A Neglected Constituent of Proteins, α-Amino-n-butyric Acid

ALTHOUGH its presence in proteins has been reported several times[1-6], α-amino-*n*-butyric acid has not been generally accepted as a naturally occurring amino-acid, probably because no readily reproducible method for its isolation has yet been described. However, the isolation of its hydroxy homologue threonine[7] suggests that α-amino-*n*-butyric acid may occur widely, since whenever a known hydroxy amino-acid occurs in any given protein, the corresponding simple amino-acid is usually present in even larger amounts. Accordingly, it seems probable that an appropriate fractionation of the alanine and valine fractions of a protein rich in threonine would yield appreciable amounts of α-amino-*n*-butyric acid. Hydrolysis should preferably be enzymatic, since prolonged heating with mineral acids has been found to liberate some nitrogen from the synthetic *dl*-α-amino-*n*-butyric acid[8], while *l*-glutamic acid heated with alkalis decomposes to acrylic acid and α-amino-*n*-butyric acid[9], so that misleading results would be obtained by alkaline hydrolysis of proteins. Preliminary work along these lines has been interrupted by the War.

Meanwhile, synthetic *dl*-α-amino-*n*-butyric acid has been increasingly used in comparative studies on amino-acids. No appropriate common name for the amino-acid has yet been proposed. Since the full chemical name is somewhat cumbersome, the term *quadrine* is suggested as a common name. This is intended to call to mind the fact that the acid contains four carbon atoms. α-Amino*iso*butyric acid could be designated as *isoquadrine*.

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Cleavability of Keratins Treated with Hot β-Naphthol by Proteinases

WHEN sheep wool is heated with β-naphthol at a temperature of 140–150°, it dissolves ; and when after cooling the β-naphthol is removed with ether, an amorphous yellowish substance is obtained in a yield of about 80 per cent of the weight of the wool. This product is readily hydrolysed by a glycerol extract of pancreatin, purified pancreatic proteinase (free of peptidases and protaminase), pepsin, and taka-diastase. Yeast polypeptidase does not affect the product but causes additional hydrolysis after a prior treatment of the product with pepsin.

In a similar manner, chicken feathers were dissolved in hot β-naphthol. The product that remained after removal of the β-naphthol is almost completely soluble in hot 70 per cent alcohol and is precipitated from this solution by an excess of absolute alcohol. The product so obtained is readily cleaved by a glycerol extract of pancreatin, by purified pancreatic proteinase and by pepsin. Like the product obtained from wool, it is resistant to yeast polypeptidase but is cleavable by the latter after a previous exposure to the action of either pepsin or purified pancreatic proteinase.

The products obtained from the two keratins thus behave toward proteolytic enzymes like the 'acropeptides' earlier obtained in a similar manner from other proteins by A. Fodor and collaborators[1].

The experimental part of this investigation was carried out in collaboration with Miss S. Cukerman and Mrs. I. Fodor-Salomonowicz. A detailed report will be published elsewhere.

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[1] cf. "Annual Review of Biochemistry", **9**, 47 (1940).

Vacuum Filtration of Sewage Sludge

VACUUM filtration of sewage sludge, particularly surplus activated sludge from the activated sludge process of sewage treatment, is a well-established process, particularly in the United States, for dewatering sludge prior to drying and incineration or preparation for use as fertilizer or disposal by other means. It has been found from long experience that for successful filtration the sludge must be coagulated beforehand. The coagulant generally used is a ferric salt, usually ferric chloride, and many attempts have been made to reduce the amount of coagulant required with the view of making the process more economical.

Experiments are being conducted on these lines at Manchester Sewage Works, and the finding of other workers[1] has been confirmed that the fresher the sludge the less ferric chloride is required for coagulation. It has also been found that the better the 'condition' of activated sludge from a sewage purification point of view the less ferric chloride is required for coagulation. When activated sludge is kept for periods up to two days, it becomes more alkaline, and this increases the ferric chloride demand. When activated sludge, or a mixture of activated sludge and sedimentation tank sludge, is stored, reducing substances are produced, and these by reducing part of the ferric salt to ferrous salt increase the ferric chloride demand. Aeration of stale activated sludge, or a mixture of activated sludge and sedimentation tank sludge, for a short period (one to two hours) reduces the alkalinity and appreciably reduces the amount of ferric chloride required for coagulation. This may be due in part to oxidation of the reducing substances referred to above. Aeration is beneficial even with the freshest sludge obtainable from the activated sludge plant.

We believe that aeration of sewage sludge, as a preliminary to coagulation and vacuum filtration, has never before been reported. It is hoped shortly to publish the results of the experiments.

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