- **INTRODUCTION**

  BIOASSAY OF OXYTOCIN USING RAT UTERINE HORN BY INTERPOLATION METHOD

Oxytocin is a peptide hormone and neurotransmitter that plays a crucial role in uterine contractions during labour and milk ejection during lactation. It acts on oxytocin receptors in the uterine smooth muscle, leading to rhythmic contractions. The bioassay of oxytocin using the rat uterine horn is a well-established method to determine its potency and concentration based on its contractile effects.

The interpolation method is a comparative bioassay technique where the response of an unknown oxytocin sample is measured against known standard concentrations. By plotting the contractile responses, the unknown concentration is determined by interpolation from the standard dose-response curve. This method is widely used due to its accuracy and reliability in quantifying oxytocin activity.

The rat uterine horn is an ideal biological model because it exhibits strong and reproducible contractions in response to oxytocin. Factors such as hormonal status (e.g., estrogen priming) influence the tissue's sensitivity, ensuring consistent and measurable contractions. This bioassay is essential for evaluating oxytocin's pharmacological effects and is commonly used in drug standardization and quality control.

- **EQUIPMENT REQUIRED**

Animal :-	Rat
Drug:-	Oxytocin stock solution
Instrument:-	Student Organ Bath, kymograph.
Physiological salt solution:-	De Jalon solution

- **PRINCIPLE**

  The bioassay of oxytocin using the rat uterine horn is based on its ability to induce dose-dependent contractions in uterine smooth muscle by stimulating oxytocin receptors. The interpolation method compares the contractile response of an unknown oxytocin sample with standard concentrations. By plotting the dose-response curve, the unknown concentration is determined through interpolation. The sensitivity of the rat uterine horn to oxytocin ensures accurate and reliable quantification of its potency.

  PROCEDURE:

  1) Sacrifice rat and isolate uterus ad prepare tissue by taking uterine horn and place it in De Jalon solution
  2) Setup organ bath and tie ends of stomach strip to the aeration tube and isotonic lever.
  3) Stabilize the tissue and allow it to withstand in the physiological salt solution for 30minutes. And change the solution at intervals of 10minutes.
  4) Introduce serotonin and take baseline at 30sec, record concentration using isotonic writing lever.

5) The contact time of tissue maintained should be of 30seconds.
6) Wash the tissue 3times after administering dose in graded response with washing time of 60sec.
7) Total time cycle should be maintained for 240sec.
8) Repeat the process of introducing serotonin three times.

CALCULATION & INTERPRETATION:

Log conc. = 1.38

Antilog (1.45) = 23.98 µg

0.4 ml of test sample contains = 23.98 µg of oxytocin
Thus, 1mL test sample contains = 23.98 x 1 / 0.4
= 59.95 µg/mL

CONCLUSION:

The bioassay of oxytocin using the rat uterine horn by the interpolation method successfully determined the potency of oxytocin based on its contractile response. The results confirmed a dose-dependent effect, demonstrating the sensitivity of the uterine horn to oxytocin stimulation. The interpolation method proved to be a reliable and accurate technique for estimating the unknown concentration. This bioassay is valuable in pharmacological research and quality control for oxytocin-based formulations.

- **IDEAL OBSERVATION**

Sample	Dose (mL)	Conc. Of oxytocin in µg/mL	Log Conc.	Response (in mm)	%Response
Standard	0.1	10	1	6	25
	0.2	20	1.30	9	37.5
	0.4	40	1.60	13	54.1
	0.8	80	1.90	17	70.83
	1.6	160	2.20	20	83.3
	3.2	320	2.51	24	100
Test	0.4	7	?	23.98	99.9

Log Conc.	% Response
1	25
1.30	37.5
1.60	54.1
1.90	70.83
2.20	83.3
2.51	100
?	41.67

DISCUSSION:

The bioassay of oxytocin using the rat uterine horn by the interpolation method effectively determines the hormone's potency based on its contractile effect on smooth muscle. Oxytocin binds to oxytocin receptors in the uterine tissue, triggering calcium-dependent muscle contractions. This response is dose-dependent, making the rat uterine horn a reliable model for quantifying oxytocin activity.

The interpolation method ensures accuracy by comparing the contractile responses of an unknown sample to known standard concentrations. By plotting a dose-response curve, the unknown concentration is determined through mathematical interpolation. The consistency of responses depends on factors such as estrogen priming, which enhances oxytocin receptor sensitivity, and maintaining optimal experimental conditions like temperature, pH, and oxygenation.

RESULT:

The results validate the effectiveness of this bioassay for pharmacological and quality control studies. It is widely used to assess oxytocin's potency in medical and veterinary applications. Future studies may explore receptor antagonists to further characterize oxytocin's role in uterine contractility.

The bioassay of oxytocin using the rat uterine horn by the interpolation method demonstrated a **dose-dependent contractile response**. The unknown oxytocin concentration was determined by comparing its effect with standard oxytocin doses using the interpolation technique. The calculated potency confirmed the accuracy and reliability of the assay. The findings validate the rat uterine horn as a sensitive model for evaluating oxytocin's pharmacological activity.