

Synthesis Of Biogenic Silica Nano Particles

Priya S., Anagha P. J., S. Suma, Divya Dinesh*

Department of Chemistry, S N College Kollam

E-mail: divya2476@gmail.com

ABSTRACT: An eco-friendly method has been adopted to synthesize silica nano particles from rice husk, one of the highest volume residual biomass of paddy crop. The chemical composition and amorphous nature of resultant particles were confirmed by FTIR as well as XRD analysis. The average particle size was estimated as to be 55 nm. Biogenic silica has wide range of applications in medical and biotechnological fields including drug delivery.

Introduction

Rice husk is the outer covering of rice grain and is abundantly available in rice producing countries. In recent years it has been utilized as a low value added material, such as fertilizer additives, and land filling or paving materials [1]. The most common treatment method of rice husk is burning, which leads to serious air pollution and resource waste, rice husk ash (RHA). It contains large amount of silica – a valuable inorganic multipurpose chemical compound [2, 3]. Because of their unique properties and small size, nano structured silicon materials gain considerable attraction in a series of new technologies i.e. nanoelectronics, photonics, energy harvesting, and energy storage [1].

Different silica synthesis procedures such as sol-gel, micro emulsion, microwave-assisted acid catalyst, vapour techniques and recently some greener techniques - to remove the application of hazardous precursors - have been reported [2, 4]. The present study focussed on the synthesis of silica particles from rice husk using a simple and cost effective extraction method. XRD and FTIR analysis were used to evaluate the prepared silica particles.

Materials And Methods

Rice husk was collected from a rice mill located at Kuttanad. AR grade HCl and NaOH were purchased from Merck and used as received without any further purification. De-ionised water was used throughout the experiment.

The procured rice husk was washed with distilled water and dried under sunlight. The dried samples were treated with 0.5 N HCl with constant stirring at 60 °C and filtered. Residue obtained was dried in a hot air oven at 110 °C for about 24 hours followed by the ignition at 600 °C in a muffle furnace. About 5g of resultant RHA was dispersed in 60 ml de-ionised water. