Electronic Supplementary Material (ESI) for Analyst.

Electrified liquid-liquid interface as an electrochemical tool for sensing of putrescine and cadaverine

S. Sudalaimani,[a,b] K. Sanjeev kumar [a,b] A. Esokkiya,[a,b] C. Suresh[a,b] and K. Giribabu,[a,b*]

[a]Electrodics and Electrocatalysis Division, CSIR-Central Electrochemical Research Institute, Karaikudi-630 003, Tamil Nadu, India.

[b]Academy of Scientific and Innovative Research (AcSIR), Ghaziabad- 201002, India

*Corresponding Author E-mail: giribabuk@cecri.res.in

*Address for correspondence:

Dr. K.Giribabu, M.Sc., M.Phil., Ph.D.,
Scientist
Electrodics and Electrocatalysis Division
CSIR-Central Electrochemical Research Institute
Karaikudi

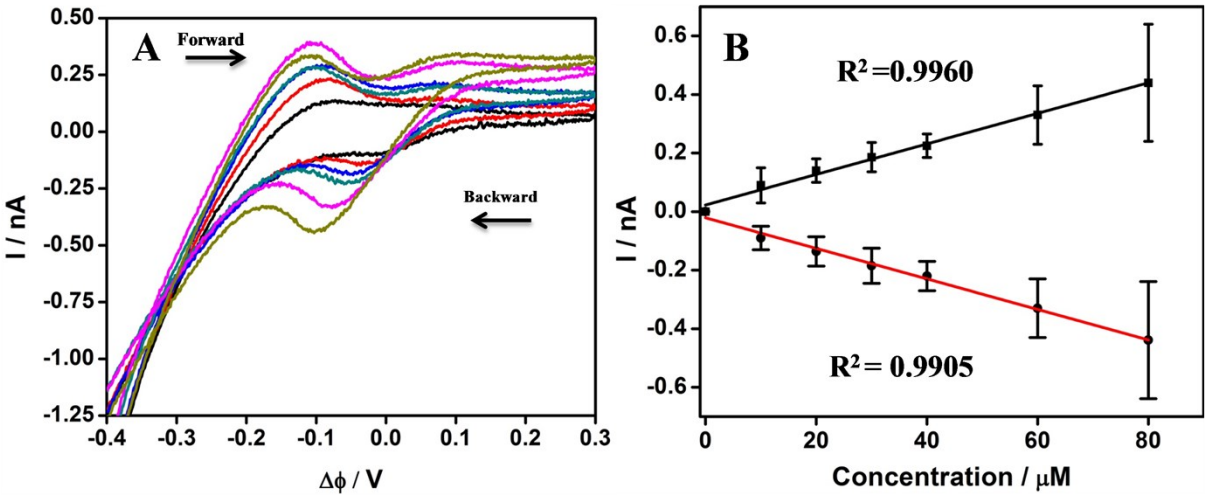

Fig. S1. Cyclic voltammograms of TBA^+ using the cell represented in Fig.1a (A), corresponding calibration plot for TBA^+ in the concentration range of 10 – 80 μM (B).

