

# Dictionary of Nutrition and Food Technology

ARNOLD E. BENDER



Y  
83.072  
B458(-4)

# Dictionary of Nutrition and Food Technology

ARNOLD E. BENDER  
B.Sc., Ph.D., F.R.I.C., F.R.S.H., F.I.F.S.T.  
*Professor of Nutrition, Queen Elizabeth College,  
University of London*

*Should this book become sufficiently familiar through usage to earn the title 'Bender's dictionary', it would probably be more correct to call it 'Benders' dictionary', in view of the invaluable assistance of D., D.A., and B.G., guided, if not driven, by A.E.*

## PREFACE

The study of food as included in the combined subjects of nutrition and food science and technology involves a wide variety of basic sciences ranging from chemistry and biochemistry to microbiology and engineering. Consequently many technical terms and abbreviations are involved.

At the same time the rapidly growing interest in the subject is shared by specialists from many fields such as sociology, medicine, agriculture and commerce. The purpose of this dictionary is to assist the specialist from one field to understand the technical terms used by the variety of specialists in the food fields.

Successive editions have become larger with the broadening scope of the subject matter, changes in policy such as the inclusion of proprietary names, the updating of information, and the introduction by official bodies of defined terminology. In the present edition the energy content of foods is expressed in both joules and calories, and vitamins are expressed, where appropriate, in both micrograms and international units.

ARNOLD E. BENDER

## INTRODUCTION

Definitions have been kept simple and brief but in many instances they are followed by a reference indicating where the reader can find further information. The codes refer to the following books.

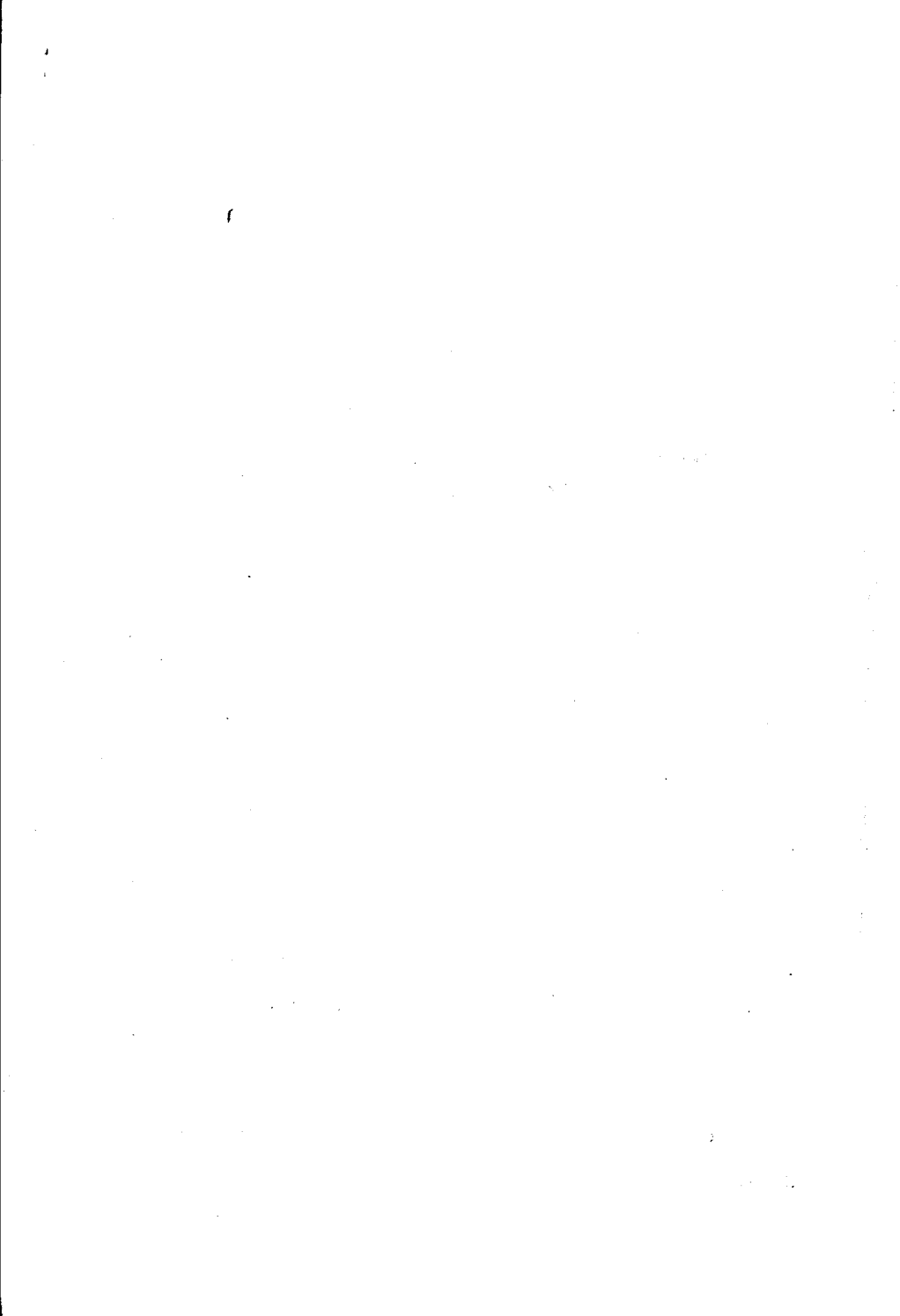
It should be noted that where the composition of foods is stated, these are average values taken from standard works of reference. It must be borne in mind that different samples of the same food can vary considerably in composition, especially in vitamin content.

