

UPGRADING AND DEVELOPMENT OF MEAT HYGIENE AND TECHNOLOGY EDUCATION IN EGYPT

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Summary

This project is designed. to enhance the quality, efficiency, relevance and outcomes of the teaching and training programs of meat hygiene and technology for the veterinary students, meat inspectors, meat hygienists and workers in Egypt. The stages of accomplishment of the project are:1) upgrading the curriculum of meat hygiene and technology, 2) preparation of textbooks, lecture notes and teaching materials, establishing up-to-date labs to help perform complex tests and investigation of quality of meat and meat products, 3) transfer of advanced teaching methodology in meat hygiene and technology, 4) setting up a system of training and re-training the specialists in meat hygiene and technology and 5) providing services to the sector of meat industry (training and inspection of meat and meat products).

Also, two important centers will be established: the modern industrial abattoir and pilot plant for meat processing. The two centers will be responsible for providing training courses for students, veterinarians , meat hygienists and workers in abattoirs and meat industry. All teaching and training programs will be kept in database system, which will be available on the internet via the project's website. The use of modern teaching technology and up-to-date labs will be available. Dissemination and sustainability will be supported by an alumni association which will spread the experience gained from the project and continue the centers' work beyond the lifetime of the project.

During the first quarter of the project (February to May, 2005), the following activities have been implemented:1) revised and newly developed curricula of the theoretical and practical meat hygiene and technology, 2) The new curricula for the undergraduate veterinary students shall be introduced at four universities in September, 2005. 3) Modern industrial abattoir and meat pilot plant are being constructed.

Keywords: Meat hygiene - K.Q of meat - Meat products - Meat technology - Industrial Abattoir - Meat pilot plant

Introduction

The science of food hygiene appertains mainly with establishment food and protect the consumers against unsafe food. The origin of food hygiene can be found already in very old societies of people living in the earth. Regarding to the establishment of food: since the beginning of the mankind food hygiene gatherers had the task of identifying the

edible food and discarding the inedible ones. Thus, they had the extra task of finding food that was also safe. In early time, edible and safe were probably synonymous when applied to food. The early Egyptians illustrated the inspection of an animal's heart at the time of slaughter and smelling of blood on an inspector's fingers to detect signs of putrefaction. The Romans were known to have confiscated foods thought to have spoiled. In twelfth-century Holland inspectors were appointed to examine the fish sold at markets (kampelmacher, 1973).

Meat hygiene represents a major branch of the food hygiene and no one can deny its economic and public health significance in our life. On the other hand, the modern food technology is becoming more and more complicated and has always constituted special risk. Therefore, the food hygiene programs are improving for food of animal origin particularly meat, fish, poultry and their products. Any national food hygiene programme represents a dynamic process, which must keep pace with the overall national social and economic development and the newly acquired scientific knowledge. Taking into account the six components of the national food hygiene programmes (Matyas, 1989), it is obvious that they cannot be run by single service/agency. It is a multisectoral and multiprofessional undertaking in which food hygiene control plays an important role.

So, education of veterinary students and hygienists should provide a broad knowledge of a variety of matters related to food including food hygiene control and particular to hazard analysis critical control points (HACCP) (ICMSF1988, USDA, 1989, WHO, 1982), and to predictive microbiology, technological, epidemiology, nutritional and economic aspect (Matyas, 1992)

Modern Meat Technology

The development of meat technology in the last decades has markedly changed and becoming more and more complicated. Therefore veterinary food hygienists must have a good knowledge of productions and technology, preservation and transportation techniques. Modern education must take into consideration the rapid developments in food industries and also cover the hygiene and technology of modern products (Matyas, 1978). In the developed countries special risk have always appeared from mass production of meat and meat products.

Good hygienic practice are necessary prerequisites for the successful application of specific risk management strategies. In particular, the faculties should be conceived, maintained and used to prevent contamination (Codex, 2003). Meat is an important carrier agent for many diseases, consideration will always form a basic part of meat hygiene programs. In general, the meat hygiene programs and the area of meat technology require highly qualified meat hygienists, inspectors and veterinarians. The following problems are prevented or at least reduced due to application of the right food hygiene programs by well educated and trained persons:

- prevention of food borne infections and intoxications in consumer and prevention of occupational food borne illness,

- prevention of environmental pollution from meat production and processing sources, as well as from industry,
- reduction of spoilage and reduction of meat losses,
- reduction of malnutrition, contribution to the program on surveillance,
- prevention and control of zoonoses,
- control of chemical contaminants and additives and also radio nuclides,
- control of rodents-vectors of diseases,
- facilitating national and international trade.

