食品专业英语文选

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FOOD

SELECTED ENGLISH WRITINGS
FOR FOOD SPECIALITY

中国轻工业出版社

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内 容 提 要

本书共分32课。内容包括：营养；碳水化合物；脂类化合物及其在食品中的用途；氨基酸和蛋白质；维生素和矿物质的人体需要量；酶的定义和命名；风味；微生物与卫生；食品冷气保藏原理；食品冷冻的基本概念；食品罐藏原理；食品的干燥保藏原理；食品浓缩原理；半干食品；食品的发酵保藏；食品的腌制和腌腊；谷物；面粉；最常用的糖；蛋的微妙构造；蔬菜的贮藏；咖啡及咖啡饮料；茶；肉类的腌制；熏制；香肠；蛋制品；制作黄油；干酪生产；面包；制造糖果的原料；蔬菜水果的罐藏。

本书取材范围广，包括大食品专业中各行业的专用词，着重在翻译的基本技巧，包括词义的转译，词义的具体化和抽象化，词的搭配，词量增减，词类转换，成分转换，成分分析，并注重疑难结构的翻译。

本书可供理、工、农类院校设有食品、农产品、水产品、畜牧产品加工专业及有关专业师生阅读，亦可供食品行业工程技术人员参考。

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序　言

据估计，全国设有食品专业的高等院校有140余所，招生人数每届达5000人以上。这些食品专业或其相关专业在其教学计划中均设有食品专业英语课，课程内容不一，取决于各自专业的特定方向以及任课教师的主观随意性。同时讲授方法也不甚相同。据调查，讲授方法基本上有三种：以讲课为主的方式，课堂指导与课余自学相结合的方式，课余辅导为主的方式。方法多变、各显神通。一般认为，专业英语课采取以讲课为主的方式对高年级大学生似无必要。而采取课余辅导为主的方式又往往流于形式。因此一般认为，采取课堂指导与课余自学相结合的方式似较合适。

按照专业教学计划程序，专业英语课属后期课程，一般有大学基础英语课作先导。因此在授课前，学生已基本具备基础英语语法和一般词汇的基础。专业英语课的主要任务是引导学生进入专业英语文献的阅读。要完成这一步，根据我们的教学经验，学生的第一个困难，是专业词汇的贫乏。尤其是我们这样的一个包罗万象的食品专业，光是各种各样水果、蔬菜和鱼类的名称，就足使学生望而生畏。更何况经过加工之后的形形色色食品的名称，使学生眼花缭乱，目不暇接。至于科技文献的语法，学生一般没有什么特殊的困难，食品科技文献并不例外。不过，由于食品行业的复杂性，行业历史的悠久性，食品与人们日常生活的相关性，因此长期形成的通俗行家语言的表达方式时有出现，这可能也是造成学生阅读时困难的原因之一。

基于上述原因，我们组织了有关专业英语课程的任课教师与英语专业教师，合作编写了这部教科书，取名《食品专业英语文选》，它取材范围广，共32课，囊括了大食品专业中各行业的大量专用词，以丰富学生的专业英语词汇。每课的篇幅较大，适合于在自学基础上进行课堂指导的教学方式。各课备有译文，以便自学。有了译文作对照，注释中对大多数一般专用词便不重复加注了。部分词的注释着重在词的引伸转译、词义的具体化和抽象化和词的搭配和词量的增减等等方面。另外，有了译文对照，句的注释中便着重在复杂难句的句子成分的分析，行家习惯语句的分析，以及特殊疑难结构的分析。

必须指出，32课略为多些，目的是提供选用余地。在采用本书作为教材时，必须根据各自食品专业的方向和内容，作出适当的取舍。

因为是初步尝试，又限于时间和水平，错误难免，敬请读者多赐指正。

高福成

CONTENTS

LESSON 1 NUTRITION

What we eat as well as how much we eat determine our nutrition status to an important extent, and both are influenced by a diversity of external and internal factors.

The person who wants to find the answer to the question "What should I eat for good nutrition?" might easily become lost in the maze of informational corridors, confused by the wealth of technical information provided by scientists or misled by simplistic answers provided by those with products to sell.[1] Somewhere in between is some reasonable, commonsense information that we can use to guide us our quest for sound nutrition knowledge.[2]

To begin, We need to learn some definitions of commonly used nutrition terms and find out what sorts of guidelines are available to help us measure the quality of our diets and to develop healthful eating patterns.