- Abrams** *Linton's Animal Nutrition and Veterinary Dietetics*, J. T. Abrams. Edinburgh: W. Green & Son Ltd.
- AEB** *Nutrition and Dietetic Foods*, A. E. Bender. London: Leonard Hill Books.
- Bailey** *Industrial Oil and Fat Products*, A. E. Bailey. New York: Interscience Publishers Inc.
- B & R** *The Nation's Food*, A. L. Bacharach and T. Rendle. London: Society of Chemical Industry.
- Baum** *Canned Foods, an introduction to their microbiology*, J. G. Baumgartner. London: J. & A. Churchill Ltd.
- BDS** *Textbook of Physiology and Biochemistry*, G. H. Bell, J. N. Davidson and Emslie Smith. London: E. & S. Livingstone Ltd.
- Bell** *Bell's Sale of Food and Drugs*, J. A. O'Keefe. London: Butterworth & Co. (Publishers) Ltd.
- Brav** *Citrus Products*, J. B. S. Braverman. New York: Interscience Publishers Inc.
- Clark** *Clark's Applied Pharmacology*, revised by A. Wilson and H. O. Schild. London: J. & A. Churchill Ltd.
- Cohen** *Theoretical Organic Chemistry*, Julius B. Cohen. London: Macmillan & Co. Ltd.
- Cruess** *The Principles and Practice of Wine Making*, W. V. Cruess. New York: The Avi Publishing Co. Ltd.
- Davis** *A Dictionary of Dairying*, J. G. Davis. London: Leonard Hill Ltd.
- Davis & Mac** *Richmond's Dairy Chemistry* revised by J. G. Davis and F. J. Macdonald. London: Charles Griffin & Co. Ltd.

DICTIONARY OF NUTRITION AND FOOD TECHNOLOGY

- DP** *Human Nutrition and Dietetics*, Sir Stanley Davidson and R. Passmore. Edinburgh: E. & S. Livingstone Ltd.
- FAO** *Food Composition Tables—Minerals and Vitamins*, Food and Agriculture Organisation, United Nations.
- FB** *Value of Food*, Patty Fisher and Arnold E. Bender. London: Oxford University Press.
- FM** *Food Industries Manual*, 21st ed., A. H. Woollen, ed. London: Leonard Hill.
- GH** *Good Housekeeping's Home Encyclopaedia*.
- Gil** *Mineral Nutrition and the Balance of Life*, F. A. Gilbert. University of Oklahoma Press.
- GMW** *Trace Elements in Food*, G. W. Monier-Williams. London: Chapman & Hall.
- Griswold** *The Experimental Study of Foods*, Ruth M. Griswold. Boston: Houghton, Mifflin Co.
- Hawk** *Practical Physiological Chemistry*, B. L. Oser. London: J. & A. Churchill Ltd.
- Hilditch** *Industrial Fats and Waxes*, T. P. Hilditch. London: Baillière, Tindall & Cox.
- Hutch** *Hutchison's Food and the Principles of Dietetics*, revised by V. H. Mottram and G. Graham. London: Edward Arnold (Publishers) Ltd.
- Jacobs** *Food and Food Products*, M. B. Jacobs. New York: Interscience Publishers Inc.
- Johnson** *Laboratory Manual in Cookery*. Doris B. Johnson. London: Putnam.
- KJ** *Modern Cereal Chemistry*, D. W. Kent Jones and A. J. Amos. Liverpool: The Northern Publishing Co. Ltd.
- Loes** *Outlines of Food Technology*, H. W. von Loesecke. New York: Reinhold Publishing Corp.
- M & W** *Composition of Foods*, R. A. McCance and E. M. Widdowson. M.R.C. Special Report Series No. 297. London: H.M.S.O.
- MP** *Food Science and Technology*, Magnus Pyke. London: John Murray.
- Matz** *Food Texture*, S. A. Matz. Westport: The Avi Publishing Co. Inc.

