

Biuret reaction,
 Direct ninhydrin reaction,
 Hydrolysis and ninhydrin reaction,
 Bromsulfalein method,
 Folin reaction according to Lowry *et al.*,
 Ultra violet absorption at 280—290 μ ,
 Total nitrogen determination (modified
 Kjeldahl or hypobromite titration).

Certain practical modifications have been introduced in some of these methods. Comparative data are given on protein material of different origin, and the relative merits of the methods are discussed.

Zone Electrophoresis of Low Molecular Weight Compounds in Cellulose Columns

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The behavior of charged low molecular weight substances in cellulose columns under different conditions has been studied for some time at this Institute. From the experience accumulated, it has been possible to work out suitable methods for effective electrophoretic fractionation of synthetic and natural mixtures of amino acids, peptides and other compounds in quantities ranging from micrograms to 25 grams and more. A description of apparatus, working conditions and results will be given.

Exchange Reactions between D₂O and Proteins or Protein Models

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It has been shown by Harrington, Hvidt, Linderstrøm-Lang and Schellman that peptides like clupein, the A-chain of insulin, and oxidized ribonuclease are devoid of secondary and tertiary structures and exist in aqueous solutions in an unfolded state. On the other hand important investigations by Elliot, Doty, Katchalski and Berger have definitely demonstrated the presence of secondary structures in certain synthetic polyamino acids. Thus poly-DL-alanine, copolymers between aspartic

acid and lysine and polyglutamic acids seem to form stable α -helices in aqueous solution. This is supported by studies of deuterium exchange carried out by Berger. The reason for the phenomena observed and the possible forces and bonds at play in the stabilization of these helices will be discussed with special reference to sidechain interactions of the following type

- a. Electrostatic interaction
- b. Hydrophobic forces
- c. Hydrogen bonds, 1. neutral, 2. ionic.

Determination of Amino Acids as Phenyl Thiohydantoins

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A method for the quantitative determination of amino acids as 3-phenyl-2-thiohydantoin derivatives using partition chromatography was briefly described in a preliminary report¹. This work has been continued and it is now possible to separate most of the natural amino acid derivatives. The partition system consists of aqueous propionic acid as stationary phase with Celite as an inert support and heptane with increasing concentrations of ethylene chloride as moving phase. Quantitative recoveries from 10—20 μ g of each phenyl thiohydantoin are obtained. Through automatic registration of the ultraviolet absorption in the effluent, the composition of the amino acid mixture is obtained directly.

1. Sjöquist, J. *Biochim. et Biophys. Acta* **16** (1955) 283.

Protein Chromatography on Columns of Calcium Phosphate

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A review of recent work at the Institute of Biochemistry regarding the chromatographic separation of a number of proteins and protein mixtures. A detailed paper will be published shortly.