Nutrition and Food: Definitions

The word nutrition is often paired with the word food because the two go together. They are interdependent, but not interchangeable.

Food might be defined as any edible substance that provides nourishment when consumed. It is made up of many natural ingredients—all chemicals—that have different functions such as providing odor, flavor, color, and nourishment. The ingredients that give us nourishment are called nutrients.

These nutrients are categorized as fats, proteins, carbohydrates (sugars and starches), minerals, vitamins, and water. They are called essential nutrients because we cannot get along without them. We need them for energy, for building and maintaining body tissue, and for regulating body processes—the three essential functions of foods in the body.

Nutrition might be defined as the process whereby we obtain the essential nutrients and use them to make many other substances our bodies need. This process would include eating and digesting food and absorbing and using, or metabolizing, the nutrients it contains.

We can obtain all of the essential nutrients from food. However, it is possible to obtain nourishment without eating and digesting food—if, for example, the nutrients are injected directly into our veins as in intravenous feeding.

Thus, it is the nutrients that are essential and the food that normally provides

them.[5] Since food is vital, we need to know the nutritive content of foods, which ones are the best sources of the various nutrients, and how to combine them into a healthful diet.

The term good nutrition implies that we are obtaining from our food all of the essential nutrients in the amounts needed to keep our bodies functioning and to maintain optimum health. A very simplified definition of good nutrition might be" eating the right foods in the right amounts."

The work of nutrition scientists involves finding the answers to questions about the nutrients—their function in the body, the amount of each that we need, what happens when we receive too much or too little—and about food and diet—what foods we should eat and in what amount.

Yet nutrition science in its broadest sense has many more facets: the influence of sensory factors of flavor, color, and texture of food on eating behavior; the psychological, cultural, emotional, and social aspects of food intake; and even the economics of food availability and consumer behavior in the purchase of food.

The Nutrients

To date, nutrition scientists have identified some 40 to 45 substances as essential nutrients. But the list is growing as new nutrients continue to be identified. The history of nutrition science contains fascinating stories about the ways food substances have been identified as essential nutrients. In some instances, medical researchers seeking the cause of a particular disease found that problem was due to a deficiency of a single substance, and that when this substance was added to the diet, the symptoms of the disease disappeared. A number of vitamins were discovered in this way.

Nutrients might be divided into two general categories based on the amount that we need. These are the macronutrients (carbohydrats, fats, proteins, and water), which we need in relatively large amounts, and the micronutrients (mineral elements and vitamins), which we need in relatively small amounts. All of the nutrients except for mineral elements and water are classified as organic chemicals because they contain the element carbon. Mineral elements and water are inorganic chemicals because they do not contain carbon.

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, and K; the water-soluble vitamins include vitamin C (ascorbic acid), niacin, thiamin, riboflavin, folacin (also called folic acid), pantothenic acid, pyrido-

xine, vitamin B_{12}, and biotin.

The mineral elements are divided into two categories based on the quantity of them that we need. Macroelements are those needed in relatively large amounts, while microelements are those needed in very small amounts. Some examples of macroelements are sodium, potassium, calcium, and phosphorus. Some examples of microelements are iron, iodine, manganese, zinc, and fluorine.

Recommended Dietry Allowances

Once a nutrient is identified, one of the principal research efforts of nutrition scientists is to determine how much of it is needed by people at various ages and stages of life. Initial studies usually are conducted with laboratory animals, but the information developed in these studies cannot be applied directly to humans since people's needs often are quite different from animals' needs. Human nutrition studies, on the other hand, are time-consuming, costly, and difficult to conduct, especially because of the problems of controlling variables and possibly causing harm to the individuals involved. Because of the obstacles to collecting accurate data, our present knowledge of nutrient needs is incomplete, and the requirements of humans for many nutrients have not been established.

However, the data on human and animal needs currently available are used by nutrition scientists to establish estimates of the amounts of essential nutrients per day that will meet the needs of most healthy persons. In the United States, the most widely used nutrient quidelines are the Recommended Dietary Allowance (RDA), which are issued by the National Academy of Sciences, National Research Council, Food and Nutrition Board.