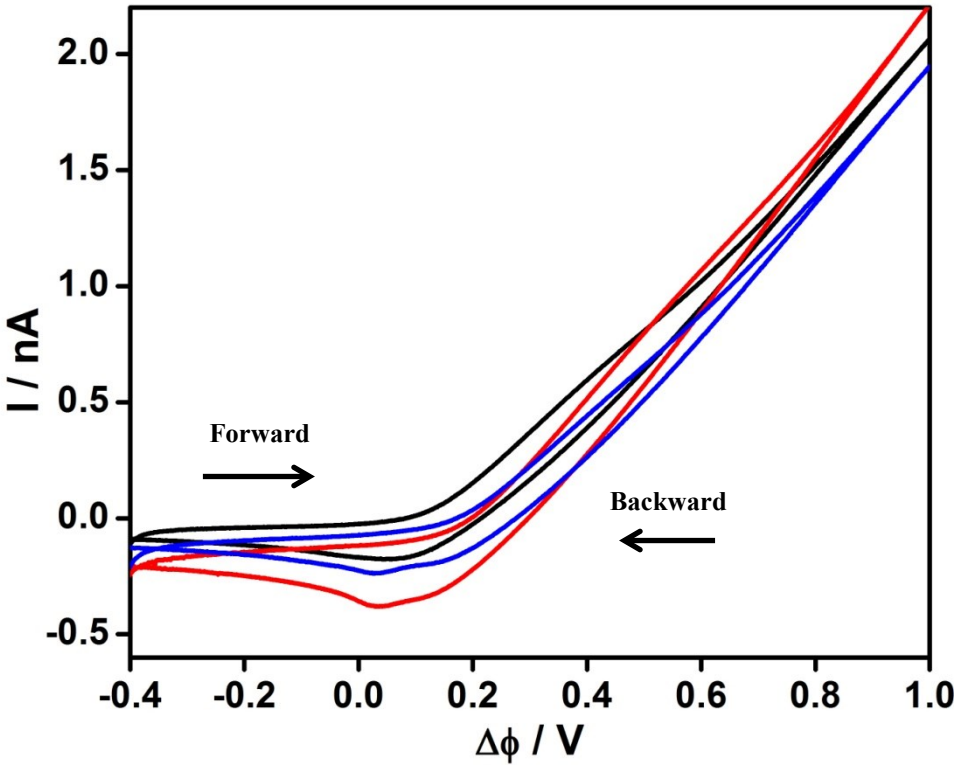

Fig. S2. Cyclic voltammograms of 10 μM putrescine and cadaverine using the cell 1 configuration extended up to 1.0 V. {Black line: 10 mM LiCl, Red line: 10 μM putrescine & Blue line : 10 μM putrescine}

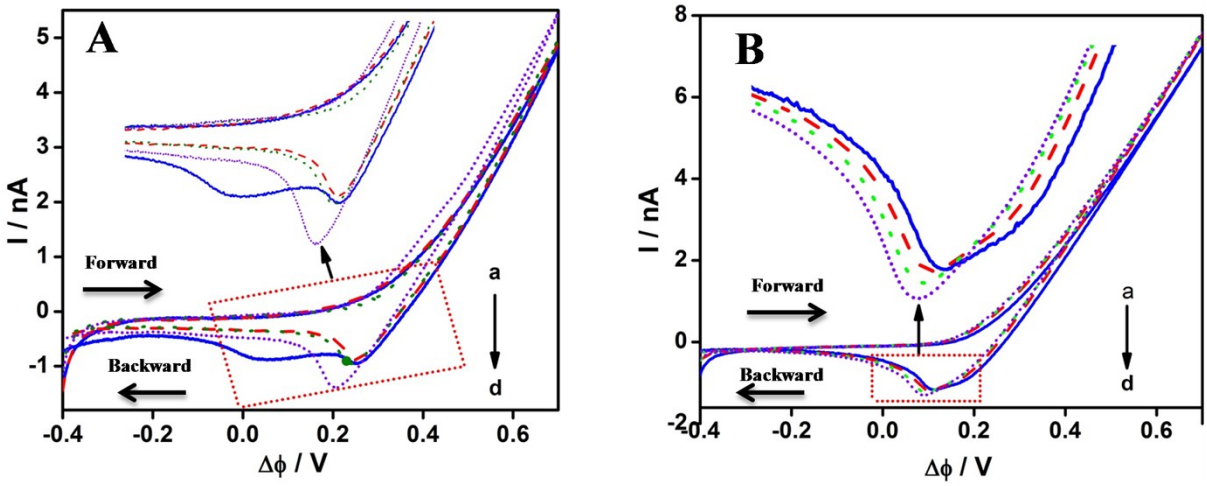

Fig. S3. Cyclic voltammograms of (a) 20 µM cadaverine (blue), (b) 20 µM cadaverine + 2 µM putrescine (red), (c) 20 µM cadaverine + 5 µM putrescine (green), (d) 20 µM cadaverine + 20 µM putrescine (violet) for 10 mM LiCl (A) and for 100 mM (NaH_2PO_4 and Na_2HPO_4 + LiCl) (B) at a scan rate of 10 mVs^{-1} , inset shows the clear view of the voltammograms.

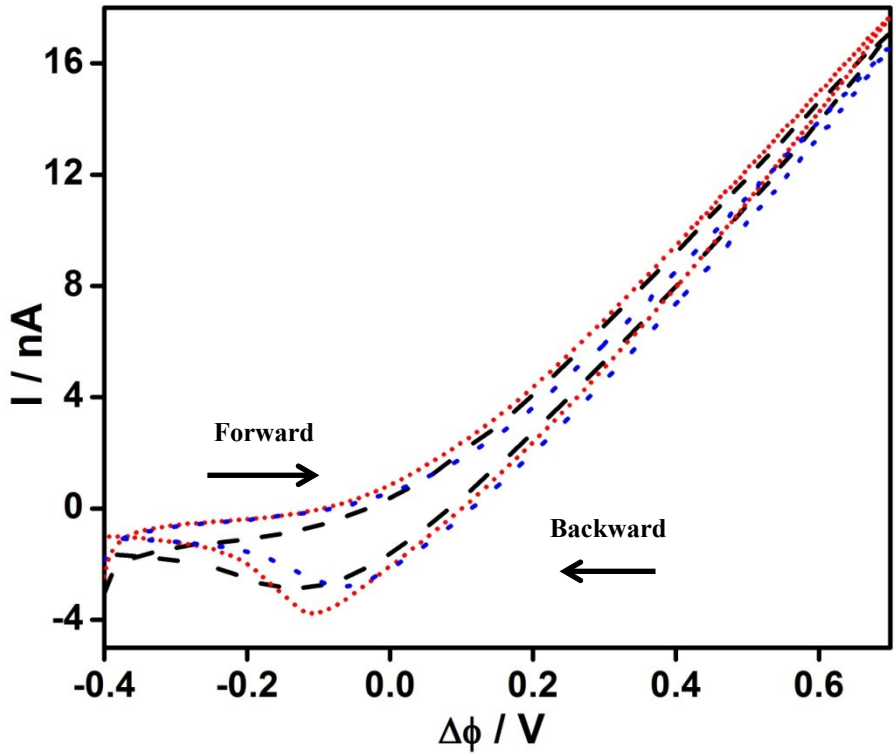

Fig. S4. Cyclic voltammograms of 10 µM putrescine and cadaverine using the cell 2 configuration {Black dashed line: 10 mM LiCl, Red dotted line: 10 µM putrescine & Blue dotted line : 10 µM putrescine} .

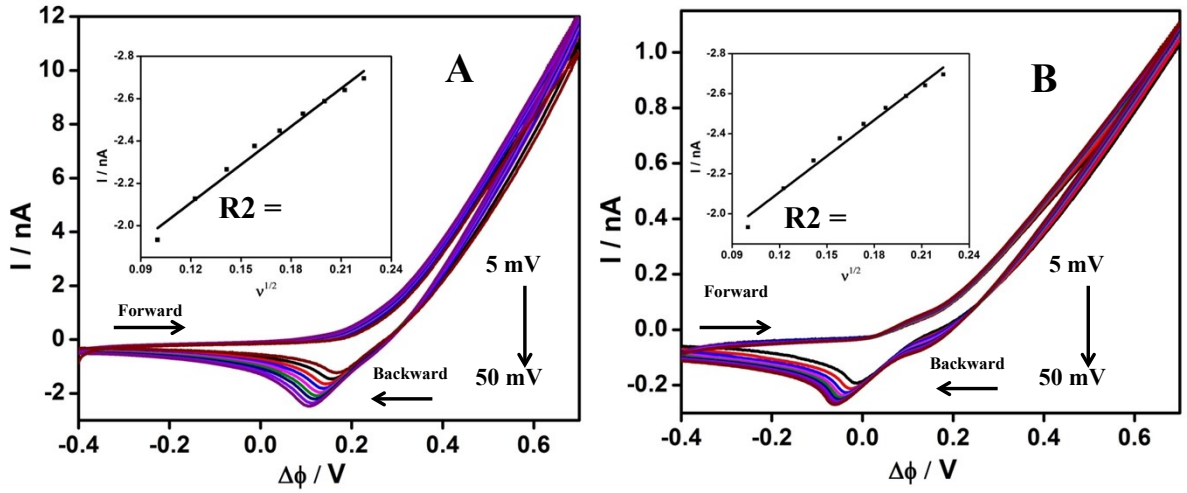

Fig. S5. Cyclic voltammograms of 10 µM putrescine (A) and cadaverine (B) using the cell 1 configuration at various scan rates in the range of 5-50 mVs^{-1}.

