Supporting Information

Maleic Acid Assisted Facile Plasmonic Chip Towards Assessment of Adulterant in Cattle Milk

Upama Das[1], Tanmoy Dhar[1], Rajib Biswas[1*], Nirmal Mazumder[2*]

[1]*Applied Optics and Photonics Research Laboratory, Department of Physics, Tezpur University, Tezpur-784028, Assam, India*

[2]*Department of Biophysics, Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal, Karnataka 576104, India*

[*]Corresponding Author: rajib@tezu.ernet.in; nirmal.mazumder@manipal.edu

1. Real image of synthesised maleic acid functionalised silver nanoparticles (MA-AgNPs)

Fig. S1. Colloidal solution of maleic acid functionalised AgNPs.

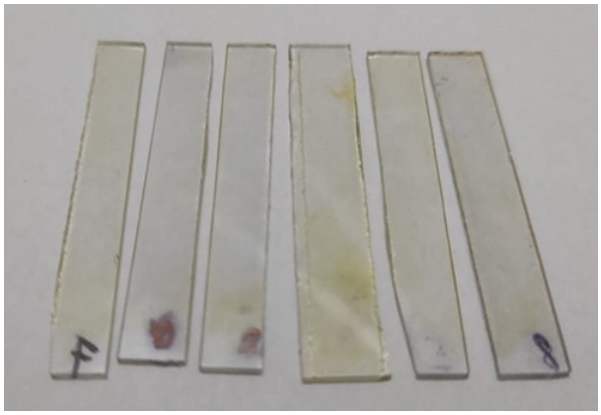


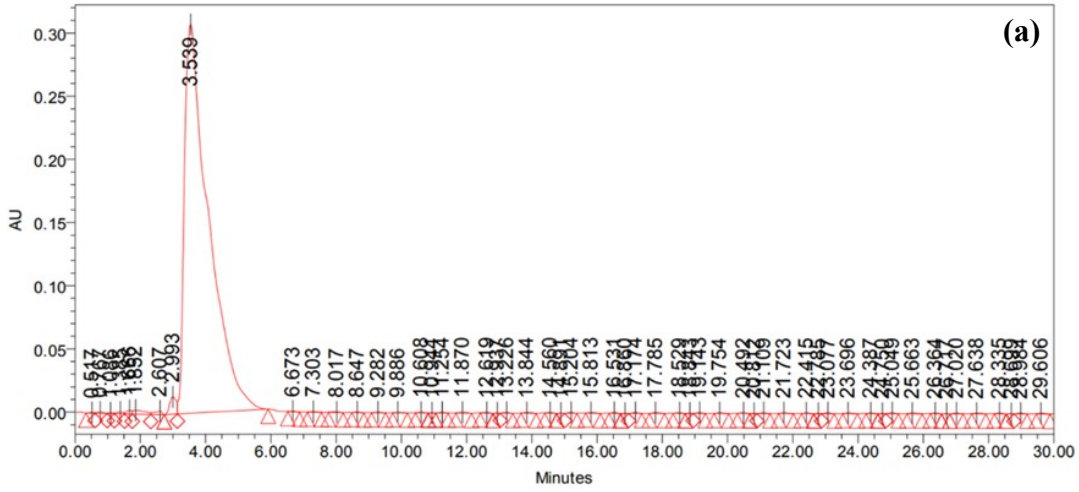
Fig. S2. Maleic acid functionalised AgNPs coated plasmonic chip.