- Matz 2**      *The Chemistry and Technology of Cereals as Food and Feed*, S. A. Matz. Westport: The Avi Publishing Co. Inc.
- Meat**        *The Science of Meat and Meat Products*, American Meat Institute Foundation. San Francisco & London: W. M. Freeman & Co.
- Merory**      *Food Flavorings, Composition, Manufacture and Use*, J. Merory. Westport: The Avi Publishing Co. Inc.
- OF**          *The Oxford Book of Food Plants*, S. G. Harrison, G. B. Masfield and M. Wallis. London: Oxford University Press.
- Platt**        *Tables of Representative Values of Foods Commonly used in Tropical Countries*, B. S. Platt. Medical Research Council Special Report, Series No. 302, 1962.
- RJC**        *Process Engineering in the Food Industries*, R. J. Clarke. London: Heywood & Company Ltd.
- Sebrell**      *The Vitamins*, W. H. Sebrell, Jr. and R. S. Harris. New York: Academic Press Inc.
- Tanner**      *The Microbiology of Foods*, F. W. Tanner. Illinois: Garrard Press.
- TND**        *Tropical Nutrition and Dietetics*, L. Nicholls, H. M. Sinclair, and D. B. Jelliffe. London: Baillière, Tindall & Cox.
- Tressler**    *Marine Products of Commerce*, D. K. Tressler and J. McW. Lemon. New York: Reinhold Publishing Corp.
- WHSS**      *Principles of Biochemistry*, A. White, P. Handler, E. L. Smith, D. Stetten. New York: McGraw-Hill Book Co. Inc.





**Abalone.** A shellfish, gastropod mollusc of the genus *Haliotis*; found in the water round Japan, California, Channel Islands and France.

Also called Ormer.

**Abbé Refractometer.** See Refractometer.

**Abernethy.** Hard biscuit flavoured with caraway seed.

**Abomasum.** See Rumen.

**Absinthe.** Green liqueur prepared from oils of wormwood, angelica, anise and marjoram. It is toxic and the manufacture has been banned in many countries. The toxic principle is oil of thujol, which is cumulative, and is a cerebral convulsant. (Clark.)

**Absorptiometer.** Instrument used to measure the absorption of light, and therefore used as a quantitative measure of coloured solutions. Frequently (incorrectly) called colorimeters. Many substances, minerals, vitamins, amino acids, will react with a particular reagent to form a coloured complex. The colour developed is proportional to the amount present and is measured in an absorptiometer or a true colorimeter. (Hawk.)

**Acaricide.** Chemical that kills acarids, i.e. ticks and mites, e.g. tetraethylpyrophosphate.

**Ac'cent.** Trade name (International Mineral & Chemical Corp., U.S.A.) for mono sodium glutamate. See Glutamate.

**Acerola.** West Indian Cherry, see Cherry, West Indian.

**Acetate.** Salt or acetic acid, which see.

**Acetate, Active.** The form in which the acetyl radical  $\text{CH}_3\text{CO}-$ , is transferred from one compound to another, as the acetyl-Coenzyme A complex (see Coenzyme A).

The metabolism both of glucose and of fats involves the formation of active acetate. (WHSS.)

**Acetate Replacement Factor.** See Lipoic acid.

**Acetic Acid.** One of the simplest of the organic acids,—formula  $\text{CH}_3\text{COOH}$ . See Vinegar. (Cohen.)

**Acetobacter.** Genus of bacteria of family *Acetobacteriaceae*, which oxidizes alcohol to acetic acid. *Acetobacter pasteurianus* (also known as *Mycoderma aceti* and *Bacterium aceti* or *pasteurianum*) is one of this type and is used in the manufacture of vinegar. Also grow in film on beer wort, pickle brine and fruit juices. See also Vinegar. (Tanner.)

**Aceto-glycerides.** Differ from the triglycerides in that either one or two of the long chain fatty acids attached to the glycerol molecule are replaced by acetic acid. There are three types, diaceto-triglycerides (e.g. diaceto-monostearin), monoaceto-triglycerides (e.g. monoaceto-distearin) and monoaceto-diglycerides (e.g. monoaceto-monostearin) in which one hydroxyl group of the glycerol is free.

Also known as **Partial glyceride esters**.

They are non-greasy and have lower melting points than the corresponding triglycerides and are used in shortenings and

spreads, as films for coating foods, and as plasticisers for hard fats.

**Acetoin.** Acetyl methyl carbinol,  $\text{CH}_3\text{CO}\cdot\text{CHOH}\cdot\text{CH}_3$ , precursor of diacetyl, butter flavour. Produced by bacteria during butter ripening and by yeast during fermentation.

