Dictionary of Nutrition and Food Technology

by

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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.

INTRODUCTION

Workers in many different fields have a professional interest in food, apart from their immediate personal interests. Medical practitioners, public health workers, home economists, teachers, chemists and chemical engineers, all, from time to time, step into the food field. The study of food covers a wide range embracing many disciplines, from cooking and chemistry to physics and pharmacology, and a specialist in one subject might be unfamiliar with some of the terms used in another. Hence this dictionary. It is a compilation of many of the terms commonly met with in discussions of the numerous facets of food.

It is hoped that when the domestic scientist wonders at the significance of butylated hydroxyanisole, and when the chemical engineer seeks an explanation of the term ATP so familiarly used by the biochemist, and the doctor boggles at a riffle flume, they will each be enlightened by this book. The publishers would be happy to learn of any sins of omission that would, if rectified, help to fulfil the declared aim.

As an additional aid to those without library facilities at hand, many of the entries include a reference to a publication where the full detailed information may be found; the following is the code to the references:—

Abrams	*Linton's Animal Nutrition and Veterinary Dietetics*, J. T. Abrams. Edinburgh: W. Green & Son Ltd.
Ayl	*Food Technology, Processing and Laboratory Control*, F. Aylward. London: George Newnes Ltd.
Bailey	*Industrial Oil and Fat Products*, A. E. Bailey. New York: Interscience Publishers Inc.
Baldwin	*Dynamic Aspects of Biochemistry*, E. Baldwin. Cambridge: Cambridge University Press.
B & R	*The Nation's Food*, A. L. Bacharach and T. Rendle. London: Society of Chemical Industry.
Barton-Wright	*Microbiological Assay of the Vitamin B Complex and Amino Acids*, E. C. Barton-Wright. London: Sir Isaac Pitman & Sons Ltd.
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 H. Scarborough. 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.
Callow	*Cooking and Nutritive Value*, A. Barbara Callow, and *Food and Health*, A. Barbara Callow. London: Oxford University Press.
Clark	*Clark's Applied Pharmacology*, revised by A. Wilson and H. O. Schild. London: J. & A. Churchill Ltd.
Davis	*A Dictionary of Dairying*, J. G. Davis. London: Leonard Hill Limited.
FAO	*Food Composition Tables—Minerals and Vitamins*, Food and Agriculture Organisation, United Nations.
GH	*Good Housekeeping's Home Encyclopaedia.*
Harrow	*A Textbook of Biochemistry*, B. Harrow and A. Mazur. Philadelphia: W. B. Saunders Company.
Hawk	*Practical Physiological Chemistry*, P. B. Hawk, B. L. Oser and W. H. Summerson. London: J. & A. Churchill Ltd.
Hilditch	*Industrial Fats and Waxes*, T. P. Hilditch. London: Baillière, Tindall & Cox.
Hutch	*Hutchinson'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.
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	*Chemical Composition of Foods*, R. A. McCance and E. M. Widdowson. M.R.C. Special Report Series No. 235. London: H.M.S.O.
Pres. Rept.	*Food Standards Committee Report on Preservatives in Food*, 1959. London: H.M.S.O.
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.
Sherman	*Chemistry of Food and Nutrition*, H. C. Sherman. New York: The Macmillan Company.
S.I.	Statutory Instrument } Legal Regulations,
S.R.O.	Statutory Rules and Orders } see Bell
Tanner	*The Microbiology of Foods*, F. W. Tanner. Illinois: Garrard Press.

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 (TEPP.)

Acetate, Active. The form in which the acetyl radical, $CH_3CO—$ is transferred from one compound to another, as the acetyl-Coenzyme A complex (*see* Coenzyme A). In glucose metabolism pyruvic acid is converted to active acetyl, so are fats, and it is the source of the ketone bodies. (Baldwin.)

Acetate Replacement Factor. *See* Lipoic acid.

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.)

