

BOOK REVIEW — BUCHBESPRECHUNG

Prof. L. TELEGDY-KOVÁTS and Prof. J. HOLLÓ: Food Industries A text-book for students in chemical engineering

Tankönyvkiadó, Budapest, Volume I. 1957. 767 p; Volume II. 1952. 836 p.

The Hungarian technical literature of the food industries is rather incomplete. The lack is still higher in text-books on food industries for teaching at the universities. The technical literature of university level was represented by the following works: the work written nearly five decades ago by Tamás KOSUTÁNY, late director of the Central Chemical Institute; the distributed lecture notes of Elek SIGMOND, professor of the University of Technical Sciences at Budapest who died nineteen years ago; the text-book published thirteen years ago entitled "Agricultural Industry", by Antal OSZTRÓVSZKY, late professor at the University of Agricultural Sciences; ultimately the text-book entitled „Food Chemistry” by professor Mihály VUK and Zoltán SÁNDOR published in 1943. The development of the Hungarian food industry necessitated the modernization of the university education and the writing of a suitable text-book making possible also continuous education.

Volume II of this university text-book contemplated to three volumes was published five years ago. The edition of this volume was motivated not only by the urgent demand of it in the field of university education, and by its best usefulness in the practice, but also by the fact that the theoretical principles of the science of foods and food-products showed then an enormous development; the results of this development and their critical treatment, respectively, could be taken into account only later in Volume I published in 1957.

The chapters of the work comprising a great material of knowledge are written by the

best theoretical and practical experts. In Volume II the different characteristics in style of the numerous authors were co-ordinated by careful editorial work. In consequence of the nature of the material and in order to ensure the uniformity of the treatment, the first volume has been compiled in co-operation with fewer collaborators.

The contents of the work are discussed in detail as follows:

The first volume (Chemistry, Raw Materials) is divided into five larger parts. The first part "Food Chemistry" (by L. Telegdy-Kováts and D. Törley) treats at first the nitrogenous organic substances. After reviewing the amino acids and the amino acid derivatives, it deals with the peptides, the proteins and other important nitrogenous compounds. The next chapter describes the chemistry and biochemistry of lipides, implying the climate theory as well. Besides the glycerides, the phosphatides, cerebrosides, and sterols are dealt with. The review on the alterations of fats, especially on the theories of drying and rancidity is also to be found in this chapter. The chemical properties of carbohydrates, mono-, oligo-, and polysaccharides, the more significant natural sugar esters and glycosides, as well as the biochemistry of the carbohydrates are treated in the third chapter.

The next chapter deals with the enzymes and their properties.

Then the book reviews the protective foods, among others the vitamins, their action mechanism—including vitamin antagonism and the antivitamin — and the vitagens. After

the hormones the mineral substances and the artificial isotopes are discussed.

The chapter entitled "Poisonous substances" treats in detail, besides the organic and inorganic poisons, the food poisoning, then — after reviewing the animal parasites — it summarizes the most important view-points of the modern operative hygiene.

The carotenoids, the pyrrole dyes (the porphyrines, the porphyrine-metal complexes, the chlorophyll and its derivatives, the more important bile pigments, the prodigiosine) as well as the flavonoid and other natural dyes are mentioned among the natural colouring agents and tannins. The tannins are treated according to Freudenberg's classification; at the end of the chapter the formation of the tannins in plants is discussed.

Hydrocarbons, alcohols, aldehydes, phenol derivatives, ketones, organic acids, amides, sulfides, and mustard oils, synthetic sweetening agents, chemical preservatives, antioxidants, stabilizers and the synthetic dyes significant in food chemistry and food industry are dealt with in the chapter entitled „Other natural and synthetic adjuncts“.

The second part entitled "Elements of nutrition" by L. Telegdy-Kováts concentrates to 40 pages the knowledge necessary for a food chemist about nutrition, the digestive processes taking place in the individual parts of the digestive tract, absorption, nutrient and energy metabolism, and energy requirement. The role of the blood and lymph as well as the theory of biological oxidation are treated in a short up-to-date summary. Finally the principles of rational human nutrition are presented.

In the part entitled "The physical chemistry of foods" by J. Holló and L. Maczelka, the properties of true solutions (diffusion, osmosis, protolysis, redox systems) and the colloid systems are briefly reviewed. The dispersed systems of some foods, *e. g.* the colloidal properties of proteins, pectins, starches, more-over the emulsions and foams are discussed in detail.

The first chapter of the fourth part entitled "Processing and storage of foods" by G. Török deals with changes of the foods during processing and storing. Besides reviewing the physico-

chemical and colloid-chemical alterations, the changes in digestibility and in nutritive value connected with processing are also mentioned.