**Acetone Bodies.** See Ketone bodies.

**Acetylcholine.** Acetyl derivative of choline (*which see*) which is liberated at certain nerve endings (cholinergic nerves) to stimulate the muscle. (BDS.)

**ACH Index.** Arm, chest, hip index. The arm girth, chest diameter and hip width used as a method of assessing the state of nutrition. (DP.)

**ACHlorhydia.** Deficiency of hydrochloric acid in the gastric secretion.

**Achrodextrin.** A product formed during the enzymic breakdown of starch to maltose; it is a dextrin that gives no colour with iodine (hence achro).

**Achromotrichia.** Loss of hair pigment. See Para-amino benzoic acid and Pantothenic acid.

**Acid-base Balance.** Body fluids are maintained just on the alkaline side of neutrality, pH 7.3 to 7.45, by buffers in the blood and tissues. Buffers include proteins, and sodium and potassium phosphate and bi-carbonate.

Acidic products of the body's metabolism are excreted in the urine in combination with bases such as sodium and potassium. These bases are thereby lost to the body and the acid-base balance is maintained by replacing them from the diet.

Buffer materials in the blood and tissues are termed the alkaline reserve. (BDS.)

**Acid Calcium Phosphate.** See Calcium acid phosphate.

**Acid Foods and Basic Foods.** Minerals sodium, potassium, magnesium and calcium are base-forming, and phosphorus, sulphur and chlorine are acid-forming. Which of these predominates in the food determines whether the food itself leaves an acid or alkaline residue. An acid residue is left by meat, fish, eggs, cheese, cereals. An alkaline residue is left by milk, vegetables, some fruits. Fats and sugars are neutral as they contain no minerals at all.

Acid-tasting citrus fruits are actually alkali formers, as, although they contain a mixture of citric acid and sodium citrate, the citric acid and the citrate radical are oxidized to carbon dioxide and water, and the sodium remains as the alkaline residue. See also Acid-base balance. (Hutch.)

**Acid Number.** With reference to fats is a measure of hydrolytic rancidity. Defined as milligrams of caustic potash required to neutralise the free fatty acids in 1 g of the fat.

The acid number, also known as the **acid value**, is an index of the efficiency of refining, during which process the free fatty acids are removed and the acid number falls to very low values; it is also an index of the deterioration in storage. (Bailey.)

**Acidophilus Therapy.** The consumption of milk containing a high concentration of viable *Lactobacillus acidophilus* (the milk itself being unfermented) as a treatment for constipation. The effect is said to be due to the implantation of these organisms in the intestine. (Tanner.)

**Acidosis.** Increase in the ratio of acid to base in the blood plasma, or a reduction in its buffering power. Causes may be alteration in carbon dioxide excretion, metabolic overproduction of acid or excessive loss of base. *See also* Acid-base balance. (BDS.)

**Acid Rebound.** Term used in reference to the secretion of gastric acid to signify the increase in acidity of the stomach that results from the administration of alkalis. There is conflicting evidence as to whether this really occurs.

**Acid Value.** *See* Acid Number.

**Aconitine.** Toxic alkaloid of Monkshood (*Aconitum*), slows the pulse and reduces blood pressure, fatal in small doses.

**Acorn Sugar.** Quercitol, extracted from acorns; pentahydroxycyclohexane.

**A.C.P.** Acid calcium phosphate. *See* Calcium acid phosphate.

**Acraldehyde.** *See* Acrolein.

**Acrodermia.** A specific type of dermatitis seen in animals fed on diets deficient in vitamin B<sub>6</sub>. (Sebrell.)

**Acrolein.** Acraldehyde, CH<sub>2</sub>:CHCHO. Formed when glycerol is heated to a high temperature, and is responsible for the acrid odour and lachrymatory vapour produced when fats are overheated. (Cohen.)

**Acronize.** Trade name (Cyanamide Co., U.S.A.) for the antibiotic chlortetracycline (used, for example, as "acronized ice").

**ACTH.** Abbreviation for adrenocorticotrophic hormone, *which see*.

**Actin.** One of the proteins of muscle, about 13% of total,

combines with myosin to form the contractile protein, actomyosin.

**Activators.** With reference to enzymes, substances that increase the activity of the enzyme in a non-specific manner. Those substances that are part of the activating system, and are required before the enzyme can activate its substrate, are activators. Substances that are part of the reaction system but play no part in the activation of the substrate are coenzymes. Many inorganic radicals are activators; thus salivary amylase requires the presence of chloride; others are potassium, calcium, magnesium, phosphate. (WHSS.)