Acetoglycerides. 1.2-diaceto-3-stearin and 1-aceto-3-stearin. Form films that remain plastic, are only slightly permeable to oxygen but more so to CO_2, extremely low permeability to most flavours—used to coat foodstuffs such as bacon and cheese, and packing materials. Also aid the spreading properties of table fat.

Acetoin. Acetyl methyl carbinol, $CH_3.CO.CHOH.CH_3$, precursor of diacetyl, the butter flavour. Produced by bacteria during butter ripening and by yeast during fermentation.

Acetone Bodies. *See* Ketone bodies.

Achlorhydria. Deficiency of hydrochloric acid in the gastric secretion.

Achrbmotrichia. *See* Para-amino benzoic acid, *and* Pantothenic acid.

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

Acid-base Balance. Body fluids are maintained just on the alkaline side of neutrality, pH 7·3 to 7·45. This condition is maintained by buffers in the blood and tissues which are weak acids or weak bases and can combine with bases and acids without change of pH. Buffers include proteins, and sodium and potassium phosphate and 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 with sodium and potassium from the diet.

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

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 neutralize the free fatty acids in 1 g of the fat. (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.)

Aconitase. Enzyme that catalyses the interconversion of citric and isocitric acids through the intermediate stage of *cis*-aconitic acid. The reaction is in equilibrium and any one of these acids results in an equilibrium mixture of all three when aconitase is present. It is involved in the Krebs tricarboxylic acid cycle. (Baldwin.)

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

Acorn Sugar. Quercitol, extracted from acorns; pentahydroxycyclohexane.

Acraldehyde. *See* Acrolein.

Acrolein. Acraldehyde, CH_2: 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.

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

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. (Baldwin.)

Actomyosin. The contractile protein of muscle. It also appears to be identical with the enzyme that catalyses the decomposition of adenosine triphosphate ("ATP-ase") and liberates its energy. This procedure provides the

energy for the work of the muscle. (Baldwin.)

Addison's Disease. Destruction 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 added to food to help manufacture and preserve the 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.

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. (Baldwin.)

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. (Baldwin.)

Adenosine Monophosphate. *See* Adenylic acid.

Adenosine Triphosphate (or Adenyl pyrophosphate). Adenine + ribose + phosphate + phosphate + phosphate. A compound of central importance in the liberation of energy from foodstuffs. The last two phosphates are linked by what is called "the energy-rich phosphate bond". On hydrolysis they liberate energy for muscular work, and they also trap the energy obtained by the oxidation of carbohydrates, fats and amino acids. *See* Phosphate bond, energy-rich *and* Phosphokinase. (Baldwin.)

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.)

Adenyl Pyrophosphate. *See* Adenosine triphosphate.

Adermin. *See* Vitamin B_6.

ADP. *See* Adenosine diphosphate.

Adrenalin. Hydroxy, dihydroxyphenyl-ethylmethylamine, also known as epinephrine. Hormone secreted by the medulla of the adrenal glands. Raises blood pressure by contraction of vessels, raises blood sugar by breakdown of glycogen, increases metabolic rate. Is largely responsible for the characteristic symptoms of fright; rapidly destroyed in the blood; inactive by mouth. (BDS.)

Adrenergic. Nerves that stimulate muscle by the secretion of sympathin, which has an effect similar to adrenalin in causing contraction of the blood vessels. The other type of nerve is cholinergic, *which see.* (BDS.)

Adrenocorticotropic 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.

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

Aerosporin. Antibiotic, old name for Polymyxin A.

Agar. Dried, purified stems of a seaweed, *Gelidium algae*. Partly soluble and swells with water to form a gel. Used in soups, jellies, ice-cream, meat and fish pastes, in bacteriological media, for sizing silk, as adhesive and as a stabilizer for emulsions. Also called agar-agar, and Macassar gum. (Jacobs.)

Agene. *See* Aging.

Aging. Term applied to treatment of flour with oxidizing agents. Originally found that when freshly milled flour was stored for several weeks it underwent an aging effect and produced a stronger and more resilient dough and a bolder loaf. During storage the flour also slowly bleached.

Oxidizing 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".