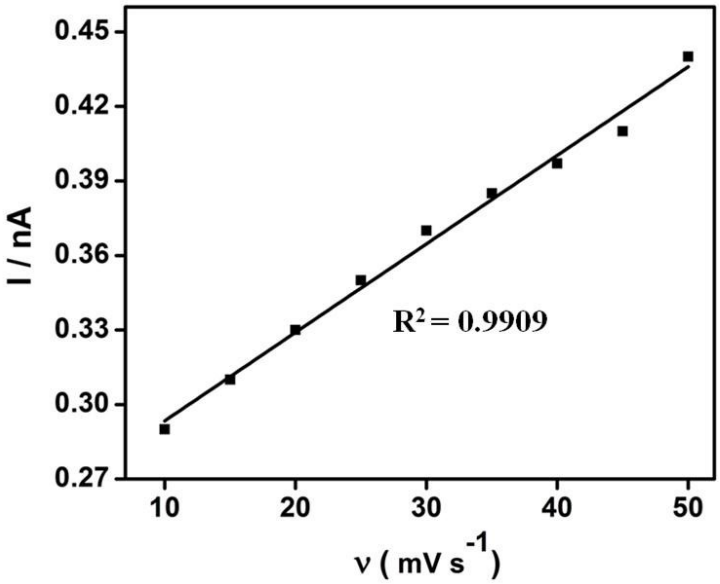

Fig. S6. Relation between scan rate and forward current of cadaverine obtained using cell 1 configuration (Fig,S5B).

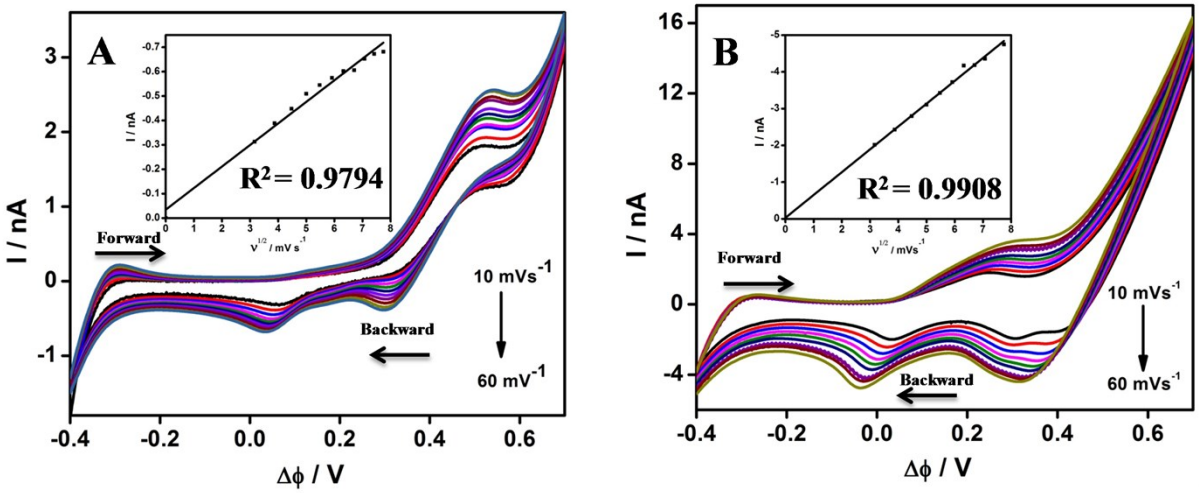

Fig. S7. Cyclic voltammograms of 10 µM putrescine (A) and cadaverine (B) using the cell 3 configuration at various scan rates in the range of 10-60 mVs^{-1}.