The RDA serve as dietary or nutritional standards for a wide range of age-weight-sex groups such as infants, children, adolescents, pregnant and lactating women, and younger and older adults. They are recommendations, not average requirements, for satisfactory levels of intake of essential nutrients for population groups of average, healthy people.[4] They do not take account of special needs certain individuals may have due to genetic make up, metabolic disorders, chronic infections, and other abnomalities, which may result in their needing different levels of nutrients.

Margin of Safety Allows for Individual Differences

To allow for individual differences, the RDA usually are set with a generous margin of safety. Thus, they are thought to meet the needs of 95 to 97 percent of the people within each age-sex group. In other words, the RDA ex-

ceed the requirements of most individuals to ensure that the needs of nearly all are met. For this reason, a person who consumes a diet that provides less than the RDA for one or more essential nutrients is not necessarily getting a diet that is nutritionally inadequate. [5] What can be concluded, however, is that the farther the intake of an essential nutrient falls below the RDA, the greater the probability of nutritional inadequacy. On the other hand, if an individual is getting all the essential nutrients at or above the RDA level of his or her age, chances are good that the diet is nutrionally adequate. [6]

An exception is the RDA for energy, or calories, which are not designed as quides for individual caloric needs. Other variables not included in the RDA, such as body size and physical activity, are involved in an individual's caloric requirements.

Differences in Nutrient Utilization Considered

Another factor considered when the RDA are established is the availability of the nutrient and factors that affect how efficiently it is used in the body. For some nutrients, such as iron, absorption or use in the body may be incomplete; so the RDA needs to be set high enough to allow for this. And because in the caseof certain other nutrients, substances in food, called precursors, may be converted into the nutrient in the body, the RDA needs to allow for this. An example is carotene, th orange-colored substance found in carrots and other vegetables and fruits, which our bodies convert to vitamin A.

On the other side of the coin, receiving too much of certain nutrients, amounts significantly above the RDA, can be just harmful as not obtaining enough. Certain vitamins (such as A and D) and minerals can be highly toxic if high doses are used over a period of time. Thus, the RDA can serve as guidelines for optimal nutrient intake from the standpoint of both maximum and minimum levels.

GLOSSARY

nourishment 滋养；营养

get along 过活；生存

functioning 功能发挥；机能活动；机体运转。文中指人体正常活动和体内代谢活动

vital 生命的；生机的，维持生命所必需的

intravenous feeding 静脉进食

stages of life 生长阶段，如青春发育期、孕期、哺乳期等

involved 涉及的；所论的；有关的。文中 the individuals involved，其中involved作后置定语用，修饰the individuals，意为有关人员

currently available 目前可资利用的；普遍可以得到的。文中作后置定语，修饰the data

guidelines 准则；标准

Recommended Dietary Allowances "推荐膳食标准"，简写"RDA"。

National Academy of Sciences, National Research Council, Food and Nutrition Board 美国科学院全国科学研究委员会食品营养研究会

recommendations 推荐；建议。有时可引伸为介绍信、建议方案、推荐值。本课中"be recommendation not average requirement" 可译为"是推荐量，不是平均需要量"

make-up 性格；特质；体格；体质

margin of safety 安全余量

precursors 产物母体；前体

on the other side of the coin 原意为硬币的另一面，现作为成语作另一方面解

NOTES

1) The person who wants to find the answer to the question "What should I eat for good nutrition?" might easily become lost in the maze of informational corridors, confused by the wealth of technical information provided by scientist or misled by simplistic answers provided by those with products to sell.

本句中who wants to find the answer to the question, " What should I eat for good nutrition?"为主语 the person的定语从句，其中 "What should I eat for good nutrition?"是the question的同位语从句，说明 the question。might easily become lost以及被略去 might easily become以后的 confused和 misled则是主句的三个并列谓语，其动词形式都是被动语态。

2) Somewhere in between is some reasonable, commonsense information that we can use to guide us in our quest for sound nutrition knowledge.

本句是倒装句，主语是some reasonable, commonsense information, somewhere in between是表语。这里somewhere是副词，作表语；in between 是介词短语，修饰somewhere。以that引导的that we…knowledge 为定语从句，修饰information。

3) Thus, it is the nutrients that are essential, and the food that normally provides them.