Ajinomoto. *See* Glutamate, sodium.

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.

Alanine. A non-essential amino acid, $CH_3.CH.NH_2.COOH$, amino propionic acid. (BDS, Sherman.)

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.

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 alkalies, not attacked by any animal digestive enzymes, comprise horns, hoofs, feathers, scales, nails. (Hawk.)

Albumins. Simple proteins (i.e. free from other subtances) 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.)

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 alkaptonurics slowly turns black. The defect appears to be harmless. (BDS.)

Alcoholic Beverages. Alcohol content (% by volume):—spirits: gin, whisky, brandy, rum—25 under proof, 43%; 35 under proof, 37%. Wines: port, sherry, madeira, 20%; burgundy, 14%; champagne, claret, hock, 10%. Cider, 4·3%; ale, 3·1–6·6%; stout, 3·9–5·3%; porter, 4·0%. Liqueurs: curaçao, 55%; benedictine, 25%; absinthe, 59%; anisette, 42%; chartreuse, 43%; kummel, 34%. (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.

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. (KJ.)

Alewives. River herrings, mostly used for canning after salting.

Algae. The interest in algae from the food point of view lies mainly in the potential large-scale cultivation of the organism *Chlorella*. If sufficient heat, light, mineral salts and carbon dioxide are provided, these organisms will multiply at a rapid rate and serve as a large-scale source of fat, protein and carbohydrate.

Seaweeds such as Irish Moss and Dulse, which are algae, have long been eaten in various countries. *See also* Seaweed.

Alginates. Salts of alginic acid found free and as calcium salt in many seaweeds. They are a polysaccharide complex, $(C_6H_8O_8)_n$, which hydrolyses to mannuronic acid. The propyl glycol ester is "mannucol" ester; this and the sodium salt are used as thickeners and to stabilize emulsions in ice-cream and synthetic cream, in artificial cherries, and as alginate sausage casings.

Alginic Acid. *See* Alginates.

Alimentary Pastes. Shaped, dried doughs prepared from semolina or wheat flour, with water, egg and sometimes milk. The dough is partly dried in hot air for about 20 min. and then dried more slowly over a period of hours.

Macaroni — tubular-shaped, about $\frac{1}{4}$ inch diameter; at $\frac{3}{32}$ inch it is called fovantini or maccaroncelli; at $\frac{1}{8}$ inch, zetoni. Spaghetti is solid rod about $\frac{3}{32}$ inch diameter; vermicelli is a third of this thickness. Noodles are shaped into sheets or ribbons. Farfals are ground, granulated or shredded. (Loes.)

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

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.

Alkanet or **Alkannet.** Colouring obtained from root of *Anchusa tinctoria*; legally permitted; 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). (Jacobs.)

Allantoin. Excretion product of purines in most mammals except man and the anthropoid apes (where it is uric acid). Other mammals possess the enzyme uricase which converts uric acid to allantoin, but this enzyme is lacking in man. (Harrow.)

Allergen. Foreign protein that gives rise to allergic reaction such as asthma, coryza, urticaria, migraine, acne, eczema and gastro-intestinal disturbances. Foods that are common allergens include eggs, milk, wheat. Pollens, house dust and animal dust are also common allergens.

Allergy. *See* Allergen.

Alligator Pears. *See* Avocados.

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

Alloxan Diabetes. Experimental diabetes caused by alloxan.

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

Allspice (or Jamaica pepper). Dried fruits of the evergreen *Pimenta officinalis*, also known as pimento. The name allspice derives from the volatile oil, which has an aroma similar to a mixture of cloves, cinnamon and nutmeg. (Jacobs.)

Almond, Bitter. Ripe seed of *Prunus amygdalus* var. *amara* (almond tree); 35–50% oil, 3% amygdalin.

Almond, Sweet. Ripe seeds of *Prunus amygdalus* var. *dulcis*.

