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Amino Acids and Their Derivatives

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I. INTRODUCTION

Thin-layer chromatography (TLC) can separate amino acids and their derivatives with high resolution and with many other advantages over other methods. This chapter emphasizes procedures that have been used successfully in this laboratory, but contributions from other laboratories are also mentioned. Thus, this is not an exhaustive review of the field; however, references of such reviews are cited. The methods described in this chapter can serve as starting points for particular applications.

II. SEPARATION OF AMINO ACIDS

A. Introduction

There are about 20 amino acids, which constitute an alphabet for all proteins and differ only in the structure of the side chain R. The amino acids exist as zwitterions at their isoelectric points (p*I*). The structures, names, abbreviations, and pK_a and p*I* values for the 20 common amino acids are summarized in Fig. 1. Amino acids are generally soluble in water, but some are less soluble than others. Alcoholic 0.5 M or 0.1% HCl should be used to prepare solutions of amino acids that are only sparingly soluble in water.

B. Preparation of Test Materials

The analysis of amino acids required either for the determination of the composition of proteins or for the investigation of certain fluids or extracts derived from animals or plants requires the removal of materials such as peptides, proteins, carbohydrates, urea, salts, and lipids from them by specific operations, and proteins and peptides need to be hydrolyzed.

1. Removal of Macromolecules

Various kinds of precipitating agents are used to remove macromolecules. A comparison of deproteinizing methods (1) has shown that in certain cases a considerable loss of amino acids must be taken into account.

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