本句由两个并列的强调句组成。一句是it is the nutrients that are essential; 另一句是it is food that normally provides them, 这句中的it is省略了，而句中的them则指nutrients.

4) They are recommendations, not average requirements, for satisfactory levels of intake of essential nutrients for population groups of average, healthy people.

they指前面提到的 RDA，是本句的主语。not average requirements省略了系词

are, 与recommendations一起构成并列表语。healthy people 意为健康的人。

5) For this reason, a person who consumes a diet that provides less than the RDA for one or more essential nutrients is not necessarilly getting a diet that is nutritionally inadequate.

这句中that provides…essential nutrients是定语从句，修饰a diet，而who consumes a diet that…essential nutrients也是定语从句，修饰 person。这复合句中的主句是a person is not necessarily getting a diet，而that is nutritionally inadequate也是定语从句，修饰diet。

6) …chances are good that the diet is nutritionally adequate.

该句中，that是连词，它引入同位语从句the diet is nutritionally adequate，作为chances的同位语。因为两者之间有其他词隔开，故称为割裂式同位语从句。

第1课 营 养

人们的营养状况在很大程度上取决于人们吃什么和吃多少。而这两方面又受体内、体外多种因素的影响。

凡是渴望找到"应该吃什么才会有良好营养"这一问题答案的人也许很容易会堕入复杂的知识迷宫，很容易被科学家所提供的丰富技术信息所迷惑，也很容易被售货员的三言两语弄得昏头转向。事实上，这中间有些信息是有一定道理的常识，我们可以利用这些信息来指导我们去寻求正确的营养知识。

首先，我们要懂得一些常用营养学术语的定义，并找出一些准则，以便帮助我们去衡量饮食的质量和制定有益于健康的饮食结构。

营养与食物的定义

由于营养和食物的关系密切，所以营养和食物这两个词常常成对出现。它们互相依赖，但不能互相替换。

食物可定义为食后起滋养作用的任何可食用的物质。食物由多种天然成份（全部都是化学物质）组成。这些成份有各种各样的功效：如提供色、香、味和营养等等。那些具有营养功效的成份称为营养素。

这些营养素可分为脂肪、蛋白质、碳水化合物(糖和淀粉)、矿物质、维生素和水。我们称这些营养素为必需营养素，因为没有它们我们就不能生存。我们需要这些营养素来提供能量，构成和修补机体组织，调节机体生理过程。这就是食物在人体内的三种基本功能。

营养可定义为一种人们赖以获得必需营养素，并利用这些营养素来制造人体所需其他物质的过程。这一过程理应包括摄入和消化食物以及吸收和利用（即同化）其中所含的营养素。

我们能够从食物中获得全部必需营养素。尽管如此，我们也可以不通过食物的摄入和消化而得到丰富的营养。例如：静脉进食的情形就是直接将营养素注射到人体的静脉

中。

由此可见，唯有营养素才是真正必需的，而正常提供营养素的则是食物。食物是维持生命所必不可少的，因此我们必须懂得各种食物的营养素含量，必须懂得哪些食物是各种各样营养素最丰富的来源，懂得怎样将它们配成有益于健康的膳食。

营养良好这一术语是指我们处在从食物中获取为保持机体正常活动和维持最佳健康状况所需的全部必需营养素。营养良好的最简明的说法是："适量食用恰当的食物"。

营养学家的任务之一是解决有关营养素方面的问题，即营养素在人体内的功能、每种营养素的人体需要量以及营养素摄入过多或过少会产生什么后果等等；二是解决有关食物和膳食的问题，即我们应该吃什么，应该吃多少。

然而，从广义上来看，营养科学还涉及更多方面：如食物的色、香、味、质构等感官因素对食用性能的影响；摄食的心理、文化教养、情绪、社交活动等的状态；甚至还包括获得食物的经济性以及消费者购买食物时的态度。