Almond Oil, Bitter. Essential oil from seeds of almond tree (*Prunus amygdalus*) or apricot tree (*Prunus armeniaca*); mostly manufactured from the apricot. Contains 95% benzaldehyde, with hydrocyanic acid and benzaldehyde cyanhydrin. When freed from hydrocyanic acid is used as flavour, in perfumes and in cosmetics.

Almond Oil, Sweet. The fixed oil expressed from the seed of *Prunus amygdalus* var. *dulcis*.

Aloe. Dried juice of leaves of *Aloe perryi*; used in medicine. Contains a glycoside, aloe-emodin or rhabarberone, aloe oil, and aloin or barbaloin.

Alpha-Laval Centrifuge. Continuous bowl centrifuge for separating liquids of different density or clarifying. Widely used for cream separation.

Alveograph. Measures stretching quality of dough as index of protein quality for baking. A standard disc of dough is blown into a bubble and the pressure curve and bursting pressure measured; gives the stability, extensibility and strength. (Ayl.)

Amaranth. Permitted red colour, trisodium salt of 1-(4-sulpho-1-naphthylazo)-2-naphthol-3:6-disulphonic acid.

Ambergris. Morbid concretion obtained from the intestine of the sperm whale. Contains cholesterol, ambrein, benzoic acid. Appears as a mottled or striped grey-brown or black wax. Used in drugs and perfume.

Amberlite. Group of polystyrene resins used to absorb specific radicals from solutions. The sulphonic acid derivative, strongly acidic (IR 120), and the carboxylic acid, weakly acidic (IRC 150), are used for cation exchange; basic types used for anion exchange (IR 4B, IR 45, IRA 400). Used for water softening, metal recovery, purification of chemicals, chemical analysis, particularly amino acids. *See also* Ion-exchange resins.

Amino Acid. Proteins are composed of 20 amino acids joined in long chains (polypeptides), these being combined in complex bundles.

Eight of them must be provided in the diet, the essential amino acids. These are lysine, methionine, valine, tryptophan, threonine, leucine, isoleucine and phenylalanine. The remaining 12 can be synthesized in the body if a source of nitrogen is available in the diet. These are non-essential and are: histidine, glycine, arginine, alanine, aspartic acid, glutamic acid, proline, serine, cystine, tyrosine, hydroxyproline and cysteine (*but see* Arginine *and* Histidine).

Many amino acids are manufactured synthetically, and, lysine and methionine in particular, can be added to food and animal feedingstuffs to increase their nutritive value.

The amino acids of foods contain the amino group, —NH_2, next to the carboxyl group, —COOH, and are therefore called alpha-amino acids. Occasional beta-amino acids, e.g. beta-alanine, are found in peptides in the tissues. (*See* Anserine.) (BDS, Sherman.)

Amino Acid, Limiting. When dietary protein has to be built into body protein the amount that can be used depends upon that amino acid present in least amount, i.e. the bottleneck or limiting amino acid. E.g., in bread, lysine is the limiting amino acid and only 45% of bread protein can be used to synthesize body tissues. If lysine is added to bread so that it is no longer limiting, the bread now becomes about 55% useable and threonine becomes the limiting amino acid. In diets as a whole methionine is usually the limiting factor. *See also* Lysine *and* Methionine.

Amino Acid Oxidase. *See* Flavoproteins.

Amino Acids, Antiketogenic. Those which are metabolized to glucose. They are glycine, alanine, serine, cystine, aspartic acid, glutamic acid, arginine, proline and hydroxyproline. (Baldwin.)

Amino Acids, Ketogenic. Those which are metabolized to acetoacetic acid (ketone bodies). They are leucine, isoleucine, phenylalanine and tyrosine. (Baldwin.)

Aminopeptidase. Enzyme of the pancreatic juice that splits polypeptides to dipeptides. Removes the terminal unit of the polypeptide chain at the end at which the amino radical is free, hence is an exopeptidase. (Baldwin.)

Aminopterin. Aminopteroylglutamic acid, specific antagonist to folic acid.

Ammonotelic. Animals that excrete their waste nitrogen as ammonia, e.g. various worms, leeches, molluscs, sea urchins, fish. (Baldwin.)

