面向21世纪高等学校规划教材（食品工程类）

Mianxiang 21shiji Gaodeng Xuexiao Guihua Jiaocai

食品专业英语

■ 李向阳　主编

SHIPIN ZHUANYE YINGYU

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内 容 提 要

本书包括食品安全质量管理和食品科学两大部分内容，第一大部分主要包括食品安全、食品质量的概念及其区别；国内外食品安全问题；GMP和SSOP以及HACCP管理体系；食品安全风险分析；食品质量管理以及食品质量控制工具；食品企业危机与风险及检验检疫管理。第二大部分包括食品的成分和营养；奶与奶制品、肉与肉制品、蛋与蛋制品基础知识。

本书为大专院校食品专业及相关专业教材，也可供从事食品监管检验及进出口贸易的人员参考。

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编写说明

近年来，随着食品科技的迅速发展和食品新产品的不断推出，人们不仅对各类食品的安全使用问题日益重视，而且对与食品安全相关的各类知识也日益关注。另一方面，为了保障与人民生命和生活息息相关的各类食品的使用安全，政府的相关部门也加大了对食品生产各环节的监管的力度。经过各食品相关主管部门的不懈努力，我国已基本形成并明确了卫生与农业主管部门抓原材料监管、质监部门抓各类食品生产环节的监管、工商部门从事食品成品监管的制度完善的食品监管体系。

目前，食品质量问题已成为全社会关注的焦点。为了适应当前的经济发展，为了从根本上解决与食品质量相关的各类实际问题，需要从最基础的专业教育抓起。这就对我国食品类高校的教育工作提出了更高的要求。

当前，食品行业的快速发展和结构性调整使其对本行业的技术水平、知识结构和人才特点提出了更加具体的要求。因此，为了进一步提高食品专业教材的编写水平，以适应市场对素质全面、适应性强、有创新能力的高技术专门人才的需求，由中国计量出版社牵头组织了西南大学（原西南农业大学）、南京农业大学、山东农业大学、湖南农业大学、四川农业大学、陕西科技大学、吉林农业大学和中国农业大学等59所高校参与食品质量与安全以及食品科学与工程专业高校教材编写与出版工作。此次的教材编写的出版工作旨在为各食品类相关院校在教材建设方面的信息交流搭建一个平台，以促进各院校之间在教学内容方面相互取长补短，从而使该套教材的参编与使用院校的课程设置更趋合理化，最终培养出更加适应当前社会经济发展的应用型人才。为了达到这一要求，我们必须严把教材写作质量关，想方设

法使参编教师的丰富教学实践很好地融入教学理论体系之中，从而推出教师好教、学生好用的优秀教材。为此，我们特别邀请了多所知名高校及科研机构的专家从事相关教材的审稿工作，从而为我们成功推出该套框架好、内容新、适应面广并且与国际接轨的好教材提供了必要的保障，以此来满足食品专业高等教育的不断发展和当前全社会范围内食品安全体系建设的迫切需要。

本次教材的编写尤其注重了理论体系的前沿性，不仅将食品科技发展的新理论合理融入教材中，而且使读者通过教材的学习可以深入把握国际食品科技发展的全貌，这对我国新世纪应用型人才的培养大有裨益。相信该套教材的推出必将会推动我国食品类高校教材体系建设的逐步完善和不断发展，从而对国家新世纪人才培养战略起到积极的促进作用。

教材编委会

2007 年 6 月

前言

• FOREWORD •

食品专业是一个朝阳产业，目前，食品专业在我国得到了快速的发展，尤其是加入WTO以后，发展速度更是迅猛。无论是食品的国际贸易还是食品专业技术的发展，都离不开国际交流，尤其是与发达国家的信息交流。这就要求我们食品专业的学生学习食品专业英语，懂得如何跟国外食品同行或专家进行技术的交流和沟通。

本书包括食品安全质量管理和食品科学基础两个方面内容。进入21世纪以来，食品安全问题日益突出，食品安全事件也不断出现，如2003年的“非典”，2004年至2006年之间不断出现的“禽流感”，2006年的雀巢奶粉碘超标，苏丹红事件，瘦肉精中毒等。所以加强食品安全与质量管理，提高食品的安全和质量是目前每一个国家、政府、企业和个人都特别关注的事情。因此，本书突出了食品安全和质量管理的重要性，并把这一部分作为本书的重点。食品安全风险是可以预防的，怎样预防呢？就是要进行食品安全风险分析，企业如何进行风险分析，本部分第五单元做出了全面的回答。食品安全事件的不断出现，使很多食品企业面临重大风险，很多企业往往在风险面前不知道如何应对，所以在本书中加上了食品企业如何进行风险应对与处理的内容。

食品安全与质量管理是建立在食品科学、食品工艺和工程基础之上的，了解食品科学的基础知识也是非常重要的。因此，在第二大部分中，重点介绍了食品的成分和营养。接着介绍了肉、蛋、奶及其制品的有关知识。由于这一部

