



“बेटी बचाओ, बेटी पढ़ाओ”

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

(Format for Preparing E Notes)

Faculty of Education and Methodology

Faculty Name- JV'n Shalini Devi Prajapati

Program- M.Sc. Zoology Third Semester

Course Name - Biochemistry Practical

Session No. & Name – Buffer Preparation

Academic Day starts with –

- Greeting by saying 'Namaste' by joining Hands together followed by 2-3 Minutes Happy session, Celebrating the birthday of any student of the respective class and the National Anthem

Lecture Starts with-

Topic to be discussed today- Today I will discuss about Buffer Preparation.

Lesson deliverance (ICT, Diagrams & Live Example)-

- PPT (3 Slides)
- Diagrams
- Tables

BUFFER PREPARATION

Buffer solutions are essential in laboratory work, as they help maintain a stable pH environment for various chemical reactions and biological processes. Here's a step-by-step guide on how to prepare a buffer solution:

Materials and Equipment:

- Weighing balance
- Distilled or deionized water
- Appropriate containers (e.g., glass beakers, bottles)
- Stirring rod or magnetic stirrer
- pH meter or pH indicator paper/strips
- Analytical balance
- Chemicals for buffer preparation (acid and its conjugate base or a suitable buffer salt)

Procedure:

1. **Determine the Desired pH:**
 - Decide on the pH value you want for your buffer solution. The choice of pH will depend on the specific requirements of your experiment or procedure.
2. **Select the Buffer Components:**
 - Choose an appropriate acid and its conjugate base or a suitable buffer salt that will give you the desired pH. Common buffer systems include acetic acid/sodium acetate (pH 4-5), phosphate buffers (pH 6-8), and Tris-HCl (pH 7-9), among others.
3. **Calculate the Amounts of Buffer Components:**
 - Use the Henderson-Hasselbalch equation to calculate the required amounts of the acid and its conjugate base (or buffer salt) to achieve the desired pH. The equation is: $\text{pH} = \text{pK}_a + \log\left(\frac{[\text{A}^-]}{[\text{HA}]}\right)$ Where:
 - pH = desired pH
 - pKa = the pKa of the buffer system

- $[A^-]$ = concentration of the conjugate base (or buffer salt)
- $[HA]$ = concentration of the acid

4. **Weigh the Buffer Components:**

- Using an analytical balance, measure the required amounts of the acid and its conjugate base (or buffer salt) according to your calculations. Ensure accuracy in measurement, as slight deviations can affect the pH of the solution.

5. **Prepare Distilled or Deionized Water:**

- Ensure that you have a sufficient quantity of distilled or deionized water. The water quality is crucial to prevent contaminants that could alter the pH of the buffer solution.

6. **Mix the Buffer Components:**

- In a suitable container (such as a glass beaker), add the calculated amount of the acid component (e.g., acetic acid) to the water and stir to dissolve completely.
- Next, add the calculated amount of the conjugate base component (e.g., sodium acetate) to the solution and continue stirring until both components are fully dissolved.

7. **Check the pH:**

- Use a pH meter to measure the pH of the buffer solution. If a pH meter is not available, you can use pH indicator paper or strips, although these are less precise.
- Adjust the pH as needed by adding small amounts of either the acid or conjugate base component and re-measuring until you reach the desired pH.

8. **Final Volume Adjustment:**

- If necessary, add additional distilled or deionized water to reach the desired final volume of the buffer solution.

9. **Label and Store:**

- Label the container with the buffer solution's pH, composition, and date of preparation.
- Store the buffer solution in a tightly sealed container at the appropriate temperature. Some buffer solutions may need to be refrigerated.

PRECAUTIONS:

When preparing buffer solutions, it's essential to handle chemicals safely, wear appropriate personal protective equipment, and follow laboratory safety protocols.

University Library Reference-

- **Suggestions to secure good marks to answer in exams-**
 - Principles, requirements, procedure, result, observation

- **Questions to check the understanding level of students-**
 - Prepare the buffer solution.

- **Next Topic-**

- **Academic Day ends with-**
National song 'Vande- Mataram'