**Phenazine Functionalized “opto-electronic nose” for ammonia/aliphatic amines sensing @ Prostate Cancer Biomarker Sensor with Food Spoilage Evaluation**

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Currently, providing a single solution of multiple problems is an urge. In this perspective, herein rapid, selective and highly efficient chromo-fluorogenic detection of ammonia/aliphatic amines over aromatic amines has been investigated by means of a novel “*opto-electronic nose*”, **CN-2**, synthesized in a single-step *via* multiple inter/intramolecular C-N fusion reactions. The in-situ generated mono-protonated **CN-2** can selectively detect primary to secondary to even tertiary aliphatic amines over aromatic amines within ~40 S with extremely low detection threshold values of 27.2 ppb, 0.7 ppm, 5.4 ppm, 1.7 ppm from UV-Vis and 42.5 ppb, 1.61 ppm, 5.5 ppm, 6.14 ppm from fluorescence spectral data for NH3, hydrazine (primary amine), diethanolamine (secondary amine) and triethylamine (tertiary amine) respectively with the hypsochromic shift in the UV-Vis spectra along with fluorescence attenuation *via* target-specific deprotonation. The colorimetric signal can also be examined by Smartphone APP, which is well correlated with spectrophotometric outcomes. Interestingly, due to presence of a unique protonated antenna centre **CN-2** with anti-oxidant activity can also detect aliphatic biogenic amines, like putrescine, spermidine, which are frequently released from spoiled food. Therefore, it may be exploited as smart food-spoilage indicator in real-time. Again, the aliphatic biogenic amines recognition capability from human urine made it as a potential prostate cancer biomarker sensor for clinical use, which alleviates the need of biopsies. **CN-2** could also be employed towards one-to-two decoder logic-circuitry formulation to monitor the ammonia levels. Moreover, **CN-2-**functionalized hydrogel-membrane based portable, handy prototype could be utilized for easy on-site recognition of amine vapor. Reversible sensing behavior in presence of HCl enables **CN-2** to exhibit anti-counterfeiting activity. To the best of our knowledge, this is the first *all-in-one* phenazine-based Smartphone-assisted chromo-fluorogenic-chemosensor, which would be of enormous interest in food-packaging industry, information technology as well as in *early-stage-cancer* diagnosis.

***References***

1. **R. Das**, S. Bej, N. C. Murmu, P. Banerjee, Selective recognition of ammonia and aliphatic amines by C-N fused phenazine derivative: A hydrogel based smartphone assisted ‘opto-electronic nose’ for food spoilage evaluation with potent anti-counterfeiting activity and a potential prostate cancer biomarker sensor, *Anal. Chim. Acta*, 1202, 2022, 339597.