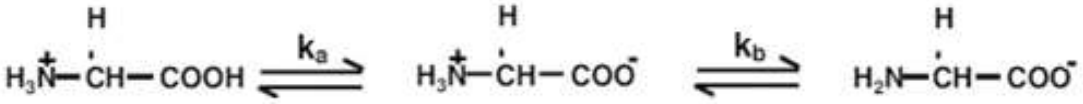
Partial work N°4: Determination of the pHi of glycine

Amino acids in solution are always in charged forms. In an acidic environment these compounds gain protons. The α-COOH function which has the strongest dissociation constant and therefore the lowest pK, will ionize first. The amino acid will carry both the positive and negative charge. When the + and – charges balance, the pH of the medium corresponds to the isoelectric point (pHi).

In a basic medium, the amino acid loses a proton and will be negatively charged.



We define by isoelectric pH, pHi, the pH for which the net charge of the molecule is zero. It means the pH at which the dipolar ion form will prevail.

This pH is calculated from the dissociation constants pK_a and pK_b of the ionizable functions. Hence:

$$pHi = \frac{pk_a + pk_b}{2}$$

1. **Aim**

Determination of pK and pHi of the amino acid glycine

2. **Principle**

This involves following the evolution of the pH over a determined volume of an amino acid solution with a pH equal to 2, depending on the quantity of NaOH added.

3. **Material**

- Stirrer
- Beakers
- Burette

4. **Reagents**

- 0.2N NaOH solution
- 20mM (0.02M) glycine solution
- 2N HCL solution

5. Operating mode

- Measure 50ml of the amino acid solution.
- Pour the amino acid solution into a beaker of 100ml.
- After calibrating the mother pH, rinse the mother pH electrode with distilled water, and place it in the beaker containing the amino acid solution.
- Measure the starting pH of the solution and bring it back to pH 2 with a few drops of 2N HCl.
- Place the 0.2N NaOH solution in the burette.
- Titrate the amino acid solution by adding the sodium hydroxide solution in successive additions of 0.5ml while stirring.
- For each volume of sodium hydroxide added, note this volume and the corresponding pH value up to pH 10.5