分是基础，所以，阐述的内容也简单明了。

本书的内容具有较强的实用性和指导性，可为食品管理者、企业和本专业的学生提供理论指导。通过本书的学习，使学生们掌握如何灵活应用与食品相关的词汇和用语，能够在食品听、说、读、写等方面有所提高，为以后的进一步的学习或就业打下良好的英语基础。

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编　者

2007 年 6 月

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Chapter 1 Food Safety and Management

Unit 1 Overview of Food Safety

1.1 Definition of Food Safety

The concept of safe and wholesome food encompasses many diverse elements. From a nutritional aspect, it is food that contains the nutrients humans need and that helps prevent long-term chronic disease, promoting health into old age. From a food safety aspect, it is food that is free not only from toxins, pesticides, and chemical and physical contaminants, but also from microbiological pathogens such as bacteria and viruses that can cause illness.

Food safety is defined as the assurance that the food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.

The term "safe food" represents different ideals to different audiences. Consumers, special interest groups, regulators, industry, and academia will have their unique descriptions based on their perspectives.

Consumers are the end users and thus are at the last link of the food supply chain from production, through processing and distribution, to retail and food service businesses. Consumers are multidimensional and multifaceted. Populations differ in age, life experiences, health, knowledge, culture, sex, political views, nutritional needs, purchasing power, media inputs, family status, occupation, and education. Safe food means food that has been handled properly, including thorough washing of food that will be cooked and anything to be eaten raw. Safe food means food prepared on clean and sanitized surfaces with utensils and dishes that also are cleaned and sanitized. Other consumers want safe food that retains vitamins and minerals but does not have harmful pesticides.

Safe food is a composite of all of the views and descriptions held by consumers, special interest groups, academicians, regulatory authorities, and industry. Almost any single definition of safe food will be overly simplistic, because safe food is a complex, multifaceted concept.

1.2 Hazards Associated with Foods

A hazard is a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect. All three types of hazards are associated with fresh produce comprise.

Biological hazards are composed of bacteria, parasites and viruses; **Chemical hazards** include

naturally occurring hazards, added chemical hazards and contaminants; **Physical hazards** are foreign bodies like glass, wood, stones, insulation, plastic, etc.

1.2.1 Biological Hazards

Biological hazards include disease-causing bacteria, viruses, and parasites. Many of microorganisms occur naturally in the environment and can be foodborne, waterborne, or transmitted from a person or an animal. Cooking kills or inactivates most pathogens, while proper cooling and storage can control them before or after cooking.

Bacteria

Bacteria are single-celled organisms so small they can only be seen with a microscope. Bacteria are everywhere and most are not pathogenic (disease-causing). The human gastrointestinal tract is home to more than 300 species of bacteria. Fortunately, only a few of these cause illness. Some bacteria are beneficial and are used in making foods such as yogurt, cheese, and beer. Others cause food to spoil, but do not cause human sickness. This difference between spoilage bacteria and pathogenic bacteria is important in the prevention of foodborne illness. Since pathogenic bacteria generally cannot be detected by looks, smell, or taste, we rely on spoilage bacteria to indicate that a food should not be eaten. Not many people will eat food that has become slimy or smells bad. Pathogenic bacteria cause foodborne illness in three different ways:

Infection Some bacteria damage the intestines directly. This type of illness occurs from eating food contaminated with live pathogenic bacteria. Cells that are alive and reproducing are vegetative cells. Many bacteria are killed in the acidic environment of the stomach; but some survive, pass through to the small intestine, and begin to grow in number. When the bacteria have multiplied to a high enough number (this depends on the strain of bacteria, its virulence or strength, and the health and susceptibility of the individual), the person becomes ill.

Intoxication Some bacteria produce harmful toxins or other chemicals that than are present in the food. It is not the bacteria itself that causes illness, but rather the toxin the bacteria produce. This can happen even if the pathogen itself has been killed, as long as it had sufficient time to produce enough toxin before dying.

Toxico-infection Some bacteria enter the intestines live, survive the acidic environment of the stomach, and then produce a harmful toxin inside the human digestive system. Toxico-infection is a combination of the previous two examples in that live cells must be consumed, but the toxin is produced in the intestine and it is the toxin that really causes the illness.

Viruses

Several viruses also cause foodborne illness. Viruses differ from bacteria in that they are smaller, require a living animal or human host to grow and reproduce, do not multiply in foods, and are not complete cells. Ingestion of only a few viral particles is enough to produce an infection. Humans are host to a number of viruses that reproduce in the intes-

tines and then are excreted in the feces. Thus, transmission of viruses comes from contact with sewage or water contaminated by fecal matter or direct contact with human fecal material. Human pathogenic viruses are often discharged into marine waters through treated and untreated sewage. The other main source of transmission is from infected food workers who have poor personal hygiene. An infected worker can transfer viral particles to any food. Therefore, proper handwashing and using a clean water supply are vital to controlling the spread of foodborne viruses.

