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A comprehensive approach for milk adulteration detection using inherent biophysical properties as 'Universal Markers': Towards a miniaturized adulteration detection platform

Suryasnata Tripathy, Aniket Ramesh Ghole, Khandavalli Deep, Siva Rama Krishna Vanjari, Shiv Govind Singh

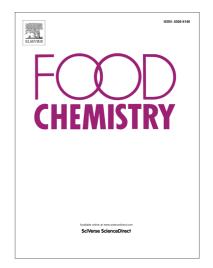
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ACCEPTED MANUSCRIPT

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4 5	Suryasnata Tripathy ^a , Aniket Ramesh Ghole ^b , Khandavalli Deep ^c , Siva Rama Krishna Vanjari ^d , Shiv Govind Singh*, ⁱ
6	Indian Institute of Technology Hyderabad, Telangana, India-502285
7	^a suryasnata.tripathy@gmail.com
8	bee13m1022@iith.ac.in
9	cee14mtech11017@iith.ac.in
10	^d svanjari@iith.ac.in
11 12	*sgsingh@iith.ac.in
	Abstract:
14	This paper proposes a novel milk quality detection approach based on utilization of inherent
15	biophysical properties as 'markers' for adulteration. Unlike the traditional adulterant-specific
16	approaches, this method is generic and universal. It exploits the change in innate milk properties,
17	such as electrical conductivity and pH, upon addition of adulterants as a transduction mechanism
18	for detecting milk adulteration. In this work, adulteration with more than 10 commercially
19	known hazardous adulterants is detected by monitoring the changes in milk electrical

ⁱ Corresponding Author. Email: sgsingh@iith.ac.in Telephone: +91-40-2301-6079

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conductivity and pH. The electrical parameters for pure milk were standardized using AC

Impedance-Spectroscopy with glassy carbon working electrode and platinum counter/reference

electrode at a potential of 0.3 V and in the frequency range of 1 Hz -1 MHz. The experiments

were repeated using gold-electrodes fabricated on glass-substrate as a first step towards

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