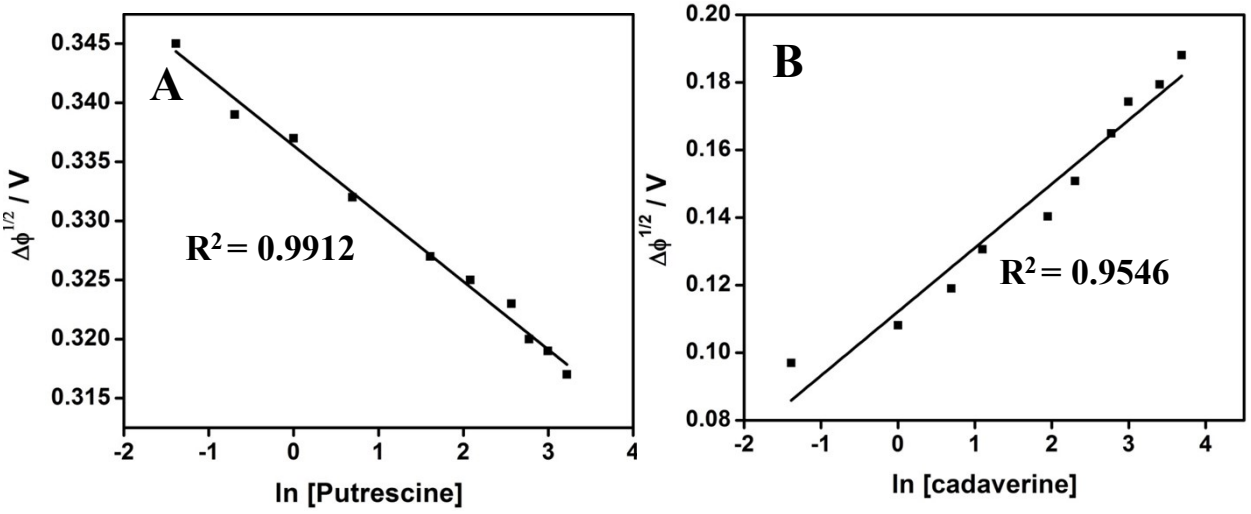

Fig. S8. Determining the binding constants, Gibbs free energy using plot of $\Delta\varphi^{1/2}$ vs ln C (A)The plot of $\Delta\varphi^{1/2}$ vs ln [putrescine]. (B) the plot of $\Delta\varphi^{1/2}$ vs ln [cadaverine].

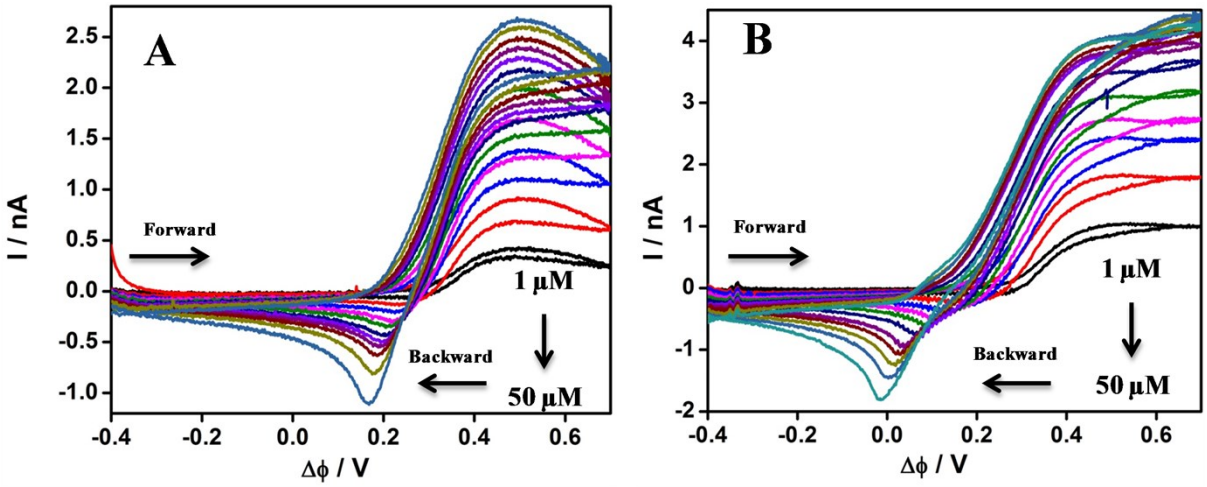

Fig. S9 . Background subtracted cyclic voltammograms of putrescine (A) and cadaverine (B) at various concentrations in the range of 1- 50 µM.