Hepatitis A is a virus commonly associated with foodborne infections. The incubation period for hepatitis A, before a person develops any symptoms, is anywhere from 10 to 50 days. It is during this period before symptoms appear that a carrier is most infectious and most likely to spread the disease. Hepatitis A, and many other viral and bacterial pathogens, is most often transmitted via a fecal-oral route. The fact that a person is infectious even before they know they have the disease makes it difficult to control.

Parasites

Some parasites also cause foodborne illness. Parasites must live on or inside a living host to survive. The most common foodborne parasites are *Anisakis simplex*, *Cryptosporidium parvum*, *Toxoplasma gondii*, *Giardia lamblia*, and *Cyclospora cayetanensis*. *Giardia*, *Cryptosporidium*, and *Toxoplasma* are all protozoa, or single-celled organisms.

1.2.2 Chemical Hazards

Chemical hazards in food processing can include chemicals which are intentionally added to foods, incidental or unintentionally added chemicals, as well as naturally occurring toxins. Intentionally added chemicals can be preservatives, such as sulfiting agents, nutritional additives, such as niacin and color additives. Unintentionally added chemical hazards can include drug residues, unapproved food and color additives and even cleaning compounds and sanitizers commonly used in the processing facility. Naturally occurring chemical hazards include mycotoxins, such as aflatoxin in nut products; shellfish and seafood toxins; and food allergens. Control strategies for chemical hazards include effective, facility-specific Good Manufacturing Practices (cGMP's), food security and other prerequisite programs, proper labeling and understanding of all components of ingredients and rigorous control of non-ingredient chemicals.

1.2.3 Physical Hazards

Physical hazards are foreign objects such as insects, dirt, jewelry, and pieces of metal, wood, plastic, glass, etc. that inadvertently get into a food and could cause harm to someone eating that food. FDA has established maximum levels of natural or unavoidable defects in foods for substances that present no major human health hazard. These are called Food Defect Action Levels. This is the maximum amount of unavoidable defects that might be expected to be in food when handled under good manufacturing and sanitation practices. They are allowed because it is economically impractical, and sometimes impossible, to grow, harvest, or process raw products that are totally free of natural defects. Unavoidable

defects include insect fragments, larvae, and eggs; animal hair and excreta; mold, mildew, and rot; shells, stems, and pits; sand and grit. The allowable levels of these substances are set at very specific levels deemed not to be a threat to human health. If a food contains more than these allowable levels, it is considered adulterated. While it may be unpleasant to find such substances in food, eating them at such low levels is not a health hazard and will not lead to illness.

1.3 History of Food Safety

Very little about foodborne illness or food safety is found in historical records. Scientists did not begin to understand bacteria, and their relationship to disease, until the late nineteenth century. People did recognize that food spoils, but the reasons for that and the potential for becoming ill from food were not known. Perhaps the absence of food safety from historical chronicles is an indication that it was less of a concern than were other problems in the past. Even early food regulations were not aimed at making food safer, but rather at preventing economic fraud. So, a history of food safety really does not exist, but numerous discoveries, inventions, and regulations have led to the present knowledge and state of affairs in food safety.

Food preservation methods such as drying, smoking, freezing, marinating, salting, and pickling had their beginnings thousands of years ago. Whether these methods were employed solely to keep food for later use, to improve flavor, or for other reasons is not known. But they also had the effect of keeping food safer. Even cooking can be viewed as an ancient method of making food safer. The Chinese Confucian Analects of 500 B.C.E. warned against consumption of sour rice, spoiled fish or flesh, food kept too long or insufficiently cooked food. The Chinese disliked eating uncooked food believing, "Anything boiled or cooked cannot be poisonous." Among the earliest of food safety manuals was one published in China in the year 2. It is possible that the practice of drinking tea originated because tea required using hot water, which would make it safer than using unheated contaminated water. Doubtless other cultures in antiquity, while oblivious to the causes or prevention of foodborne disease, experienced it and prescribed methods to avoid it.

Early scientists grappled with the nature of disease and bacteria, which would set the stage for later discoveries. Much of the present knowledge about pathogens that cause foodborne illness is built on a foundation of scientific discoveries spanning back over three centuries. Aristotle (384 – 322 B.C.E.) and his Greek philosopher/scientist predecessors believed in the spontaneous generation of organisms—that insects and animals arose spontaneously from soil, plants, or other species of animals. Francisco Redi, an Italian physician and poet, set out to disprove this theory in 1668. He believed that maggots did not arise spontaneously in meat, which challenged the common wisdom of the day. He prepared eight flasks with meat in them; four sealed and four left open to the air. No flies could land on the meat in the sealed flasks, thus no maggots grew. The clear conclusion was that mag-

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