营 养 素

到目前为止，营养学家已确认大约40～45种物质为必需营养素。然而，随着不断地鉴定出新的营养素，这个数目还会进一步增多。营养科学的历史记载着多种食物怎样被确认为必需营养素的有趣故事。在有些情况下，医学研究者在寻找某种特殊疾病的病因时发现问题就出在缺乏单单某一种物质上，并且发现当把这种物质加入到病人的饮食中之后，症状便消失了。许多维生素就是这样被发现的。

根据人体需要量的不同，营养素可分为两大类：需要量较大的称为常量营养素（碳水化合物、脂肪、蛋白质和水）；需要量较小的称为微量营养素（矿物质和维生素）。除了矿物质和水以外，所有其他营养素都属于有机化合物，因为它们都含有碳元素。矿物质和水都是无机化合物，因为它们不含碳元素。

维生素按其可溶于水或脂肪分为两大类：脂溶性维生素，有维生素A、D、E、K；水溶性维生素，包括维生素C（抗坏血酸）、烟酸、硫胺素、核黄素、叶酸、泛酸、吡哆醇、维生素B_{12}和生物素。

矿物质按人体需要量分为两类。人体需要量较大的称为常量元素，如钠、钾、钙、磷；人体需要量较小的称为微量元素，如铁、碘、锰、锌、氟。

推荐膳食标准

当一种营养素被确认之后，营养学家的主要研究任务之一就是确定人们在不同年龄和不同生长阶段需要多少这种营养素。初步研究一般是通过动物实验进行，但这些研究所得到的数据资料不能直接应用于人类，因为人的营养需要量常常不同于动物的营养需要量。另一方面，人体营养需要量的研究耗时长、费用大，而且难于进行，特别是因为控制可变因素和可能引起对有关人员的危害问题上存在着困难。由于收集正确数据不便，目前我们对营养素需要量的知识并不完备，因而许多营养素的人体需要量还未确定下来。

尽管这样，营养学家还是运用了目前可利用的有关人类和动物营养素需要量的数据来确定能满足大多数健康人每天必需营养素需要量的概略值，在美国，使用最为普遍的

营养素标准是"推荐膳食标准（RDA)"，它是由美国科学院全国科学研究委员会食品营养研究会颁布的。

RDA 供各种不同年龄 体重 性别组，如婴幼儿、儿童、青少年、孕妇、产妇、成年人和老年人作为膳食或营养的标准。但这些标准只是为了满足全人口各组平均健康水平者适当摄入必需营养素的推荐量，而不是其平均需要量。制定 RDA并不考虑某些个别人由于遗传体质、代谢紊乱、慢性传染病以及其他会引起不同营养水平需要的人体异常所造成的特殊需要量。

考虑个体差异的安全余量

考虑到个体的种种差异，RDA中通常规定了充余的安全余量。因此一般认为RDA能满足各年龄-性别组内95～97%的人的营养需要。换句话说，RDA 标准 超过大部分个体的需要量，以便保证几乎所有人的需要量都能得到满足。因此，若某人受用的饮食中所提供的一种或多种必需营养素低于RDA，他的膳食也未必就是缺乏营养的膳食。 不过可以肯定，必需营养素的摄入量低于 RDA 越多，则缺乏营养的可能性就越大。另一方面，如果某人摄入的所有必需营养素都正好等于或高于RDA按其年龄规定的标准，那么他的膳食就有很大可能是营养充足的膳食。

例外的情况是RDA对能量(热量) 的要求并不设计成个体热量需要量标准。在个体热量需要量方面，要涉及到诸如体形、体力活动等其他可变因素，这些因素是 RDA 中所没有的。

考虑营养素利用上的差异

制定RDA时所考虑的另一个主要方面是营养素的利用率以及 影响 它在人体内如何被有效地利用的各种因素。对于某些营养素如铁，它在人体内的吸收和利用可能是不完全的，因此RDA为考虑到这种情况而将这种营养素的需要量订得较高。而对另一些营养素，由于它们可以从食物中某些称为前体的物质在人体内转化而成，故 RDA 对此酌情减低标准。例如存在于胡萝卜和其他果蔬中的橙色的胡萝卜素，它可在人体内转变成维生素A。

另一方面，摄取某些营养素过多（大大超过RDA)，也有可能会与这些营养素摄取不足一样有害。某些维生素(如V_A、V_D) 和矿物质若大剂量食用超过一段时间会有很大的毒性。因此，可把 RDA 作为从最高、最低两限量来看都是最佳的营养素摄入量标准来使用。