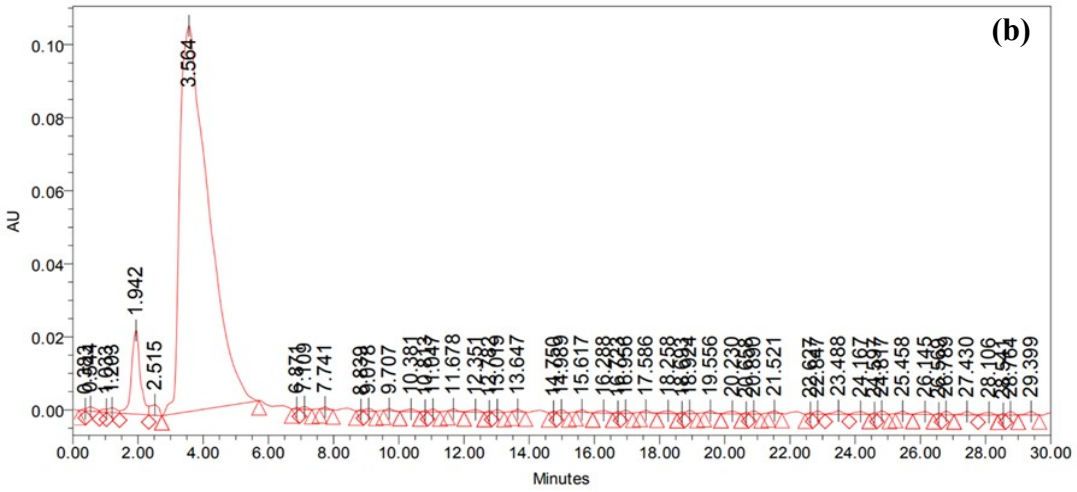
2. Validation by High Performance Liquid Chromatography (HPLC)

To determine the efficacy of the developed sensor in detecting melamine within raw milk, a validation was conducted using HPLC as the standard validation method. The HPLC analysis performed by testing melamine-spiked milk samples using a standardized procedure. Specifically, a standard solution of 1000 ppm melamine dissolved in water was utilised and employed a C18 column coupled with a UV detector operating at 240 nm was involved.

During the analysis, a 3 µL aliquot of the melamine spiked milk sample was introduced into the column, where the mobile phase comprised a mixture of acetonitrile and water, flowing at a rate of 0.7 mL/min. Notably, a distinct peak emerged at a retention time of approximately 3.5 minutes, aligning with the presence of melamine in the milk samples. Furthermore, a consistent augmentation in the intensity of the peak was observed with increasing concentrations of melamine in the spiked milk samples.

This rigorous validation technique affirmed the accuracy and reliability of the results obtained through UV–vis spectroscopic analysis, thus bolstering the confidence in the sensor's capability to detect melamine in milk samples with precision and sensitivity **Fig. S3**.




(b)
AU
Minutes
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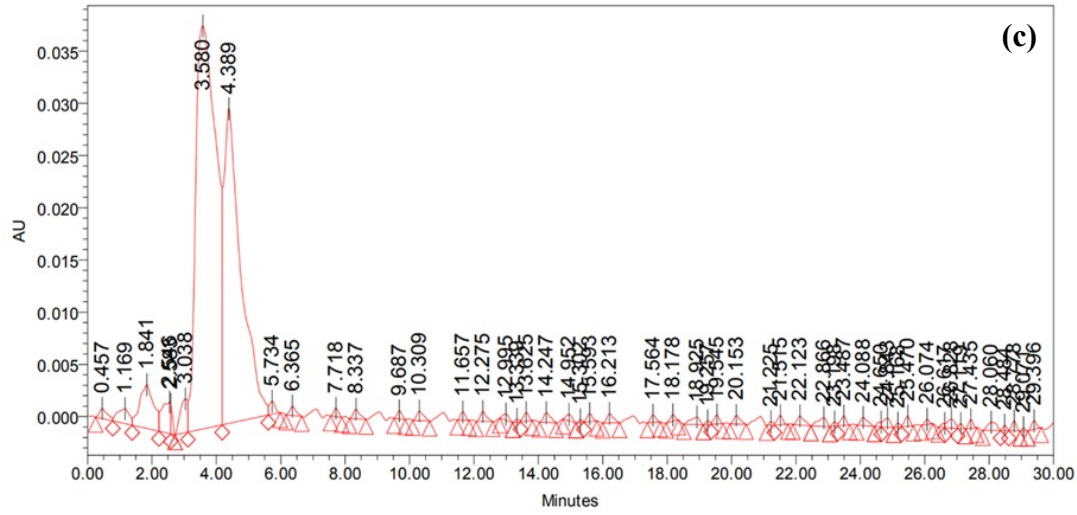
1.942
2.515