In connection with the microbiological changes the second chapter details the microflora of the foods, the breakdown of carbohydrates, proteins, and fats, as well as the prevention of food spoilage. The hygiene of food processing is mentioned too. After treating the preconditions of food preservability, the establishments serving for conservation of foods, furthermore the storage properties of foods are discussed.

The part entitled "The raw materials of the food industries" by J. Holló and J. Görög elaborates a comprehensive material too. After the fundamental conceptions of general botany (cytology, histology, morphology) and of botanical taxonomy the raw materials of plant-origin are described as cereal grains, oleaginous plants, sugar-beet, vegetables, mushrooms, fruits, spice-plants, tea, coffee, cocoa and tobacco. The cultivation problems of the more important crops are discussed; the properties and cultivation of the more significant varieties are emphasized.

At first the meat animals, poultry and game are described from among the raw materials of animal origin. The tissues and composition of the animal body, the ripening and spoilage as well as the grading of meat, and the fundamentals of animal husbandry are reviewed. Then the specification of the more important species of animals (cattle, sheep, hog, horse, rabbit, poultry, games) and their processing, moreover the making use of slaughter by-products are described. The chapter entitled cold-blooded animals handles the organism of fishes, furthermore the species and processing of freshwater and salt-water fishes, whales, shellfishes, snails, as well as the processing of by-products as the caviar and fish-glue. Milk, egg and honey are treated in separate chapters.

The air, then the industrial, drinking and mineral waters are discussed, including the problems of water production and purification, and the water requirement of the food industries. The production and processing of common salt is reviewed in the last chapter of the book.

The book is made more graphic and synoptical by a great number of formulas and illustrations.

The references are to be found at the end of each part.

The second volume writes about the different technological processes. Its authors: J. Csiszár †, Gy. Gänger, K. Gärtner, F. Gruzl, L. Haskó, J. Holló, M. Jáky, L. Karácsonyi. Zs. Kende, J. Kolostori, J. Krausz †, F. Lőrincz, L. Maczelka, I. Marton, A. Peltz, L. Rakesányi, L. Telegdy-Kováts, T. Téti, D. Törley and G. Török are well-known industrial and scientific experts, respectively.

The first chapter treats the milling industry and its equipments. The preparation and cleaning of the cereals, the milling process, the bolting and purification of the products, and also the needed machinery are described. The second chapter (The production of bread and bakery products) treats the value of the flours from the view point of the baking industry, the operations of the bread-making, and the properties of the products. The spoilage of bakery products is dealt with too. The third chapter (Industry of macaroni products) deals with the manufacturing of the different macaroni-goods.

The chapter entitled "Starch-industry" fully discusses the technical problems of producing potato, corn, wheat and rice starches, dextrins, corn syrup, and dextrose, furthermore the utilization methods of the products and by-products.

The chapter entitled "Sugar-industry" writes chiefly about the manufacturing of beet sugar. After the preparatory operations (storing, cleaning, cutting) it treats the theoretical and practical problems of diffusion (velocity, losses, the equipments of batch and continuous operations), the chemistry and procedures of juice purification, and corresponding equipments, ultimately the changes taking place during evaporation, and the vacuum pans. After the part entitled "Sand sugar manufacturing, formation of molasses, and raffination", the processing of by-products and the water economy of sugar-factories are treated, then the recent development trends of sugar manufacturing, especially the modern

processing possibilities of molasses are described. At the end of the chapter the production of cane sugar, maple-sugar, fructose, and wood sugar is briefly discussed.

In chapter entitled "Confectionery" the soft and hard candies, fondant, fudge, production of dragée, manufacturing of cocoa and chocolate, flour products, cakes and biscuits and producing of ice-cream are mentioned.

In chapter entitled "Malt producing" the theoretical and practical relations of malting, then the drying, purification and storing of malts, and the producing of special malts are discussed.

The eighth chapter entitled "Industry of coffee substitutes" deals with production of coffee surrogates, describes the raw and additional materials authorized in Hungary, then the technology and theoretical relations of the chicory, cereal and blended coffee substitutes.

The chapter entitled "Producing of neutral spirits" treats the more important yeast species, the mechanism of alcoholic fermentation and the technological details. After describing the malting process, it illustrates the horizontal and Henze's steamers, the continuous steaming (cooking) operations, then the mashing, and the preparation of the selected yeast cultures. The problems of industrial fermentation processes, then the manufacturing of neutral spirits from potato, corn, sugar-beet and molasses furthermore the processing of inulin containing materials are discussed. After the theory and technology of distilling and refining, the production of absolute alcohol, the processing of sulfite liquor, ultimately the glycerol and the butanol-acetone fermentation are described.