AMP. Adenosine monophosphate or adenylic acid, *which see.*

Amphoteric. *See* Iso-electric point.

Amygdalin. Glucoside in almonds and cherry stones, hydrolysed by the enzyme, emulsin, to glucose, hydrocyanic acid and benzaldehyde. The benzaldehyde gives the characteristic odour and is also present in almond oil.

Amylases. Enzymes that hydrolyse starch and glycogen to maltose.

Alpha-amylase, or dextrinogenic amylase, breaks starch down to small dextrin-like molecules and does not proceed to maltose.

Beta-amylase, or maltogenic amylase, is specific for the 1:4-alpha-glucosidic linkages of starch and liberates maltose. Complete degradation of starch requires the attack of both these enzymes.

Salivary amylase and pancreatic amylase in animals behave like the alpha-amylase. Also known as diastase. *See also* Z-enzyme. (Baldwin.)

Amylograph. Measures the viscosity of flour paste as it is heated from 25°C to 90°C (the same temperature rise as in baking) and serves as a measure of the diastatic activity of the flour. (KJ.)

Amyloins. Alternative name for dextrins.

Amylolytic. General adjective applied to enzymes that can split starch into soluble products.

Amylopectin. Starch consists of 20–25% amylose and the remainder amylopectin.

Amylose consists of 1:4 alpha-linked glucose units and gives a pure blue with iodine. Amylopectin is a branched structure built up of 20–24 glucoside units linked 1:4, and gives a purplish colour with iodine. *See also* Amylases. (Baldwin.)

Amylose. *See* Amylopectin.

Anabiosis. Suspended animation (with stoppage of respiration and the heart-beat), caused by freezing or freezing and drying, as achieved, for example, by Alaskan and Siberian insects during cold spells.

Anabolism. *See* Metabolism.

Anaemia. The production of red blood cells in the bone marrow requires protein and iron as raw materials, and vitamins C, B_{12} and folic acid as catalysts. A deficiency of any of these results in some form of anaemia. Iron deficiency leads to red cells deficient in haemoglobin, though normal in numbers. This is often called nutritional anaemia. Deficiency of vitamin B_{12}, usually due to failure to absorb it rather than dietary shortage, leads to pernicious anaemia. *See also* Intrinsic factor. (BDS.)

Anaemia, Iron-deficiency. *See* Anaemia.

Anaemia, Nutritional. *See* Anaemia.

Anaemia, Pernicious. *See* Anaemia *and* Intrinsic factor.

Anaerobes. Micro-organisms that grow in the absence of oxygen. Obligate anaerobes cannot survive in the presence of oxygen. Facultative anaerobes normally grow in oxygen but can also grow in its absence. (Tanner.)

Analysis, Gastric. *See* Fractional test meal.

Anchovy. *Engraulis encrasicholus.* Usually prepared semi-preserved with 10–12% salt and sometimes benzoic acid.

Aneurin. *See* Vitamin B_1.

Angostura. Essential oil distilled from the bark of *Galipea cusparia.* Contains galipol, cadinene, galipene and pinene; used in preparation of bitters and liqueurs.

Ångström Unit. One ten-millionth part of a millimetre, or one ten-thousandth part of a micron. Used to measure wavelength of light; symbol Å.

Angular Stomatitis. *See* Ariboflavinosis.

Animal Protein Factor. Name given to certain growth factor or factors which were found to be present in animal but not vegetable proteins. Vitamin B_{12} was identified as one of these.

Anise. *See* Aniseed.

Aniseed. Or anise, is the dried fruit of *Pimpinella anisum* (parsley family). Chief component of the volatile oil is anethole (methoxypropenyl benzene). (Jacobs.)

Annatto. Also known as bixin or butter colour; colour from seed-pods of *Bixa orellana.*

Used for colouring butter and cheese (not margarine); legally permitted. Contains orellin, of minor importance, soluble in water, and bixin, the major colour, insoluble in water. Also used to dye cotton and silk and in wood stains. (Jacobs, Davis.)

