

普通高等教育“十三五”规划教材  
中外合作办学英语通用教程

# 食品质量与安全 专业英语

吴 澎 张建友 杨凌宸 主编

Professional English  
of Food Quality and Safety



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· 北 京 ·

《食品质量与安全专业英语》从食品原料安全控制、食品营养、食品添加剂、食品感官评价、食品毒理学、食品包装、食品工厂卫生、食品质量与安全管理体系、食品质量安全相关国际组织、食品质量安全认证十个方面着手编写,通过课文、词汇、课后练习、参考译文的形式概述食品质量与安全主要内容。根据学生实际需要,增加了科技论文写作专章内容,为学生学好本专业英语打下坚实基础。

《食品质量与安全专业英语》主要适用于高等院校食品质量与安全、食品科学与工程、生物工程等相关食品类本科专业的教学用书,也可用于相关专业研究生、专科生的辅助教学参考用书;同时,也可作为食品从业人员掌握食品安全中、英文双语词汇的辅助教材。

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近些年来，食品安全引发的社会、政治和贸易问题逐渐增多，世界各国的食品安全管理体系也随之不断完善。及时了解和掌握各国在食品安全管理方面的相关研究成果以及适合中国国情的食品安全管理体系，是食品质量与安全专业课程建设亟须解决的问题。本教材紧密结合我国急需食品安全管理人才的实际情况，填补我国食品质量与安全专业多年来未有及时更新的专业英语教材的空白，适应当前各高校食品课程开设需要。编者近年已出版多本教材，本书联系各高校共同编写，针对本科生、研究生急需教材的情况进行整理编写，以期希望能够解决教学现实问题。

《食品质量与安全专业英语》教材从食品原料安全控制、食品营养、食品添加剂、食品感官评价、食品毒理学、食品包装、食品工厂卫生、食品质量与安全管理体系、食品质量安全相关国际组织、食品质量安全认证十个方面着手，通过课文、词汇、课后练习、参考译文的形式概述食品质量与安全主要内容。根据学生实际需要，增加了科技论文写作专章，为学生学好专业英语打下坚实基础。

由于时间仓促，编者水平有限，书中不当之处在所难免，敬请读者批评指正，以便我们修订时改正。

编者

2017年9月



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# Unit 1

## Food Materials Safety Control

### 1.1 Food Safety Hazard

A foodborne hazard is a biological, chemical, or physical agent in, or condition of food with the potential to cause an adverse health effect.

#### 1.1.1 Biological Hazards

Biological hazards include pathogenic bacteria, fungi, viruses, prions, protozoans and helminthic parasites. There are two types of foodborne disease from microbial pathogens: infections and intoxications. Infections result from ingestion of live pathogenic organisms that multiply within the body and produce disease. Intoxications occur when toxins produced by pathogens are consumed. Intoxications can occur even if no viable microorganisms are ingested. This often occurs when foods are stored under conditions that allow the pathogens to grow and produce toxin. Subsequent processing of the food may destroy the microorganisms but not the toxin. Manifestations of biological hazards typically involve foodborne illnesses with symptoms including gastrointestinal distress, diarrhoea, vomiting and sometimes death. The U. S. Public Health Service classifies moist, high-protein, and low-acid foods as potentially hazardous. High-protein foods consist, in whole or in part, of milk or milk products, shell eggs, meats, poultry, fish, shellfish, edible crustacea (shrimp, lobster, crab). Baked or boiled potatoes, tofu and other soy protein foods, plant foods that have been heat-treated, and raw seed sprouts (such as alfalfa or bean sprouts) also pose a hazard. These foods can support rapid growth of infectious or disease-causing microorganisms.

#### 1.1.2 Chemical Hazards

A very wide variety of chemical hazards may appear in food products either by natural occurrence in a raw material or by deliberate or unintentional addition during processing. When ingested, these may cause gastrointestinal distress, organ damage and immunological reactions that may result in death. The long-term ingestion of foods containing toxic chemicals can lead to chronic effects, including cancer. Some chemical hazards are presented below,

Naturally occurring chemical hazards: allergens, mycotoxins

Agricultural chemicals: pesticides, fertilizers, antibiotics

Heavy metals: lead, cadmium, mercury, arsenic, uranium

Chemicals used in food processing environments: lubricants, detergents, sanitizers, re-

frigerants, pesticides

Chemicals used in food packaging materials; plasticizers, other additives used in manufacture

### 1. 1. 3 Physical Hazards

Food borne physical hazards are commonly called “foreign materials” or “foreign bodies”. The general sources of contamination are the environment, the food itself, the food processing facilities and personal objects. Their presence in food may result in choking, or orolal internal cuts, but rarely result in death.

