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Biopolymers as promising green engineering material

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This paper represents excellent performances of some naturally occurring biopolymers in heavy metal adsorption, clay-flocculation and tackifier in rubber compounds. Aqueous solution of processed guar gum (GG) has been found promising adsorbent for soluble Pb (II) in contaminated water. 1000 ppm GG adsorbs nearly 60% of the soluble Pb (II) after 150 min shaking at room temperature. The efficiency drastically improves (more than 95%) on grafting acrylic acid onto GG. GG along with native Acacia niloticaare found highly potent as organic flocculant for settling kaolin suspension. 9 ppm GG and 25 ppm acacia efficiently settles down 3 wt% kaolin suspension both in acidic and alkaline pH. The later has huge commercial significance since kaolin does not settle beyond pH 9.0 due to extremely high zeta potential (-29.3 mV). However, strong action as adsorbent and flocculant are attributed to polyelectrolyte characters of them. Terpenes and terpenoids represent another class of naturally occurring biomolecues. Terpenes and terpenoids isolated from the latex of Euphorbia caducifolia Hains have shown equivalent tack property to that of the commercial resins used in tyres. The ash obtained from these natural resins are found to be richer in zinc and magnesium which additionally has been used for successful part-replacement of the synthetic cure retardants (zinc oxide and magnesium oxide) in the chlorinated butyl rubber compounds in tyre tube applications.

Biography

Abhijit Bandyopadhyay is presently working as Assistant Professor in the Department of Polymer Science & Technology, University of Calcutta, India and as Technical Director in South Asian Rubber & Polymers Park. He has published 62 papers in reputed international journals (total citations: 692), more than 25 papers in national and international conference proceedings, 4 book chapters and has filed one Indian Patent to his credit. He has guided two PhD and 10 MTech/MSc research projects and presently 7 doctorate students are working under his supervision. He has received Young Scientist Award from Materials Research Society of India, Kolkata Chapter in 2005, Young Scientist Award from Department of Science & Technology in 2009 and Career Award for Young Teachers from All India Council for Technical Education, Govt. of India in 2010. He is an Evaluator of Rubber Skill Development Program run by Government of India.

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