(c)
AU
Minutes
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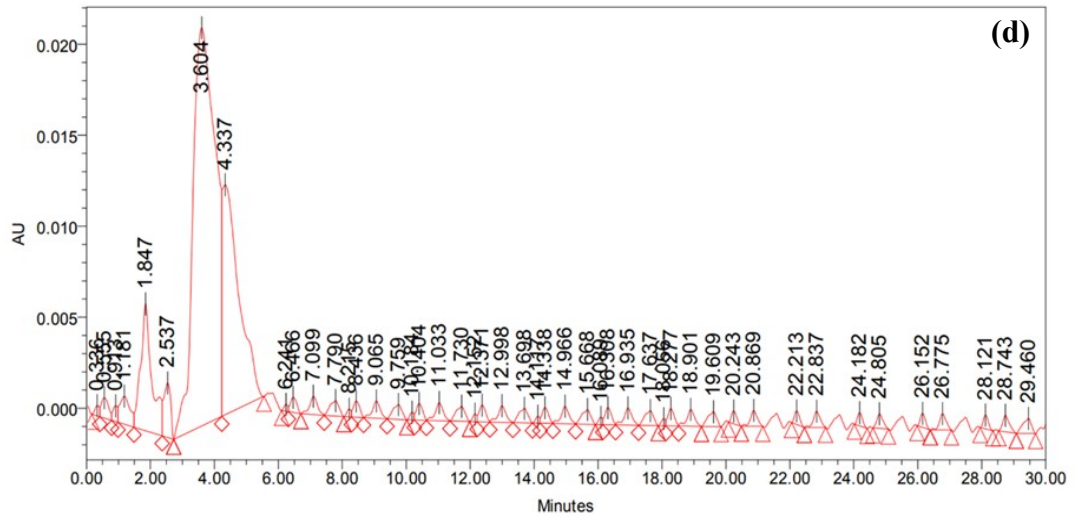
4.389


(d)
AU
Minutes
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4.337
1.847
2.537

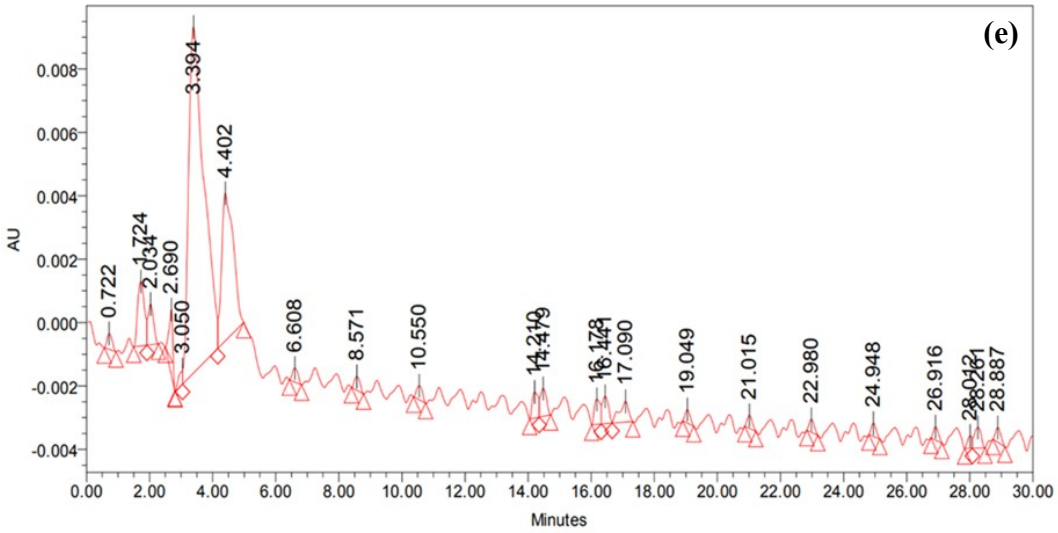

Fig. S3. HPLC data of melamine spiked in raw milk at various concentrations: (a) 50, (b) 40, (c) 30, (d) 20, and (e) 10 ppb.