**Active Oxygen Method.** A method of measuring the stability of fats and oils by bubbling air through the heated material and following the formation of peroxides.

Also known as the **Swift Stability Test**.

**Actomyosin.** The contractile protein of muscle formed from actin plus myosin. It also appears to be identical with the enzyme that catalyses the decomposition of adenosine triphosphate ("ATP-ase") and liberate its energy. This procedure provides the energy for the work of the muscle. (WHSS.)

**Addison's Disease.** Destruction of the cortex of the suprarenal glands; symptoms are low blood pressure, anaemia, muscular weakness, fall in metabolic rate. Treatment partly successful by taking sodium chloride, or by implantation of pellets of deoxycorticosterone acetate. (BDS.)

**Additives.** Include all materials deliberately added to food to help manufacture and preserve food, improve palatability and eye-

**appeal;** such as emulsifiers, flavours, thickeners, curing agents, humectants, colours, vitamins, minerals, and mould, yeast and bacterial inhibitors. Most of these are controlled by law in all countries.

**Additives, Baking.** See Baking additives.

**Adenine.** See Purines and Nucleic acids.

**Adenosine.** Combination of the base, adenine, with the sugar, ribose. Of special importance, as adenosine triphosphate plays a central part in the energy release in muscle.

See also Adenosine diphosphate, Adenosine triphosphate, Phosphate bond, energy-rich and Phosphokinase. (WHSS.)

**Adenosine Diphosphate** (or ADP). Adenine + ribose + phosphate + phosphate. Involved in energy exchange in muscle metabolism as the addition and subtraction of the third phosphate (to form adenosine triphosphate) is the means of trapping and releasing energy respectively.

See also Adenosine triphosphate, Phosphate bond, energy-rich and Phosphokinase. (WHSS.)

**Adenosine Monophosphate.** See Adenylic acid.

**Adenosine Triphosphate** (ATP or adenylyl pyrophosphate). A compound of central importance in the liberation of energy from foodstuffs, consisting of adenine linked to ribose and three phosphate molecules. The last two phosphates are linked by what is called "the energy-rich phosphate bonds". On hydrolysis they liberate energy for muscular work, etc. The energy obtained by the

oxidation of carbohydrates, fats and amino acids is trapped as ATP. See Phosphate bond, energy-rich and Phosphokinase. (WHSS.)

**Adenylic Acid.** Combination of the base, adenine, with the sugar, ribose, and phosphoric acid. Also known as adenosine monophosphate or AMP; of importance in muscle metabolism. (BDS.)

**Adenylyl Pyrophosphate.** See Adenosine triphosphate.

**Adermin.** See Vitamin B<sub>6</sub>.

**Adipose Tissue.** Groups of cells that store and mobilize fat; constitutes a fifth to a quarter of the total body mass—more in fat people. Composed of 82–88% fat, 2–2.6% protein and 10–14% water and contains 8–9 kcal (34–38 kJ) per gram or 3,600–4,000 (15.1–16.8 MJ) per lb. (DP.)

**Adlay.** A tall grass that grows wild in parts of Asia and Africa. Latin name *Coix lachryma-jobi*,—Job's tears. Used as a cereal to eke out rice supplies in parts of India, China, Siam and Philippines. Belongs to the same tribe (*Trip-saceae*) as maize.

Protein 14%, fat 4%, kcal 363 (1.52 MJ), Ca 20 mg, Fe 4 mg, vitamin B<sub>1</sub> 0.3 mg, B<sub>2</sub> 0.2 mg, nicotinic acid 3 mg—per 100 g (TND, Platt.)

**ADL.** Acceptable daily intake: refers to chemical additives used in food processing.

**ADP.** See Adenosine diphosphate.

**Adrenal Glands.** Also called **suprarenal glands**; situated just above each kidney. Comprise the inner part, or medulla, which secretes adrenaline and noradrenaline (*which see*), and the

outer cortex, which secretes steroid hormones.

Steroid hormones include steroid sex hormones, corticosterone (affects carbohydrate metabolism and is anti-inflammatory) and aldosterone (controls excretion of salt and water through the kidneys.) (BDS.)

**Adrenaline.** Hormone secreted by the medulla of the adrenal glands; the first hormone to be discovered. It is secreted under conditions of emotional stress and causes an increase in blood pressure, blood sugar levels and metabolic rate, thus mobilising the body's reserves of energy.

Also known as epinephrine, chemically hydroxy, dihydroxy-phenyl-ethyl-methylamine. (BDS).

**Adrenocorticotrophic Hormone.** Hormone extracted from the anterior part of the pituitary gland of animals and used in the treatment of rheumatoid arthritis. Acts by stimulating the adrenal gland to secrete corticosteroids.