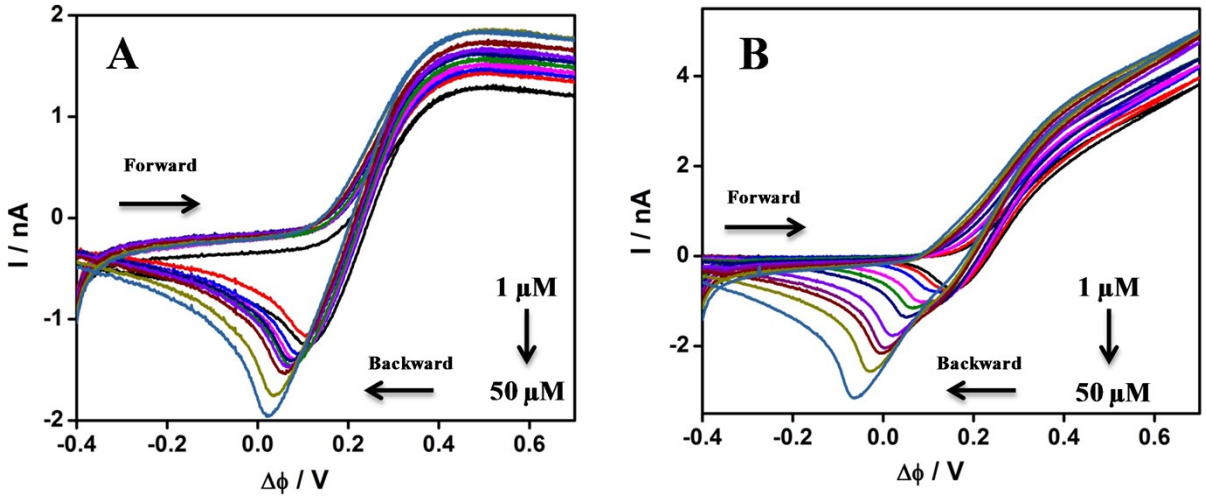

Fig. S10. Background subtracted cyclic voltammograms of putrescine (A) and cadaverine (B) at various concentrations in the range of 1- 50 µM.

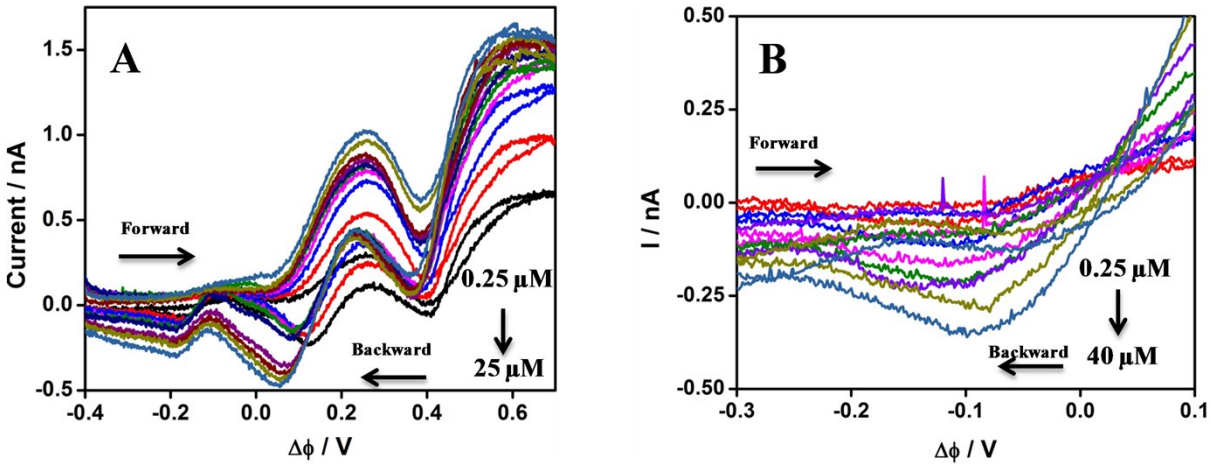

Fig. S11 . Background subtracted cyclic voltammograms of putrescine (A) in the range of 0.25- 25 µM and cadaverine (B) in the range of 0.25 – 40 µM .