Soil and stones are typical environmental contaminants during harvesting. Some foreigh material contamination originates with the food itself such as fruit stones and stems, bones or bone chips from fish and meat. A great deal of foreigh material contamination originates in food processing facilities. Nails, cut wires and broken utility blades can be dropped into the food stream by maintenance workers. Pieces of glass, hard plastic and wood splinters can enter the food from other fixtures and utensils in the processing area. Personal objects used or worn by maintenance and line workers and by food handlers in food service operations often fall into the food. These may include rings, pencils, papers, earrings, nose rings, buttons, thermometers, hair and gloves.

## 1.2 Control of Microbiological Hazards

Some educators refer to the “three Ks” as a comprehensive programme of microbiological hazard control in food production, those being, “kill them”, “keep them from growing” and “keep them out”. Described more scientifically, these three procedures are:

### 1. 2. 1 Destruction of Microorganisms

Many well-established and several novel procedures are available to kill microorganisms. These include thermal processes such as pasteurisation and ultra-high temperatures sterilisation, and non-thermal processes such as irradiation, high hydrostatic pressure and pulsed electric fields. Most often, pasteurisation involves a cooking or heating procedure conducted at atmospheric pressure. It is used to protect the public health by killing pathogenic microorganisms and to extend product shelf-life by killing spoilage microorganisms. Many foods to be sterilised are packaged into metal, glass or plastic retail containers, hermetically sealed and processed under pressure with steam at 121°C or higher. Foods may be sterilised at ultra-high temperatures (UHT) for a very short time, e. g. 140~150°C for several seconds.

### 1. 2. 2 Prevention of Microbial Growth

The principal process controls to prevent the growth of microorganisms in foods include refrigeration, freezing, modified atmospheres. Below its minimum growth temperature, a microorganism is no longer able to grow. The generally accepted temperature for optimum refrigeration is 5°C or lower. The shelf-life of refrigerated perishable foods can often be extended by frozen storage. Commercially produced frozen foods are usually stored at -18°C. Some perishable food products are packaged in containers with a headspace for air under atmospheric pressure. Other factors permitting, aerobic microorganisms can grow freely in



such products. Their growth can be inhibited or prevented by the removal of headspace oxygen (vacuum packaging) or the addition of inhibitory gases (modified atmosphere packaging).

### 1.2.3 Prevention of Contamination

Many potential microbiological hazards can be avoided by preventing cross-contamination. Cross-contamination is the transportation of harmful substances to food by:

Hands that touch raw foods, such as chicken, then touch food that will not be cooked, like salad ingredients.

Surfaces, like cutting boards or cleaning cloths, that touch raw foods, are not cleaned and sanitized, then touch ready-to-eat food.

Raw or contaminated foods are touch or drip fluids on cooked or ready-to-eat foods.

Cleaning and sanitation procedures and personnel practices used in food processing facilities are most important in this regard.

## 1.3 Control of Chemical Hazards

Food manufacturing facilities should maintain a chemical control plan to prevent contamination of its products with allergens, mislabelled or adulterated ingredients, and cleaning and maintenance chemicals. As with all food safety and quality practices, employee training and awareness is an essential factor in minimising the risk of chemical hazards in foods. For example, these include verification of the accuracy of the ingredient declarations on product labels, and the implementation of suitable prerequisite control for the receipt, storage and use of high-risk ingredients. Quality assurance and production personnel must verify that the ingredients are added correctly to product mixers or preblend operation. Cleaning and sanitation chemicals, pesticides and other non-food chemicals need to be stored in a confined, locked area and not to be used during periods of food production.