**Aequum.** Amount of food necessary to maintain body weight under normal or specified conditions of activity (rarely used).

**Aerobes.** Micro-organisms that need oxygen for growth. Obligate aerobes cannot survive in the absence of oxygen. (Tanner.)

**Aesculin.** A glycoside (dihydroxycoumarin glycoside) found in chestnuts, with "vitamin P" activity. (WHSS.)

**AFD.** Accelerated freeze-drying. See Freeze-drying.

**Aflatoxins.** Toxic metabolites of the mould *Aspergillus flavus*. The cause of an outbreak of a fatal disease among turkeys in United Kingdom in 1960, called **turkey**

**X disease**, arising from ground-nuts infected with the mould. Since then found in cottonseed meal and cereals.

Eight forms isolated; chemically related to furocoumarins; carcinogenic to several animal species.

Also formed by other strains of *Aspergillus* and *Penicillium puberulum*.

**Agar.** Dried, purified stems of a seaweed, *Gelidium algae*, *Gracilaria* and other genera. Partly soluble and swells with water to form a gel. It has a wide temperature range between gelling and melting points.

Used in soups, jellies, ice-cream, meat and fish pastes, in bacteriological media, for sizing silk, as adhesive and as a stabiliser for emulsions. Also called agar-agar, Macassar gum and vegetable gelatine. (Jacobs.)

Agar is a galactan, i.e. a complex of galactose units but it is not digested by man.

**Agene.** See Aging.

**Ageusia.** Lack or impairment of sensitivity to taste stimuli.

**Agglutinins.** See Haemagglutinins.

**Aging.** (1) Term applied to treatment of flour with oxidising agents, i.e. aging agents.

When freshly milled flour is stored for several weeks it undergoes an aging effect and produces a stronger and more resilient dough and a bolder loaf, and the flour slowly bleaches. Chemical agents can produce these effects immediately.

Oxidising agents, such as ammonium persulphate (used at 160 ppm) and potassium bromate (20 ppm), are "improvers" but

do not bleach. Nitrogen peroxide (5 ppm) and benzoyl peroxide (Novadelox, 20-40 ppm) bleach but do not "improve". Nitrogen trichloride (agene) (60 ppm) and chlorine dioxide (Dyox, 30 ppm) bleach and "improve".

The Bread and Flour Report 1960 recommends the use of only one bleaching agent, benzoyl peroxide at not more than 50 ppm. No specific limit is set on maturing agents such as ascorbic acid, potassium bromate, ammonium and potassium persulphate, chlorine dioxide, chlorine (cake flour only) sulphur dioxide (brown flour only). (KJ.)

(2) In reference to wine "aging" refers to the development of bouquet and smooth mellow flavour, and disappearance of harsh and yeasty taste—due to slow oxidation and formation of esters.

(3) With reference to meat *see* Rigor mortis. (Cruess.)

**Aginomoto.** *See* Glutamate, sodium.

**Aglycon.** The non-sugar part of a glycoside.

**Agnelloto.** Envelope of pasta stuffed with minced meat or vegetables; cut in half-moon shape, so differing from ravioli, which is cut in squares.

**A/G Ratio.** *See* Albumin/Globulin ratio.

**Ajinomoto.** Trade name (Hercules Powder Co.) for range of flavour enhancers—Ajinomoto IMP, disodium inosinate; Ajinomoto GMP, disodium guanylate; Ajinomoto, monosodium glutamate.

**Akee.** *Blighia sapida*; fruit of West African origin, long grown in West Indies; unripe fruits are toxic. (OF.)

**Ala.** Bulgur, *which see*.

**Alanine.** A non-essential amino acid, amino propionic acid. The alpha amino acid is found in all proteins; there is also beta-alanine (the amino group attached to the second carbon atom) which is part of the molecule of pantothenic acid, of carnosine and of anserine. (BDS.)

**Albedo.** White pith of the inner peel of citrus fruits, also known as the mesocarp; 20-60% of the whole fruit. Consists of sugars, cellulose and pectins; used as a source of pectin for commercial manufacture. (Brav.)

**Albumen.** *Oxford Dictionary* spelling of albumin.

**Albumin.** Often used as a non-specific name for protein, strictly should refer to one of the albumins, *which see*. *See also* Egg white, Lactalbumin, and Albumin/Globulin ratio.

**Albumin/Globulin Ratio.** Ratio of the blood albumin to the globulins; in normal human serum 1.82. Change in the A/G ratio is of diagnostic value.

**Albumin Index.** A measure of the quality of an egg; the ratio of height of the albumin to the width when broken on to a flat surface. As the egg deteriorates the albumin index decreases, i.e. the egg white spreads. (Griswold.)

