

## BI1541-01 RESPIROMETER APPARATUS

A respirometer experiment measures oxygen consumption or carbon dioxide production during respiration to determine metabolic rates. Typically, living organisms (like germinating seeds or insects) are placed in a sealed container with a manometer (a liquid-filled tube). As the organism respire, it consumes oxygen, causing a pressure change that moves the manometer fluid. By measuring the movement of the fluid over time, you can calculate the rate of respiration.

### 1. Prepare the Respirometer:

- Ensure the respirometer is airtight.
- Set up a control tube with inert material (like glass beads) to account for environmental changes.
- In the experimental tube, place the organism (e.g., germinating seeds, insects).
- Include a substance like soda lime or KOH in both tubes to absorb CO<sub>2</sub>.

### 2. Set up the Manometer:

- Introduce a drop of coloured liquid (like a dye mixed with detergent) into the manometer tube.
- Use a syringe to adjust the fluid level to a convenient starting point on the scale.

### 3. Start the Experiment:

- Close the respirometer to isolate it from the atmosphere.
- Start a stopwatch.

### 4. Record Measurements:

- Note the position of the manometer fluid at regular intervals (e.g., every minute for 5 minutes).
- If the manometer tube is not graduated, you may need to measure the distance the fluid moves and calculate the volume change using the formula:  $\text{Volume} = \pi r^2 \times \text{distance}$ , where 'r' is the radius of the manometer tube.

### 5. Repeat and Analyze:

- Repeat the experiment with different organisms or under varying conditions (e.g., different temperatures).

- Analyze the data to determine the rate of oxygen consumption or carbon dioxide production.

Key Considerations:

- **Temperature Control:**

Maintaining a constant temperature (e.g., using a water bath) is crucial as temperature affects respiration rates.

- **Soda Lime/KOH:**

These substances are essential for absorbing CO<sub>2</sub>, allowing the respirometer to accurately measure oxygen consumption.

- **Airtight Seal:**

Ensuring an airtight seal is vital for accurate readings. Any leaks will affect the pressure and invalidate the results.

- **Safety:**

Be mindful of potential hazards when using chemicals like KOH. Wear appropriate safety gear (like goggles) and follow safety guidelines.

- **Data Analysis:**

Calculate the rate of respiration (volume of gas consumed/produced per unit time).

Youtube video link :

<https://www.youtube.com/watch?v=rMp9R1Fq0lY&t=774s>