## 1.4 Control of Physical Hazards

There are three principal means to control physical hazards in foods:

Exclusion—including programmes for glass, wood, personnel practices and pest control

For example, most food processing facilities maintain a strict prohibition on the use of glass or brittle plastic instruments, utensils to avoid the possible entry of glass fragments into the food product. Wooden pallets and wooden handles on tools and maintenance equipment used in all production areas need to be excluded. Employees should not wear items of jewellery and should wear uniforms and hair covers. The uniforms should have no pockets, so that items such as pens and pencils cannot be carried in the pockets and fall into the products. Insect activity can be minimised inside facilities by the use of insect light traps that attract flying insects with an ultraviolet light.

Removal—by the use of devices such as magnets, sifters

Many types of in-line magnets are used by food processors on incoming ingredients, processing equipment and packaging operations, both to protect the equipment from damage by tramp metal and to avoid product contamination. Sifters and sieves are often used to separate

foreign materials from dry food materials.

Detection—by using instruments such as metal detectors, X-rays and optical sorters

Several technologies are available to detect the presence of foreign materials in a food. The most common of these are metal detectors that can be used online or for packaged products. With image-enhancing capabilities, X-ray devices can be used to detect dense foreign material inside food products, such as bone chips in meat products. Optical technologies, using visible or ultraviolet light, are used with fruits, vegetables and nuts to detect surface defects and the presence of extraneous vegetable matter, stones, etc.

## Technical Terms

foodborne disease 食源性疾病

pathogenic bacteria 病原性细菌

fungi ['fʌŋgi:] n. 真菌

virus ['vaɪrəs] n. 病毒

prion ['pri: ɒn] n. 感染性蛋白质

protozoan [ˌprəʊtə'zəʊən] n. 原生动物

helminthic parasite 蠕虫寄生虫

intoxication [ɪnˌtɒksɪ'keɪʃn] n. 中毒

gastrointestinal [ˌgæstrəʊɪn'testɪnl] adj. 胃与肠的

diarrhoea [daɪə'rɪə] n. 腹泻

allergen ['ælədʒən] n. 过敏源

mycotoxin [ˌmaɪkəʊ'tɒksən] n. 毒枝菌素, 真菌毒素

alkaloid ['ælkələɪd] n. 生物碱

phytohaemagglutinin [faɪtəhi:mæg'lu:tɪnɪn] n. 植物血凝素

pesticide ['pestɪsaɪd] n. 杀虫剂, 农药

fertilizer ['fɜ:təlaɪzə(r)] n. 肥料, 化肥

antibiotic [ˌæntɪbaɪ'ɒtɪk] n. 抗生素, 抗菌素

lead [li:d] n. 铅

cadmium ['kædmɪəm] n. 镉

mercury ['mɜ:kjəri] n. 汞, 水银

arsenic ['ɑ:snɪk] n. 砷, 砒霜

uranium [ju'reɪniəm] n. 铀

lubricant ['lu:bɪkənt] n. 润滑剂, 润滑油

refrigerant [rɪ'frɪdʒərənt] n. 制冷剂, 冷冻剂

plasticizer ['plæstɪsaɪzə] n. 增塑剂, 可塑剂

vinyl chloride 氯乙烯

adhesive [əd'hi:sɪv] n. 黏合剂

tin [tɪn] n. 锡, 马口铁

thermal processes 热处理

pasteurisation [ˌpɑ:stəraɪ'zeɪʃən] n. 巴斯德杀菌法

sterilisation [ˌsterɪlaɪ'zeɪʃən] n. 消毒, 灭菌

non-thermal processes 非热加工

high hydrostatic pressure 高静压技术

pulsed electric fields 脉冲电场

ultra-high temperatures (UHT) 超高温

refrigeration [ˌrɪfrɪdʒə'reɪʃn] n. 冷藏

freezing ['fri:zɪŋ] n. 冻结, 结冰

frozen storage 冻藏

vacuum packaging 真空包装

modified atmosphere packaging 气调包装

ready-to-eat food 方便食品, 即食食品

cross-contamination 交叉污染

sanitize ['sænɪtaɪz] v. 进行消毒

cleaning and sanitation procedures 清洗消毒步骤

adulterate [ə'dʌltəreɪt] v. 掺假

sifter ['sɪftə (r)] n. 筛具

## Exercises

I. Answer the following questions according to the article

1. What is the definition of a foodborne hazard?
2. What do biological hazards mainly include?
3. What disease systems can be caused by chemical hazards?
4. How to control microbiological hazards?
5. List some measures that can be taken to control physical hazards.

