

SUMMARY AND CONCLUSION

- ❖ A new simple and highly selective and specific seven Calcium ion selective electrodes were developed and electrochemically evaluated.
- ❖ All electrodes worked well in the acidic pH range of 3.42-6.24.
- ❖ The potential remained unchanged in the various solvent medium like 25%, 50%, 75% of Acetone, Ethanol, DMF, DMA.
- ❖ All prepared calcium ion selective electrodes worked well in the presence of various cations.
- ❖ Electrochemical impedance study was carried out, it revealed that sub-Nernstian response is due to the perturbation in diffusion layer associated with high rate of charge transfer in electrode surface and super-Nernstian response is due to charge transfer become low rate process and mainly independent of diffusion.
- ❖ All electrodes were successfully used as an indicator electrode in potentiometric titrations.
- ❖ All electrodes worked successfully for the determination of calcium ions in various real samples with maximum recovery.
- ❖ The life time of the prepared Calcium ion selective electrodes was found to be 5 months with good reproducibility of E.M.F values except for the electrode IV(Schiff base based Ca-ISE).
- ❖ The investigations proved that this study offers an easy, simple and efficient method for determining Ca^{2+} ion for various concentrations.

Table 5.1
Characterization of all prepared Ca - ISE

S.No	Electrode Prepared	Concentration Range	pH range	Non-aqueous medium	Selectivity
1	Ester based Ca-ISE	1×10^{-4} -1M	3.42-5.57	25%,50%,75% of ethanol, acetone, dimethyl formamide, dimethyl acetamide	Na^+ , Ce^{2+} , K^+
2	Vinyl acetic acid based Ca-ISE	1×10^{-4} -1M	3.42-6.24	25%,50%,75% of ethanol, acetone, dimethyl formamide, dimethyl acetamide	Co^{2+} , K^+ .
3	Enzyme based Ca-ISE	1×10^{-4} -1M	4.63- 6.24	-	Na^+ , Co^{2+} , K^+
4	Schiff base based Ca-ISE	1×10^{-4} -1M	3.42-6.24	25%,50%,75% of ethanol, acetone, dimethyl formamide, dimethyl acetamide	Na^+ , Cd^{2+} , K^+ .
5	Acyclic polyether based Ca-ISE	1×10^{-4} -1M	3.42 to 6.24	50%,75% of acetone, 25%,50% of DMA,25%,50%, 75% of DMF medium.	Na^+ , K^+
6	Surfactant Modified based Ca-ISE	1×10^{-4} -1M	5.57 to 6.24	25% of acetone, Dimethyl acetamide, 50% of ethanol	Na^+ , K^+
7	Polyurethane fibers based Ca-ISE	1×10^{-8} -1M	3.42 to 6.24	50%, 75% of ethanol, 25% of dimethyl formamide, 50%,75% of dimethyl acetamide, 25,50% of acetone	Na^+ , K^+