**Albumin milk.** *See* Protein milk.

**Albuminoids** (or scleroproteins). Fibrous proteins that have supporting or protective function in the animal (in plants cellulose fulfils this function). Three types: (1) collagens in skin, tendons and bones, resistant to pepsin and

trypsin, converted to water-soluble gelatin by boiling with water; (2) elastins in tendons and arteries, not converted to gelatin; (3) keratins, proteins insoluble in dilute acids and alkalis, not attacked by any animal digestive enzymes, comprise horns, hoofs, feathers, scales, nails. (Hawk.)

**Albumins.** Simple proteins (i.e. free from other substances) soluble in water and coagulated by heat, e.g. ovalbumin in egg-white, serum albumin in blood serum, lactalbumin in milk.

The name albumin is often used for any protein, e.g. albuminuria is the presence of protein in the urine, and although this protein is often largely serum albumin it is not necessarily so. (Hawk.)

**Albumoses.** Old name for proteoses, *which see*.

**Alcaptonuria.** A rare inborn error of metabolism of the two amino acids phenylalanine and tyrosine. Their metabolism ceases at homogentisic acid, which is excreted in the urine. Homogentisic acid oxidizes to black melanoid pigments, hence the urine of alcaptonurics slowly turns black. The defect appears to be harmless. (BDS.)

**Alcohol.** The name without further description refers to ethyl alcohol, chemical formula  $C_2H_5OH$ . This is the second member of a series of alcohols of the general formula  $C_nH_{2n+1}OH$ , the first member being methyl alcohol  $CH_3OH$ , and rising to long molecules such as cetyl alcohol, *which see*.

Alcohol is produced by yeast fermentation of carbohydrates and is the basis of a large number of beverages. It has an energy value of 7 kcal (29 kJ) per gram;

the quantity of alcohol contained in various drinks is shown under Alcoholic Beverages. (Cohen.)

**Alcohol, denatured.** Alcohol to which unpleasant materials have been added to prevent it being drunk, e.g. methylated spirits contains 10% methyl alcohol, a blue dye and unpleasant-smelling pyridine. Denatured alcohol is used for industrial purposes and not subject to Excise Duty.

**Alcoholic Beverages.** Yeast fermentation of sugar or starchy materials yields a solution of approximately 15% alcohol, (wine) at which strength the alcohol kills off the yeast. If sweet wines are wanted the fermentation is stopped at an earlier stage when there is still some sugar left. If stronger wines are required, such as port, they are fortified by the addition of brandy.

The strong spirits are made by distilling the alcohol from wine.

Alcohol content (per cent by volume):—spirits—gin, whisky, brandy, rum—25 under proof, 43% alcohol; 35 under proof, 37%. Wines,—port, sherry, madeira 20%; burgundy, 14%; champagne, claret, hock, 10%; cider, 4-3%; ale 3-1 to 6-6%; stout, 3-9 to 5-3%; porter 4-0%. Liqueurs; curacao, 55%; benedictine, 52%; absinthe, 59%; anisette, 42%; chartreuse, 43%; kummel, 34%. *See also* Proof spirit. (Hutch.)

**Aldehyde.** One of a large class of organic substances derived from primary alcohols by oxidation, and containing the grouping  $-CHO$ . E.g. formaldehyde, acetaldehyde, benzaldehyde. (Cohen.)

**Aldosterone.** Hormone secreted by the adrenal cortex which

controls the excretion of salt and water through the kidneys. (BDS.)

**Ale.** See Beer.

**Aleurone Layer.** Single layer of large cells under the bran coat and outside the endosperm of cereal grains; about 3% by weight of the grain, rich in protein. Botanically is part of the endosperm but during milling remains attached to the inner layer of bran.

Contains about 20% of the thiamin, 30% of the riboflavin and 50% of the nicotinic acid of the grain. (KJ.)

**Alewives.** River herrings, mostly used for canning after salting. (Tressler.)

**Algae.** Sub-group, mainly aquatic, of the division of plants called *Thallophyta* which show no differentiation into root, stem and leaf. Includes seaweeds, such as Dulse and Irish Moss, which have long been eaten by man.

Unicellular varieties such as *Chlorella*, *Scenedesmus* and *Spirulina* are being grown experimentally in tanks as a potential source of food. They require only carbon dioxide and mineral salts since they obtain their energy by photosynthesis.

Protein content on dry weight basis: *Spirulina* 60-70%, *Scenedesmus* and *Chlorella* 50-60%; fat, *Spirulina* 2%, *Chlorella* 8-20% depending on growing conditions; nutritional value of the proteins is similar to that of casein, i.e. NPU 50-70, per 2.2-2.5. (FM.)

