Date
8.6.2020

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Question :- Write Notes on structure of Amino Acid?

Answer :-

Amino acid :- Amino acid are organic compounds that contain amine ($-NH_2$) and carboxyl ($-COOH$) functional groups. Along with a side chain (R group) specific to each amino acid. The key elements of an amino acid are carbon (C), hydrogen (H), oxygen (O), and nitrogen (N). Although other elements are found in the side chains of certain amino acids. About 500 naturally occurring amino acid are known (though only 20 appear in the genetic code) and can be classified in many ways.

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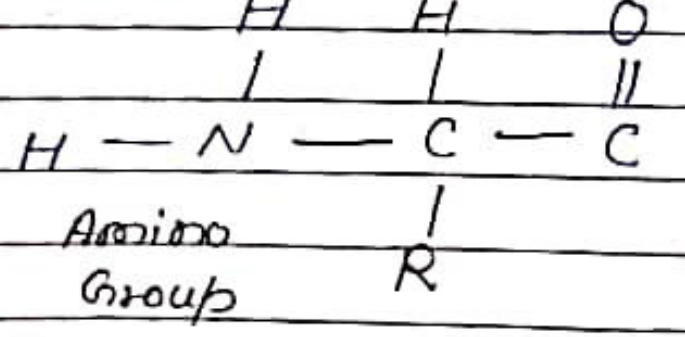
They can be classified according to the core structural functional group's locations as alpha- (α-), beta- (β-), gamma- (γ-) or delta- (δ-) amino acids; other categories relate to polarity, pH level, and side chain group type (aliphatic, acyclic, aromatic, containing hydroxyl or sulfur, etc.). In the form of proteins, amino acid residues form the second-largest component (water is the largest) of human muscles and other tissues. Beyond their role as residues in proteins, amino acids participate in a number of processes such as neurotransmitter transport and biosynthesis.

Nine proteinogenic amino acids are called "essential" for humans because they cannot be produced from other compounds by the human body and so must be taken in as food. Others may be conditionally essential for certain ages or

medical conditions. Essential amino acids may also differ between species.

Because of their biological significance, amino acids are important in nutrition and are commonly used in nutritional supplements, fertilizers, feed, and food technology. Industrial uses include the production of drugs, biodegradable plastics and chiral catalysts.

Amino Acid structure :-



~~Amino Acid~~

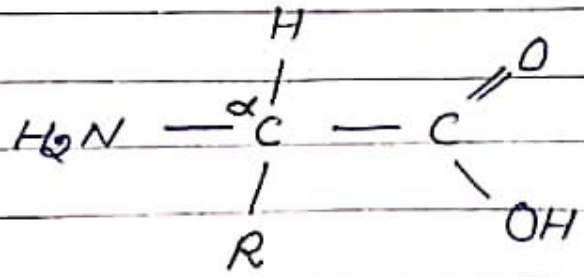
side chains :-

Amino acids are designated as α-whose

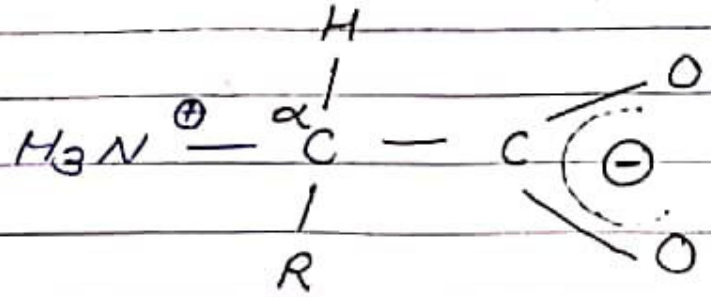
the nitrogen atom is attached to the carbon atom adjacent to the carboxyl group : in this case the compound contains the sub - structure $N-C-CO_2$. Amino acids with the sub - structure $N-C-C-CO_2$ are classified as β - amino acids. γ - amino acids contain the sub - structure $N-C-C-C-CO_2$, and so on.

Zwitterions :-

(1)



(2)



An amino acid in its (1) molecular and (2) zwitterionic forms.

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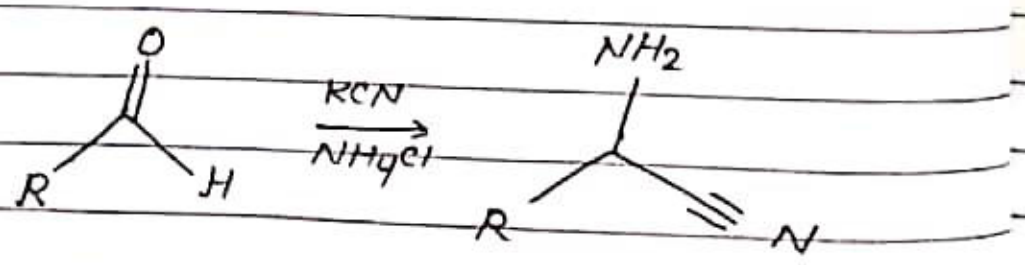
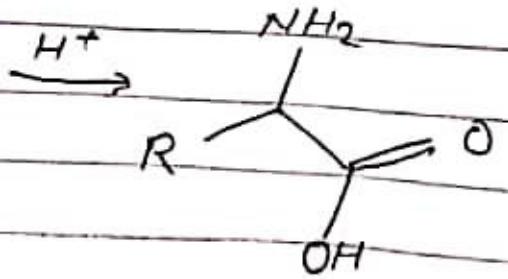
In aqueous solution amino acids exist in two forms as illustrated at the right. the molecular form and the zwitterion form in equilibrium with each other. The two forms co-exist over the pH range pK_1 - 2 to pk_2 + 2, which for glycine is pH 0-12. The ratio of the concentration of the two isomers is independent of pH. The value of this ratio cannot be determined experimentally.

synthesis :-





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Chemical synthesis :-

The commercial production of amino acids usually relies on mutant bacteria that overproduce individual amino acids using glucose as a carbon source. Some amino acids are produced by enzymatic conversions of synthetic intermediates. e.g. Aminothiazoline-4-carboxylic acid is an intermediate in the industrial synthesis of L-cysteine. For example, Aspartic acid is produced by the addition of ammonia to fumarate using Lyase.

See also :-

- Amino acid dating
- Beta peptide
- Degron
- Epsilon
- Homochirality
- Hypoaminoacidemia
- Leucines
- Miller-Urey experiment
- Nucleic acid sequence