II. Choose a term from what we have learnt to fill in each of the following blanks.

Change the word form where necessary

1. Foodborne hazards can be divided into \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ three categories.
2. \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ foods are classified as potentially biological hazardous because these foods can support rapid growth of infectious or disease-causing microorganisms.
3. Microorganisms in food materials can be killed by thermal processes such as \_\_\_\_\_, and non-thermal processes such as \_\_\_\_\_.
4. \_\_\_\_\_ are naturally occurring protein to which some person develop a hypersensitivity or immunological response.
5. Peanut product producers use \_\_\_\_\_ to remove dark-coloured nuts, thereby reducing the risk of aflatoxin contamination in finished products.

# Unit 2

## Food Nutrition

Food and food products have become commodities produced and traded in a market that has expanded from an essentially local base to an increasingly global one. Changes in the world food economy are reflected in shifting dietary patterns, for example, increased consumption of energy-dense diets high in fat, particularly saturated fat, and low in unrefined carbohydrates. These patterns are combined with a decline in energy expenditure that is associated with a sedentary lifestyle—motorized transport, labour-saving devices in the home, the phasing out of physically demanding manual tasks in the workplace, and leisure time that is preponderantly devoted to physically undemanding pastimes.

Furthermore, rapid changes in diets and lifestyles that have occurred with industrialization, urbanization, economic development and market globalization have accelerated over the past decade. This is having a significant impact on the health and nutritional status of populations, particularly in developing countries and in countries in transition. Nutrition is coming to the fore as a major modifiable determinant of chronic disease, with scientific evidence increasingly supporting the view that alterations in diet have strong effects, both positive and negative, on health throughout life.

### 2.1 Food and Nutrition

---

Food refers to what humans eat for the consumption of more than one nutrient, which is composed of carbohydrates, fats, proteins and water. Almost all foods are of plant or animal origin except some other sources such as fungi. Fungi is used in the preparation of fermented and pickled foods. When food is abundant, it is wasted or treated as a commodity. However, when food is scarce, it is regarded as the staff of life and its distribution becomes a highly emotional issue. Food production worldwide is increasing faster than population, but distribution is uneven, reserves are limited, and bad weather conditions could lead to widespread famines.

Nutrition refers to both the absorption and usage of food, including all the elements that are intaked, digested, absorbed in the human body. An extremely important aspect of food is nutrition, which is especially true for vulnerable groups such as infants and young children. Therefore, we use accurate diet assessment which is important for assessing the relationship of diet to health outcomes; identifying factors (e. g. biological, environmental, psychosocial) influencing dietary intake which could be targeted for change; assessing chan-

ges over time in diet (surveillance) and evaluating the outcome of dietary interventions. Yet accurate dietary assessment remains a challenge; perhaps especially when children are the subjects.

### 2. 1. 1. The Nutrients

Nutrients refers to substances which have trophic function, including proteins, lipids, carbohydrates, vitamins, minerals and water. All of the nutrients except for mineral elements and water are classified as organic chemicals because they contain carbon.

About 60% of the human body is water by weight, which is constantly lost from the body and must constantly be replaced. Carbohydrates and fats or lipids are especially important energy-yielding nutrients. Proteins play a big role in functionality such as texture, water binding, emulsification, gel formation, and foam formation.

Vitamins are organic chemicals, other than essential amino acids and fatty acids that must be supplied to an animal in small amounts to maintain health. The vitamins are divided into two general categories based on their solubility in either water or fat. The fat-soluble vitamins are vitamins A, D, E, K; the water-soluble vitamins include vitamin C (ascorbic acid), niacin, thiamin, riboflavin, folacin (folic acid), pantothenic acid, pyridoxine, vitamin B<sub>12</sub> and biotin.

Depending on whether or not they are required for human nutrition and have metabolic roles in the body, the mineral elements are classified as either essential or non-essential. Some examples of essential ones are sodium, potassium, calcium, and phosphorus. Some examples of non-essential ones are iron, iodine, manganese, zinc, and fluorine.

