CARBOXYMETHYL AND AZO DERIVATIVES OF HISTIDINE

by

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Major Subject	Biochemistry
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VI. Summary

1. The structure of the two isomeric 1- and 3-carboxymethylhistidine derivatives has been determined through unambiguous chemical synthesis.

2. The derivatives were shown to be identical with those previously assigned on a less rigorous basis. Identity was established through infrared spectral, chromatographic, and electrophoretic comparison.

3. Acid ionization constants were determined for the carboxymethylhistidine derivatives. In addition pKa' were computed for ten other histidine and one imidazole derivatives.

4. Reaction of histidine with diazonium-1-H-tetrazole has been investigated. The bisazo derivative was shown to undergo an acid ionization at the pyrrole nitrogen in the neutral pH range to form an intensely colored solution.

5. Reaction of the diazonium salt with an imidazole-alkylated histidine derivative was found to produce no colored products. The molecular extinction of the colored derivative at 480 mμ and pH 9.2 was determined to be 2.25×10^4.

6. A rapid technique for measurement of the extent of histidine carboxymethylation in sperm whale myoglobin has been devised using the colorimetric azo reaction. The procedure is applicable to other alkylating agents.

7. The characteristics of carboxymethylation and diazonium salt reactions with proteins as well as implicated future experiments are discussed.

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