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Nano-engineered natural fiber in biocomposites and biosorption

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Poultry processing plants generate billions of pounds of feathers each year. Feathers are light and tough with over 90% protein. At present, in addition to few applications in animal feed and other products, the majority of the poultry feathers are disposed in landfills. Recently, due to strong emphasis on environmental awareness worldwide, utilization of natural fibers in the development of recyclable and environmentally sustainable composites/materials has been growing. In addition to environmental factors, biofibers offer many advantages over synthetic fibers in terms of low density, biodegradability, reduced dermal and reduced respiratory irritation and low cost. However, these fibers have intrinsic weaknesses such as moisture sensitivity, low thermal stability and high flammability etc. These drawbacks should be collectively addressed for biofibers to be used in a wide range of applications. Exploitation of nanotechnology, incorporation of nanostructures into biofibers has great potential to address these challenges. This presentation will discuss the modifications of Keratin from feathers for biosorption and biocomposite applications. The surface and *in situ* modifications of feather keratin were carried out. The structural changes and properties of the modified keratin were compared with untreated keratin fiber and confirmed by various characterization techniques such as SEM, XPS, FTIR, XRD, DSC and TGA. The modified fibres were used as biosorbents and also blended with co-polymer matrix to prepare the hybrid biocomposites. The modifications led to improvements in biosorption, thermal stability, flammability and other physical properties compared to the neat one.

Biography

Aman Ullah has received his PhD (with distinction) in Chemical Sciences and Technologies in 2010 at the University of Genova, Italy by working together at Southern Methodist University, USA. He is currently working as an Assistant Professor at the Department of Agricultural, Food and Nutritional Science, University of Alberta. He has published more than 20 papers in reputed journals. He was named as a Canadian Rising Star in Global Health by Grand Challenges Canada in 2012.

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