**Alginates.** Salts of alginic acid found as the free acid and calcium salt in many seaweeds. Alginic acid is a polysaccharide complex built from mannuronic acid units.

Salts such as iron, magnesium and ammonium alginates form viscous solutions. They hold large amounts of water and are useful as thickeners, stabilisers and gelling, binding and emulsifying agents in ice-cream, synthetic cream. The propyl glycol ester is used under the trade name of "mannucol ester". (Tressler.)

**Alginic Acid.** See Alginates.

**Alimentary Canal.** The digestive tract, comprising, in man, mouth, oesophagus, stomach, duodenum, small and large intestines. (BDS.)

**Alimentary Pastes.** Shaped dried doughs made from semolina or wheat flour with water, and sometimes egg and milk. The dough is partly dried in hot air, then more slowly.

**Macaroni** — tubular - shaped, about  $\frac{1}{4}$  inch diameter; at  $\frac{1}{2}$  inch it is called *fovantini* or *maccaroncelli*; at  $\frac{3}{4}$  inch, *ziton*.

**Spaghetti** is solid rod about  $\frac{1}{16}$  inch diameter; *vermicelli* is a third of this thickness.

**Noodles** are shaped into sheets or ribbons.

**Farfals** are ground, granulated or shredded. (Loes, Matz 2.)

**Aliment de Sevrage.** Protein-rich baby food, 20% protein. Algerian version made from wheat, chick peas, lentils, skim milk powder and sugar with added vitamin D.

Senegal version made from millet flour, peanut flour, skim milk powder and sugar with vitamins A and D and calcium.

**Aliphatic.** Name given to those organic chemicals that have open-chain structure in distinction to the alicyclic compounds, which contain rings of carbon compounds. (Cohen.)



**Alkali Formers.** See Acid Foods and Basic Foods.

**Alkaline Reserve.** See Acid-base balance.

**Alkaloids.** Group of organic compounds containing nitrogen, occurring in plants and having powerful effects on animals. Many drugs and poisons are alkaloids, such as strychnine, codeine, morphine, atropine, nicotine, quinine. (Cohen.)

**Alkalosis.** Decrease in the acid-base ratio in the blood plasma, or an increase in its buffering power. Causes may be excessive loss of carbon dioxide, excessive intake of base as in antacid drugs, loss of gastric secretion by vomiting, high intake of sodium or potassium salts of weak organic acids. See also Acid-base balance. (BDS.)

**Alkannet** (Alkanet, Alkannin, Alkanna). Colouring obtained from root of *Anchusa tinctoria* (*Alkanna tinctoria*); legally permitted in food in most countries; colouring principle is alkannin. Insoluble in water but soluble in alcohol and ether. Blue in alkalies, blue with lead, crimson with tin, violet with iron. Used for colouring fats, cheese, essences (and inferior port wine). Also known as orcanella. (Jacobs.)

**All Bran.** Trade name (Kellogg's Ltd.) for a breakfast cereal derived from wheat bran.

Composition per 100 g: 14 g protein, 2 g fat, 65 g soluble carbohydrate, 6.3 g fibre, 350 kcal (1.4 MJ), 11 mg iron, 0.6 mg B<sub>1</sub>, 2.5 mg B<sub>2</sub>, 32 mg nicotinic acid.

**Allantoin.** Oxidation product of uric acid; end-product of purine metabolism in most mammals except man and the anthropoid

apes (where it is uric acid). (BDS.)

**Allergen.** See Allergy.

**Allergy.** An altered or abnormal tissue reaction which may be caused by contact between a foreign protein, the allergen, and sensitive body tissues.

Food allergies are more common in infants and the usual causes are eggs, milk and wheat, together with fish and various fruits. The reactions may include nettle-rash, hay fever, asthma, and dyspepsia. (DP.)

**Allicin.** Sulphur compound responsible for the flavour of garlic. (Griswold.)

**Alligator Pears.** See Avocados.

**Allinson Bread.** A whole wheat bread named after Allinson who advocated its use in England at the end of the nineteenth century, as did Graham in the United States (thus Graham bread).

**Allolactose.** A sugar, which may be a modification of lactose, which, together with gynolactose, has been claimed to be found in human milk. (Davis & Mac.)

**Allotriophagy.** Unnatural desire for foods, alternative words cissa, cittosis and pica.

**Alloxan.** Pyrimidine derivative that can induce diabetes when given orally or by injection, by damaging the Islets of Langerhans (that part of the pancreas which secretes insulin). (BDS.)

**Alloxan Diabetes.** Experimental diabetes caused by alloxan.

**Alloxazine.** Three-ring structure, the central part of riboflavin. The latter is dimethyl ribityl iso-alloxazine. (BDS.)