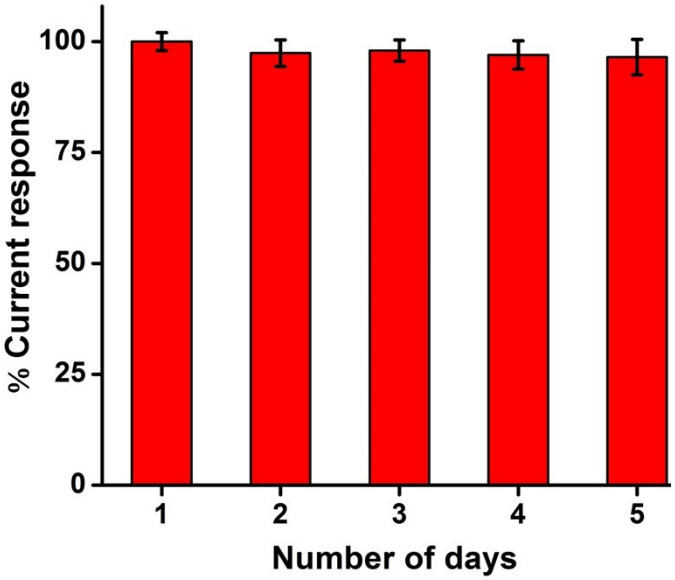

Fig. S12. Inter-day variability of current response using liquid-liquid interface method for sensing of cadaverine.

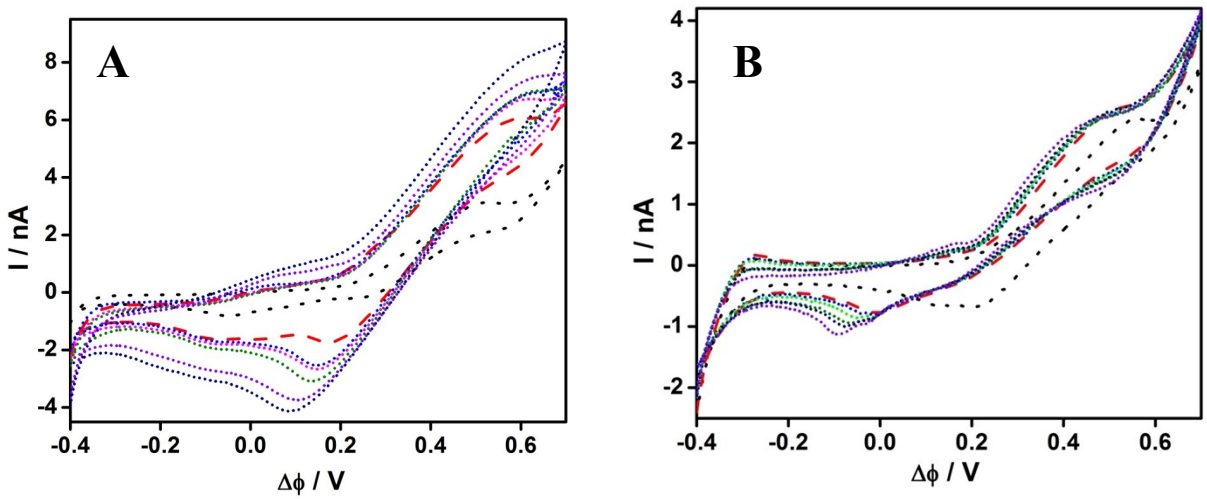

Fig. S13. Cyclic voltammograms of 10, 20, 30, 40, 50 μM of putrescine(A) and cadaverine(B) using cell 3 configuration. Black- 10 mM LiCl; red- 10 mM LiCl + 0.5 mL Real sample extract, other dotted lines corresponds to various concentration of putrescine(A) and cadaverine(B)