LESSON 2 CARBOHYDRATES

The food scientist has a many-sided interest in carbohydrates. He is concrned with their amounts in various foods, availability (nutritional and economic), methods of extraction and analysis, commercial forms and purity, nutritional value, physiological effects, and functional properties in foods. Understanding their functional properties in processed foods requires not only knowledge of the physical and chemical properties of isolated carbohydrates, but also knowledge of the reactions and interactions that occur in situs between carbohydrates and other food constituents and the effects of these changes upon food quality and acceptance. This is a tall order for knowledge. Because processing affects both nutritional and esthetic values of food, knowledge of the changes that carbohydrates undergo during milling, cooking, dehydration, freezing, and storage is especially important.

Students are advised to study the fundamental chemistry underlying useful carbohydrate properties. Of service will be an understanding of the association of polar molecules through hydrogen bonding, ionic effects, substituent effects, chelation with inorganic ions, complexing with lipids and proteins, and decomposition reactions. [1] This background will provide an understanding of properties that affect the texture and acceptance of processed foods (e.g., solubility, hygroscopicity, diffusion, osmosis, viscosity, plasticity, and flavor production), properties that enable the formation of high-quality pastries, gels, coatings, confections, and reconstitutable dehydrated and frozen foods.

Ability to predict what changes in functional properties are likely to ensue from incorporating various types of carbohydrates into processed foods is a practical goal of the food scientist. [2] Such forecasting requires either a wealth of experience with trial-and-error methods or a deep knowledge of carbohydrate properties as related to structure - perhaps both. However, scientific knowledge of cause and effect is highly respected when it shortens industrial development time.

Sources, Types, and Terminology

The layman's conception of carbohydrates generally involes only the sugars and starches of foods - those that generate calories and fat. The food chemist knows many other types that are ingested.

Because most people enjoy the sweetness of sugars and the mouthfeel of cooked starches, they become familiar by association with table sugar(sucrose), invert sugar (hydrolyzed sucrose), corn syrup sugars (D-glucose and maltose), milk sugar (lactose), and the more starchy foods. These carbohydrates are nutritionally available; i.e., they are digested(hydrolyzed to component monosaccharides) and utilized by the human body. The carbohydrates of dietary fiber (cellulose, hemicellulose, pentosans, and pectic substances), in contrast, tend to be overlooked because they are largely unavailable. They are not hydrolyzed significantly by digestive enzymes; nevertheless, they may be quite important for human health.

The carbohydrates of natural and processed foods are divided into available and unavailable types. The available carbohydrates vary in degrees of absorption and utilization depending upon quantities ingested, accompanying food types, and human differences in complements of digestive enzymes and intestinal transport mechanisms. Malabsorption difficulties and adverse physiological effects are known for all the available carbohydrates but gelatinized starches give little or no trouble.

It is important to realize that in ruminants the unavailable and most abundant polysaccharide cellulose is partially hydrolyzed to the same highly available sugar that starch provides upon digestion; i, e., D-glucose. Grazing animals do it through the cellulases generated by the microorganisms of their rumen. Cellulose is, therefore, a contributing source of valuable animal protein. The efficiency and economics of the ruminant's conversion of cellulose to nutrients probably can be improved upon by food chemists. Development of cellulases that are stable outside the cells of microorganisms enables the culturing of fungi and yeasts on cellulose hydrolyzates. Fungi (e.g., mushrooms) can produce protein with the biological value of animal protein. The conversion of cellulose wastes to animal feed and human food is an intriguing prospect for limiting environmental pollution and for feeding the world's expending population.

Carbohydrates were first named according to their natural sources; e.g., beet sugar, cane sugar, grape sugar, malt sugar, milk sugar, cornstarch, liver glycogen, and sweet corn glycogen. Trivial names were then formed, in English terminology, often from a prefix related to the source followed by the suffix "-ose" to denote carbohydrate. Names arising in this way, for example, are fructose, maltose, lactose, xylose, and cellulose. These short, well-established names are still commonly used. They furnish no information on the chemical structures, however, so a definitive carbohydrate nomenclature has been developed. From the definitive names, structural formulas can be written. Some of the terms