defense Team should take part in the activities of food protection assessment, and the formulation, implementation and verification of food protection.

3.2 Conducting food defense assessment Defense assessment is the base of the whole Food Defense Plan. Its accuracy and comprehensiveness directly determine the effectiveness of the Food Defense Plan. Defense assessment is accomplished mainly by the Food Defense Plan Team. The main purpose of defense assessment is to identify the risk of deliberate pollution and damage of enterprise products, the major concerns and the weak links. Content of defense assessment includes the external security, internal security of enterprise, processing security, storage security, delivery or receiving security, water or ice safety, personnel security, information security, supply chain security, laboratory safety, and identification of non-traditional hazards. The above contents should be assessed by making the evaluation sheet of food defense, in order to find out the vulnerabilities. Result of defense evaluation shall be kept confidential.

3.3 Developing a Food Defense Plan After obtaining the region vulnerable to intentional destruction and the vulnerabilities in daily operating procedures, we should formulate effective and preventive control measures to minimize the possibility of deliberate damage. Food defense measures should be fixed after analyzing all the steps, including the defense measures existed and those formulated according to weak links. Thus, Food Defense Plan of enterprise is formed.

3.4 Confirming the Food Defense Plan Confirmation should be carried out before the implementation and after the alteration of Food Defense Plan. Enterprise should start from the effectiveness of the establishment of Food Defense Plan, and ensure the reasonable, effective and operational characteristics on the basis of scientific analysis. When the confirmed results could not meet the above requirements, the Food Defense Plan should be revised and re-evaluated.

4 Forecast of the establishment and implementation of food defense

4.1 Establishing the awareness of food defense Enterprises should be fully aware that they are the final victims of "latent rules". They should set a good example without adulterating, improve the protection awareness, and protect their own interests. Food Defense Plan is a management system with integrated structure, which needs the joint participation of all staff. Its ultimate goal is to ensure the health and safety of consumers. Therefore, existing management system is the premise of Food Defense Plan; and establishment of Food Defense Plan is the further improvement of enterprises' own.

4.2 Concerning about the new non-traditional food safety Deliberate contamination of food caused by anti-social action and terrorism is similar to the air crash, which is a small probability event easy to have vibration effects. Deliberate contamination of food caused by improper commercial purposes is similar to the car accident, which has small effect in short time, but its cumulative effect may just equal to the consequences of earthquake due to the wider range of impact.

Taking into account the development phases of actual pro-
ductivity, socio-economy and the integrity construction, the
food adulteration caused by improper commercial purposes and
vicious competition among industries is an issue of particular
concern. Adulteration may include adding non-food sub-
stances into food, using the illegal agro-veterinary medicine
and food additives, and other methods not suitable for human
consumption during food production and process. Food safety
assessment, control theory and method of the United States
can provide a good reference.

4.3 Studying on the Food Defense Plan suitable for
the national conditions of China At present, the referenced edi-
tion of protection plan in China is mainly the one offered by
the Food Safety Inspection Department of United States (FSIS)
at January 2007: food protection plan for meat, poultry slaugh-
tering factory and processing factory (model version). The Unit-
ed States is a developed capitalist country, its development
stage and environment are very different from those of China.
Many of the management methods have reached the scientific
and quantify status, but China should not simply copy these
management methods. China should develop the Food De-
defense Plan in depth, establish and implement related researches,
make suitable adjustments according to the status of Chi-
inese enterprises, and formulate a food protection guide for food
enterprises in China.

4.4 Establishing the non-traditional hazard identification
and evaluation database We should organize experts in rele-
vant government departments, food industry, scientific re-
search institutions and industry associations to evaluate the
possible abnormal potential hazards in products during the
process of production, and then discover the "latent rule"
in time, and establish database. Meanwhile, we should collect
the information, such as illegal food additives issued by other
government departments, set up the related channels for ac-
cepting the complaints and reports, explore the models and
methodologies to detect and identify the non-traditional food
safety hazards according to the regions, production types and
actual situation of enterprises. We should also establish data-
bases and develop application software, and implement identifica-
tion and effective protection with a clear objective.

4.5 Achieving the effective integration with existing sys-
tems Food Defense Plan is an organic composition of the
food safety management system of enterprises. When making
the Food Defense Plan, enterprise should take full account of
the compatibility with other system files in order to avoid
conflicting or overlapping.

Food Defense Plan and the HACCP Plan for food security
are closely related. But the two focus on different causations
for food safety problems. Food Defense Plan may affect the
overall food security with wider range. Its purpose is to prevent
the intentional pollution and destruction. However, the HACCP
Plan is limited in ensuring the safety of food consumption. Its
purpose is to prevent some accidental, accidental food contam-
ination. Creating a Food Defense Plan does not need to set up
a file of HACCP type. Some of the information used to create
the Food Defense Plan may be already in the HACCP Plan,
Sanitation Standard Operating Procedures, and other docu-
ments such as Emergency Response Plan. Enterprises can ob-
tain information from these documents, and there is no need to
"push over" [5].

5 Conclusion

We should study on the basic theory and practical applica-
tion of food protection in depth, propagate the knowledge of
food safety and protection, guide the enterprise managers to
establish the awareness of food safety protection, set up and
implement the Food Defense Plan, promote the status amelio-
rated of food safety and protective management, and ensure
the security of food production and transport storage.

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四川省粮食生产可持续发展能力评价

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态稳定发展, 总量不断增加; (4) 近年下降阶段 (2000 年至今), 由于耕地面积等因素的影响, 粮食产量下降, 并在综合考虑了自然、经济和社会因素的基础上, 构建了四川省粮食生产可持续发展能力的评价指标体系。运用主成分分析法对四川省 1950 – 2006 年的粮食生产可持续发展能力进行了评价。结果表明: 四川省粮食生产可持续发展能力稳步提升; 以产量与人均耕地面积和农业从业人员存在负相关关系, 第二主成分与粮电水网水平和粮食总产量存在正相关关系; 农业科学技术水平和粮食品质水平对粮食生产产生正向效应, 稳定粮食产量面积对粮食生

产可持续发展具有不可替代的作用。运用聚类分析法对四川省 21 个市州 (市) 2006 年的粮食生产可持续发展能力进行了研究。结果显示: 不同地区的粮食生产可持续发展能力存在相似性和互补性, 应根据实际情况采取不同的粮食生产区域规划。

关键词 四川省; 粮食生产; 可持续发展; 主成分分析; 聚类分析

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原则为风险评估, 预防性、保密性、隔离性以及沟通原则。4 项步骤为：(1) 组建食品防护小组, 参与食品防护计划建立与实施的后续步骤; (2) 食品防护评估, 对影响食品安全的因素及预防措施进行评估, 寻找薄弱环节; (3) 食品防护计划的制定, 包括现由有的和针对薄弱环节采取的各项防护措施; (4) 食品防护计划的确认, 在计划实施之前及变更后进行确认。最后, 展望了中国食品安全防护工作的发展方向; 树立食品防护意识; 关注新型非传统食品安全; 研究国际中国食品的食品防护计划; 建立非传统危害识别和评估数据库; 实现与现有体系的有效融合。

关键词 食品防护计划; 食品企业; 建立; 实施