The above results due to application of the well organized and managed meat hygiene programs by well educated and trained persons, are sufficient justifications of proposals for strengthening, developing and upgrading of meat hygiene and meat technology education and training particularly in Egypt.

Meat Hygiene and Meat Technology in Egypt

The existing conditions for slaughtering and meat handling in Egypt cause quality deterioration ; post-harvest losses of meat and food borne diseases in consumers. The achievement of national levels of meat quality, efficiency and profitability presents a difficult challenges for Egypt due to:

1. lack of effort to provide knowledge and skills in adequate hygienic slaughtering, meat cutting and handling.
2. the absence of meat preservation techniques presents a serious constraints to the development of viable meat production by resource-poor rural livestock produces.
3. growing consumer awareness of food borne diseases particularly the emerging diseases i.e. Mad Cow disease, listeriosis, E.coli O157:H7 (causing Hamburger disease).
4. workers and management in Egypt Meat Industry are generally insufficiently trained and skilled in recognizing, preventing or reducing the health and safety risks related to their work. Middle management often lacks the necessary skills for policy making and management of this aspect of their conduct of business.

Meat hygiene and meat technology education has to take into account these new and changing awareness. The importance of this topic is to provide the meat industry in abattoirs and meat factories with a highly qualified veterinarians that they are working as meat inspectors and hygienists. This target will be done through the upgrading and development of meat hygiene and meat technology education for under and post-graduate students.

The Curriculum Content of Meat Hygiene and Technology

The current situation of the course of meat hygiene and meat technology for undergraduate students in the faculty of Veterinary medicine, comprises of 6 h. (theoretical lectures) and 4h (practical) per week as illustrate in Table 1. The recommendations of the two International Congress of Food Hygiene and Human

Table 1. Curriculum Contents of Meat Hygiene and Inspection in the Veterinary Medicine of Assiut University - Egypt

Meat Hygiene and Meat Technology		
Meat Hygiene		Meat Technology Training
<p><u>Theoretical Part</u></p> <ul style="list-style-type: none"> • Food animals • Abattoir • Methods of slaughtering • Rigor mortis • Abnormal conditions • Affection of specific parts • Bacterial, viral & parasitic diseases of food animals • Meat microbiology • Meat preservation • Chemical residues in meat • Consumer protection • Poultry hygiene • Fish hygiene • Byproducts 	<p><u>Practical Part</u></p> <ul style="list-style-type: none"> • Comparative anatomy • Lymphatic system • Chemical examination • Abnormal conditions and yellow coloration • Detection of freshness • Inspection of fish • Inspection of poultry • Microbiological investigation • Lesions in the different organs of slaughtered animals 	<p><u>Meat Technology</u></p> <ul style="list-style-type: none"> • Lack subjects related to the modern meat technology • Few knowledge related to the technology of traditional meat product • Few knowledge related to the modern meat preservation <p><u>Training</u></p> <ul style="list-style-type: none"> • Few training in abattoir “mainly meat inspection” • No training in meat factories • Generally, Lack of modern and advanced training programs

Health that were held in Assiut University in 2001 and 2003 and the workshop on the evaluation of the food hygiene education in Egypt (during the first congress) focused on the following:

1. The improving and upgrading of the contents of the whole courses of food hygiene education and increasing the teaching hours of theoretical and practical per week.
2. Updating the methods of teaching of the theoretical and practical meat hygiene and technology . Developing of advanced programs for training students and veterinarians in modern abattoirs and meat factories.

From the above Table (1) and the recommendations of the two International Congress of Food Hygiene and Human Health, it became very important to revise the current curriculum of the meat hygiene to conquer all defects in it. Furthermore, advanced meat technology course and training programs should be created according to the international standards.

The contents of the meat hygiene course (theoretical and practical), and the training policy for students, meat hygienists and workers have not been considerably developed in all faculties of Veterinary Medicine in Egypt at all levels over the last 40 years. Furthermore, teaching of modern meat technology is completely ignored. Unfortunately, most employees in the meat industry (abattoirs and meat factories) have limited education and skills training. On the other hand, due to the bad situation of the most abattoirs in Egypt, serious problems and constraints in supplying expanding populations with good quality meat and meat products can be expected.

This area of meat hygiene and meat technology entirely fits into national priorities, standards in quality control, public service development and social policy. Therefore, the academic programs must: develop curriculum that reflect market place expectations, enhance the efficiency of resource utilization, embrace new technologies that provide novel methods of information delivery, and reassess cooperative linkages among industrial with governmental organizations and Universities.