### 2. 1. 2 Nutrients and Food Processing

Food processing is the methods and techniques used to transform raw ingredients into food for human consumption. The effects on the losses of vitamins and minerals of cereals cooked by different methods are different. The losses of minerals are mainly water-soluble losses. The losses of B vitamins in cooking include water-soluble loss, heating loss, oxidation loss and alkali treatment loss. Vitamin B<sub>1</sub> often reaches the highest loss rate of vitamins .

In the processing of tofu products, the mineral content is often increased. Soybean itself is rich in calcium, Tofu is an important source of dietary calcium and magnesium elements because calcium or magnesium salt is used as tofu coagulant. The micronutrients in soybean are basically preserved in soybean products. However, there are still some B vitamins lost in water-soluble loss. Most of them are lost in precipitation and some loss is caused by heating degradation.

Fresh vegetables is the main consumption form in daily diet. There will be significantly changes in vitamins and minerals contents in vegetables because of the processing of curing, drying, quick freezing and canning. In particular, the water-soluble loss and decomposition loss of vitamin C, vitamin B<sub>1</sub> and folic acid will caused by heating.

In the processing of meat, poultry and fish, the loss of water-soluble vitamins is more obviously than the losses of proteins and minerals. The fat content will be changed according

to different processing methods.

Dairy products are a kind of food that is rich in nutritions. There will be little effects on the milk proteins but different levels of losses of vitamins and minerals in the proper processing methods.

## 2.2 Nutrition Education

The increase in obesity and chronic diseases such as diabetes and heart disease worldwide reflects the complex interactions of biology, personal behaviour and environment. Consequently, there has been a greater recognition of the importance of nutrition education. Nutrition education needs to address food preferences and sensory-affective factors; person-related factors such as perceptions, beliefs, attitudes, meanings, and social norms; and environmental factors.

Nutrition education has been defined as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being; nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels.”

### Technical Terms

scarce [skeəs] adj. 缺乏的, 不足的; 稀有的

commodity [kə'mɒdəti] n. 商品, 货物; 日用品

intake ['inteɪk] n. 摄入量

digest [daɪ'dʒest] vt. 消化, 吸收

absorb [əb'sɔ:b] vt. 吸收, 吸引

diet assessment 膳食评估

fungi ['fʌŋgi:] n. 真菌, 菌类; 蘑菇

fermented [fə'mentɪd] adj. 酿造, 已发酵的

pickled ['pɪkld] adj. 腌制的, 盐渍的; 烂醉如泥的

carbohydrates [ɪkɑ:bəʊ'hɑɪdreɪt] n. 糖类; 碳水化合物

lipids ['lɪpɪdz] n. 脂肪, 油脂; 脂类

proteins [p'rəʊti:nz] n. 蛋白质

riboflavin [ɪraɪbəʊ'fleɪvɪn] n. 核黄素, 维生素 B<sub>2</sub>

folacin ['fɒləsɪn] n. 叶酸

pantothenic acid [ɪpæntə'θenɪk'æsid] n. 泛酸

pyridoxine [pɪrɪ'dɒksi:n] n. 维生素 B<sub>6</sub>, 吡哆醇

biotin ['baɪətɪn] n. 维生素 H, 生物素

sodium ['səʊdiəm] n. 钠

calcium ['kælsiəm] n. 钙

iron ['aɪən] n. 铁

nutritional status 营养状况

nutritive value 营养价值

food processing 食品加工

## Exercises

I. Answer the following questions according to the article

1. What is the definition of NUTRITION?
2. How many categories can nutrition be divided into?
3. What is the definition of FOOD?
4. Name five minerals required by the body.
5. How many categories can mineral be divided into?

II. Judge whether the sentence is right or wrong

1. People who are sleeping consume only REE. ( )
2. People wish to lose weight can do no better than to control calories and avoid carbohydrate-rich foods. ( )
3. Starch is a kind of carbohydrates. ( )
4. Glycogen can be hydrolyzed into glucose and fructose. ( )
5. The calories that burned in the involuntary work remain constant during human life. ( )

# Unit 3

## Food Additives

For centuries, ingredients have served useful functions in a variety of foods. Our ancestors used salt to preserve meats and fish, added herbs and spices to improve the flavor of foods, preserved fruit with sugar, and pickled cucumbers in a vinegar solution. Today, consumers demand and enjoy a food supply that is flavorful, nutritious, safe, convenient, colorful and affordable. Food additives and advances in technology help make that possible.

There are thousands of food additives used to make foods. For example, The government of the People's Republic of China maintains a list of over 2000 additives in its data base while over 3000 in the United States', many of which we use at home every day (e. g., sugar, baking soda, salt, vanilla, yeast, spices and colors).

Still, some consumers have concerns about additives because they may see the long, unfamiliar names and think of them as complex chemical compounds. In fact, every food we eat—whether a just-picked strawberry or a homemade cookie—is made up of chemical compounds that determine flavor, color, texture and nutrient value. All food additives are carefully regulated by governments and various international organizations to ensure that foods are safe to eat and are accurately labeled.

### 3.1 Concept of food additives

In its broadest sense, a food additive is any substance added to food. Legally, the term refers to “any substance the intended use of which results or may reasonably be expected to result—directly or indirectly—in its becoming a component or otherwise affecting the characteristics of any food.” This definition includes any substance used in the production, processing, treatment, packaging, transportation or storage of food. The purpose of the legal definition, however, is to impose a premarket approval requirement. Therefore, this definition excludes ingredients whose use is generally recognized as safe (where government approval is not needed); those ingredients approved for use by a government prior to the food additives provisions of law, and color additives and pesticides where other legal premarket approval requirements apply.

Direct food additives are those that are added to a food for a specific purpose in that food. For example, xanthan gum—used in salad dressings, chocolate milk, bakery fillings, puddings and other foods to add texture—is a direct additive. Most direct additives are identified on the ingredient label of foods.



Indirect food additives are those that become part of the food in trace amounts due to its packaging, storage or other handling. For instance, minute amounts of packaging substances may find their way into foods during storage. Food packaging manufacturers must prove to the government that all materials coming in contact with food are safe before they are permitted for use in such a manner.

### 3.2 Functions of food additives

Additives perform a variety of useful functions in foods that consumers often take for granted. Some additives could be eliminated if we were willing to grow our own food, harvest and grind it, spend many hours cooking and canning, or accept increased risks of food spoilage. However, most consumers today rely on the many technological, aesthetic and convenient benefits that additives provide.

The following are main reasons why additives are added to foods:

#### (1) To Maintain or Improve Safety and Freshness

Preservatives slow product spoilage caused by mold, air, bacteria, fungi or yeast. In addition to maintaining the quality of the food, they help control contamination that can cause foodborne illness, including life-threatening botulism. One group of preservatives—antioxidants—prevents fats, oils, and the foods containing them from becoming rancid or developing an off-flavor. They also prevent cut fresh fruits such as apples from turning brown when exposed to air.

#### (2) To Improve or Maintain Nutritional Value

Vitamins and minerals (and fiber) are added to many foods to make up for those lacking in a person's diet or lost in processing, or to enhance the nutritional quality of a food. Such fortification and enrichment has helped reduce malnutrition worldwide. All products containing added nutrients must be appropriately labeled.

#### (3) To Improve Taste, Texture and Appearance

Spices, natural and artificial flavors, and sweeteners are added to enhance the taste of food. Food colors maintain or improve appearance. Emulsifiers, stabilizers and thickeners give foods the texture and consistency consumers expect. Leavening agents allow baked goods to rise during baking. Some additives help control the acidity and alkalinity of foods, while other ingredients help maintain the taste and appeal of foods with reduced fat content.

### 3.3 Types of food additives

Food additives can be divided into six major categories: preservatives, nutritional additives, coloring agents, flavoring agents, texturizing agents, and miscellaneous additives. A detailed list of these additives are noted in Table 1.

#### (1) Preservatives

There are basically three types of preservatives used in foods: antimicrobials, antioxidants, and antibrowning agents.

Antimicrobials play a major role in extending the shelf-life of numerous snack and convenience foods and have come into even greater use in recent years as microbial food safety