Chem 131A: Preparation of Tyrosine

The method used for the isolation of various amino acids consists of the hydrolysis of a protein mixture and subsequent separation of the desired amino acid from the hydrolysate that contains other amino acids and perhaps other substances. In order to separate a particular amino acid, it is first necessary that the amino acid is present in appreciable quantities in the protein, and secondly, that it possess properties, which facilitate its separation from the other amino acids.

Amino acids and proteins are least soluble at their isoelectric points. This fact is utilized in the preparation of tyrosine from casein. Although the isoelectric point of tyrosine is similar to those of other amino acids, it may be separated from the mixture since it is present in relatively larger amounts in the protein used and is appreciably less soluble than other amino acids present.

The preparation of tyrosine involves its isolation from casein hydrolysate.

Materials: pancreatin sodium carbonate

500-mL conical flask with cork toluene

sodium fluoride solution (one squirt) Whatman filter paper (check

out from storeroom)

Preparation of Tyrosine:

18.1 g of casein hydrolysate is transferred into a 125 mL conical flask. The mixture is suspended in 10 mL of dilute HCl (8 mL of 6 M HCl diluted to 20 mL with water) and heated to boiling. The hot mixture is filtered while hot through a fluted Whatman No.1 filter paper. The filtrate is collected in a 125 mL conical flask. When the filtrate has cooled, add concentrated ammonium hydroxide (with care) until there is a slight excess of ammonia. Cork the flask and allow it to stand on ice for at least an hour, and if only a small amount of white solid has formed after an hour then store the flask in the refrigerator overnight. Filter the product and wash twice with 10 mL aliquots of ice water.

Recrystallize the product by dissolving it in 20 mL of 0.5 M NaOH, add 0.65 mL of concentrated HCl, acidify to litmus with acetic acid, and allow to stand overnight in the refrigerator. The product is filtered, washed with 7 mL of ice water, and allowed to dry. Weigh the dried product and calculate percentage yield. Run 1-dimensional chromatography on the product.