Anorexia Nervosa. Refusal to eat because of lack of appetite, nausea and abdominal discomfort.

Anserine. Beta-alanyl methylhistidine; a dipeptide originally isolated from goose muscle; found in muscle of mammals, fishes and birds; function unknown.

Antabuse. Tetra-ethyl thiuramdisulphide, drug used in the treatment of alcoholism. The drug alone has no effect, but if alcohol is subsequently taken, it gives rise to headache, palpitation, nausea and vomiting. (Clarke.)

Antacids. Bases or buffers that neutralize acid; used generally in relation to the partial neutralization of stomach acidity. Substances like magnesium carbonate, sodium bicarbonate, magnesium hydroxide, glycine, etc., are used.

Anthelmintics. Chemicals used to destroy intestinal worms.

Anthocyanins. Colouring matter of many fruits, flowers and leaves, violet, red and blue. Contain the pelargonidin nucleus, a substituted benzopyranol. Examples are delphinin, pelargonidin, cyanidin. Can attack iron and tin and cause trouble in canned foods.

Anthrax. Contagious disease caused by *Bacillus anthracis*; infection can take place through skin, lungs, or gastro-intestinal tract.

Antibiotics. Substances produced by living organisms which inhibit the growth of other organisms. Classic example is penicillin, produced by a mould and inhibitory to many bacteria.

When fed to animals in minute doses (a few mgm per ton of food), many antibiotics, such as penicillin, aureomycin, terramycin, increase growth rate. Effect believed due to curing a sub-acute infection that the "normal" apparently healthy animal is suffering from.

Used in some countries as food preservatives but not permitted in Gt. Britain with the exception of

nisin. *See also* individual antibiotics: Gramicidin, Nisin, Penicillin, Tetracyclines, etc. (Pres. Rept.)

Antibodies. *See* Toxins.

Anti-cholinesterases. Muscle is stimulated by the acetyl choline liberated at the nerve ending. This is then destroyed by the enzyme choline esterase so that the muscle is prepared for the next stimulus. Anti-cholinesterases prevent destruction of the acetylcholine and the muscle is unable to respond to further stimuli. The war gases of the nerve gas group, and certain insecticides such as TEPP (tetra ethyl pyrophosphate) and DFP, are anticholinesterases. Eserine, *which see*, is an anticholinesterase used clinically.

Anticoagulants. With reference to blood, substances that prevent clotting by interfering with the mechanism. Oxalate and citrate are anticoagulants as they combine with the calcium which is needed; dicoumarin and heparin inhibit the formation of prothrombin, needed to release fibrin from fibrinogen; hirudin inactivates the thrombin. (BDS.)

Antidiuretics. Drugs that reduce the rate of formation of urine, i.e. reduce water loss from the body.

Antienzymes. Substances that specifically inhibit enzymes; produced by the lining of the digestive tract to prevent attack by the digestive enzymes, by intestinal parasites, and as antibodies in the blood stream. (BDS.)

Antifoaming Agents. Octanol (capryl alcohol), sulphonated oils, silicones; reduce foaming often caused by the presence of dissolved protein or other stabilizer.

Antigalactics. Substances that suppress the secretion of milk.

Anti-Grey Hair Factor. *See* Paraamino benzoic acid.

Anti-mould Agents. *See* Antimycotics.

Antimycotics. Substances that inhibit mould growth, such as sodium and calcium propionate, methyl hydroxybenzoate, quaternary ammonium chloride, sodium benzoate, sorbic acid.

Antioxidants. Substances that retard the oxidative rancidity of fats. Legally permitted antioxidants are (S.I. 1958, No. 1454) propyl gallate, octyl gallate, dodecyl gallate, butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT). Natural fats, particularly vegetable oils, contain naturally occurring antioxidants, such as tocopherol, which protect the oils from rancidity for a limited period. *See* Induction period.

Antisialagogues. Substances that arrest the flow of saliva.