In chapter entitled "Yeast-production" the scooping and aerating technologies, furthermore the principle elements of producing the dry baker's yeasts and of fodder yeast are reviewed.

The following chapter treats the raw materials and operations of the producing of distilled liquors and cordials: the more significant sub-titles are as follows: production of fruit-brandies, rum, and whisky, distilling equipments, rectification, mixed and synthetical brandies, raw materials of cordial industry,

composing and mixing of cordials, ageing, storing.

The chapter entitled "Beer-making" reviews the theoretical and practical problems of the brewing process (malt-grinding, mashing operations, filtering, hopping, cooling), describing the chemical processes which take place. The yeast species as well as the processes and technology of the primary fermentation (bottom and top fermentation) then the questions of the fermentation in the storage tanks, and the technology of filtration, drawing off and pasteurization are treated. After discussing losses and heat economy of breweries, the special brewing processes (Nathan's process, English beers, Porter, ale) are mentioned.

In chapter entitled "Oenology and its by-products" the history of oenology, the technology of must- and wine-making, and the processing of by-products represent the more important subtitles. Among other topics this chapter treats the old and the up-to-date methods in the production of table wines, dessert wines, champagne, condensed must, cognac, and dregs of wine.

The chapter entitled "Vinegar-making" handles chiefly the producing of spirit vinegar. It describes the chemical processes of acetous fermentation, then the processes with resting mash and the generator methods. It gives particulars of the up-to-date equipments, and ultimately mentions the other vinegar-making processes (synthesis, destructive distillation of wood) too.

The part entitled "Dairy industry" reviews the questions of the urban milk supply. After describing the purchasing, transportation, and cleaning of milk, the kinds and equipments of pasteurization, the heat exchange, cooling, storing, bottling, the sweet and sour cream, yoghurt, and the homogenization of milk, the operations and theory of butter-making are discussed. The processes and operations of cheese- and cheese-curd making are described. The chapter is ended by review of evaporated milk, refrigerated milk and milk powder, and of technology of casein and lactose production.

The first part of "Cold storage and freezing preservation of foods" describes the effects of cold to the microorganisms, then the theoretic-

cal problems of cooling, refrigeration, quick freezing, and thawing, emphasizing the importance of the reversibility of the freezing process. The freezing preservation of meat and meat products, poultry, games, fish, eggs dairy products, fruits, and vegetables, etc. is treated in the second part.

The chapter entitled "Meat industry" deals with the slaughterhouse processing of the meat animals (fresh and refrigerated meat, varieties of lard, cured meats, sausages, meat extracts), moreover the processing of poultry, fish and game. It handles also the processing of by-products: the utilization of blood, the production of marrow fat and gelatine, the processing of casings, hairs and horn, ultimately the primary processing of endocrine glands.

The chapter entitled "Fat industries" reviews the gaining methods of vegetable oils as well as of warm-blooded and sea animals. It treats the storing, cleaning, drying, and grinding of oil seeds, the expression and solvent extraction of vegetable oils, Iljin's and Skipin's processes, furthermore the oil refining and the processing of by-products. Chiefly, the rendering processes are handled among the methods supplying animal fats.

The hydrogenation (oil hardening) is treated in a separate chapter. After reviewing the theoretical problems of hydrogen uptake (formation of iso-oleic acid, selectivity, etc.) the preparation and regeneration of catalysts, then the equipments are discussed.

The following chapter handles the production of margarine and shortenings (vegetable shortenings, blended fats). The technological equipments and processes as well as the problems of emulsion formation are discussed.

The chapter entitled "Canning industry" describes the principles and methods of preservation as well as the technology of the more important products. Further on, the dehydration, salting, souring, preservation with chemical agents, sterilization, then the canned foods and their spoilage, finally problems of storing and business organization are discussed.

In chapter entitled "Technology of tea and coffee" the production of black, green and Oolong tea and the accompanying chemical processes, the tea substitutes, the processing

of unroasted coffee, and the roasting processes are described.

In chapter treating the technology of flavouring agents, the production of paprika, prepared mustard, natural essential oils, and synthetic flavouring blends is discussed.

In appendix of the book the technology of

fat splitting, the production of stearic acid and glycerol, the soap making, and the technology as well as some theoretical problems of the tobacco industry are to be found as addenda.

The book contains a number of illustrations and flow sheets; the compiled literature is given at the end of each chapter.

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