The needs of the consumer and subsequent challenges to the meat and farming industry, will be proposed as the driving force behind the changes occurring in veterinary public health. The current risks to consumers, from food borne diseases particularly the emerging diseases as Mad Cow Disease, Hamburger disease (caused by E.coli O157:H7) are highlighted. The two examples given above are evidence of the increasingly important role of meat processing in the meat sectors of Egypt

From the above knowledge's, it is necessary to focus on promoting the teaching and training program of meat hygiene and technology for students and meat hygienists (Codex, 1998) .The following requirements should be acquired:

1. Updating and introduction of new subjects of meat hygiene course according to the international standards, also the course should include an advanced and up-to-date part for meat technology..
2. Training staff members to use educational aids.
3. Training of the professionals and technicians on meat technology and inspection.
4. Organizing training courses in both meat technology and inspection for meat hygienists and workers in meat industries.
5. Upgrading of the teaching class, Lab of students.
6. Establishment of modern abattoirs and small meat processing units (pilot plant) in Assiut University. Through this pilot plant training of students, meat hygienists and the technical assistance of the project will be provided.

Conclusions

Food hygiene programmes (food control) in Egypt tends to be inadequate, due to limited resources and often poor management. Food control laboratories are frequently poorly equipped and lack suitably trained analytical staff. This is accentuated where multiple agencies are involved in food control. A lack of overall strategic direction means that limited resources are not properly utilized. Food control systems may also suffer from poorly or inadequately developed compliance policies.

Modern food control systems call for science-based and transparent decision-making process, and require access to qualified and trained personnel in disciplines such as food hygiene, technology, chemistry, biochemistry, microbiology, veterinary science, medicine, epidemiology, agricultural sciences, quality assurance, auditing and food law. Food control authorities need to better appreciate the role of science in the risk-based approach and to take advantage of scientific resources in the international community.

Recommendations

- There is no doubt that, the well organized food sections of any countries (developed or developing) are successfully implemented by well educated and trained persons.
- Well trained veterinarians, meat hygienists, meat inspectors are the basis of effective and long-lasting improvements in the level of food hygiene.
- Food hygiene should be considered as an integral part of the total food system
- Food hygiene control program is an important component of any national food hygiene program.
- Education and training must keep pace with developments and reflect the needs of the respective countries
- Primary health care concept, hazard analysis critical control points system (HACCP), the microbial food safety risk assessment, health system research (HSR), health economics and socioeconomic consequences of food borne

infections and intoxications should also become part of education and training (Caswell, 2000; Lammerding, 1997).

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References

- Caswell, J.A. 2000. Economic approaches to measuring the significance of food safety in international trade. *Int. J. Food microbial.* 62:261–266.
- Codex. 1998. Codex Alimentarius Commission. Codex Committee on Food and Hygiene (CX/FH98/2). Proposed draft principle and guidelines for the conduct of microbial risk assessment. FAO/WHO, Rome, Italy
- Codex. 2003. Codex alimentarius Commission. Joint FAO/Who Food Standards Programme Codex Committee on Food Hygiene. Thirty-fifth Session, Orlando, USA, 27 January – 1 February, 2003.
- Kampelmacher, E.H. 1973. "Since Eve Ate Apples" *Canada Jour. Public Health* 64:231–237.
- ICMSF. International Commission on Microbiological Specifications for Foods 4. 1988. Application of the hazard analysis critical control point (HACCP) system to ensure microbiological safety and quality. Blackwell Scientific Publication, Ltd., Oxford.
- Lammerding A.L. 1997. An overview of microbial food safety risk assessment. *J. Of Food Protection* 60:1420–1425.
- Matyas, Z. 1978. Role of veterinarians in modern food hygiene. *Bull. Wld. Hlth.org.* 65, 5, 699–711.
- Matyas, Z. 1989. The promotion of Veterinary food hygiene programs in developing countries. *Proceedings of Health Animal Safe Food Healthy Man. WAVFH.* Page 267–271.
- Matyas, Z. 1992. Teaching and training programmes. The 2nd Volume of the 3rd World Congress of Food borne Infection and Intoxication, Page :955–962.
- USDA, United States Department of Agriculture, 1989. Food Safety and inspection service. National advisory committee on microbiological criteria for food. HACCP principles for food production. Washington, D.C.
- WHO, World Health Organization 1982. International Commission on microbiology Specification for Food. Report of the WHO/IMSF meeting on hazard analysis: critical control points system in food hygiene. VPH/82.