Anti-spattering Agents. Added to fats used in frying, e.g. lecithin, sucrose esters (laurates and stearates), and sodium sulphoacetate derivatives of mono- and diglycerides. They function by preventing the coalescence of water droplets. (Bailey.)

Apoerythein. Name suggested for the Intrinsic factor, *which see*.

Apollinaris Water. An alkaline, highly aerated water, containing sodium chloride and calcium, sodium and magnesium carbonates; obtained from a spring in the valley of the Ahr (Prussia). (Hutch.)

Apparent Digestibility. *See* Nitrogen, metabolic, *and* Digestibility.

Apple (*Malus sylvestris*). Protein 0·3%, fat 0·3%; Calories 49;

Ca 5 mg, Fe 0·3 mg; vitamin A 80 i.u., B_1 0·03 mg, B_2 0·03 mg, nicotinic acid 0·2 mg, vitamin C 4 mg —per 100 g. Apple is not a very valuable food. (FAO.)

Apple Butter. Apple that has been boiled in an open kettle to a thick consistency. Similar to apple sauce but darker in colour due to the prolonged boiling.

Apples, Dried. Protein 3·1%, fat 0·6%; Calories 280; Ca 54 mg, Fe 2·3 mg, vitamin A 1,000 i.u., B_1 0·06 mg, B_2 0·12 mg, nicotinic acid 1·5 mg, vitamin C 10 mg—per 100 g. (FAO.)

Apple Essence. The synthetic material is iso-amyl valerate.

Apple Jack. American name for apple brandy; distilled cider, also known as Calvados.

Apricot (*Prunus armeniaca*). Protein 0·8%, fat 0·2%; Calories 47; Ca 14 mg, Fe 0·5 mg; vitamin A 2,270 i.u., B_1 0·04 mg, B_2 0·05 mg, nicotinic acid 0·6 mg, vitamin C 5 mg—per 100 g. (FAO.)

Arachidonic Acid. Straight-chain fatty acid containing 20 carbon atoms and four double bonds. Found only in animal fats. *See* Essential fatty acids.

Arginase. Enzyme that hydrolyses arginine to urea and ornithine, the last stage of urea synthesis from the amino groups of the amino acids. Present in most animal cells. (Baldwin.)

Arginine. Dibasic amino acid that is non-essential to adult man. As it is partly essential to growing rats (growth only 80% of normal in its absence) it may similarly be partly essential to children. It is essential to the chick. Arginine is the last stage of the "urea cycle" (*which see*). Chemically aminoguanido valeric acid. (Sherman, BDS.)

Argol. Crust of crude cream of tartar (potassium acid tartrate) that forms on the sides of wine vats. White argol from white grapes, red argol from red. 50–80% potassium hydrogen tartrate and 6–12% calcium tartrate. Used in vinegar fermentation, as mordant in dyeing, and in the manufacture of tartaric acid.

Ariboflavinosis. Name given to set of symptoms caused by deficiency of riboflavin (vitamin B_2). Characterized by swollen, cracked, bright red lips (cheilosis), enlarged tender, magenta-red tongue (glossitis), cracking at the corners of the mouth (angular stomatitis), congestion of the blood vessels of the conjunctiva. (Sebrell.)

Armenian Bole. Or ferric oxide; occurs naturally as haematite or prepared by heating ferrous sulphate, etc. Used in metallurgy, polishing compounds, paint pigment, and is a permitted food colour.

Arrowroot. Starchy substance obtained from the root of the arrowroot plant, *Marenta arundinacea*. Almost pure starch with very little protein; widely used in the baking industry. (Loes.)

Arsenic. Arsenic in Food Regulations, 1959; beverages limited to 0·1 ppm arsenic, other foods 1·0 ppm with certain exceptions (does not apply to fish and crustacea in which there is a natural arsenic content greater than 1 ppm; 5 ppm limit in colours, spices and dried herbs). (Bell.)

Ascorbic Acid. *See* Vitamin C.

Ascorbic Oxidase. Plant enzyme that oxidizes ascorbic acid to the dehydro form. In the living tissue it appears to be separated from the