Mitali Saha, Expert Opin Environ Biol 2014, 3:3
http://dx.doi.org/10.4172/2325-9655.C1.009

OMICS International
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International Summit on
Past and Present Research Systems of Green Chemistry
August 25-27, 2014 Hilton Philadelphia Airport, USA

Natural resources for nanocarbons and applications as biosensors

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In the past decade, the use of nanotechnology as a tool to develop novel structures of carbon and metal nanoparticles as well as the fabrication ofdevices for bio-sensinghas increased tremendously. Encouraged by the continuing research work on biosensors using nanomaterials, it was felt to explore some new carbonaceous materials for the synthesis of carbon nanoparticles for their possible application as biosensors. In this context, different types of carbon based nanostructured materials have been synthesized fromeasily available raw materials like coconut oil, bamboo, potato, barley, etc., employing simple processes of burning and pyrolysis. Interestingly, it was found that different type of raw materials produced carbon nanoparticles of different shapes and sizes viz. CCNT, CN, CNA and CNS from coconut oil, bamboo, peeled potatoes and barley, respectively. The non-enzymatic electrochemical behavior of all the electrodes showed good response to glucose detection with a wide linear range from10−2 to 10−6 M.The sensitivity and selectivity of the electrodes towards glucose oxidation promises its effectiveness as a non-enzymatic glucose sensor for practical applications also. The non-enzymatic cholesterol biosensor basedon CCNT, showed a high sensitivity of ~15.31 μAμM−1cm−2 and lower detection limit of 0.017 μM. This research work is still continuing with other carbonaceous materials and the control of the shape and the size of these nanocarbons and their dependency on the mechanism of bio-sensing are under investigation. However, the proposed electrodeshold a great potential for the development of non enzymatic biosensors for real samples.

Biography

Mitali Saha has completed her PhD in synthetic organic chemistry in 1999 and from 2008, she has been working in the field nanoscience. Her main area of research work includes carbon and metal nanoparticle synthesis for biosensor, water purification and solar applications, green chemistry, heterocyclic bioactive compounds, etc. She got the DST, Young Scientist Award in 2007 while working in IIT Kanpur, India. She has published around 40 research papers in journals of international reputeand around 50 research articles in national and international conferences. She has been serving as editorial board members of few reputed journals and review members of Elsevier journal.

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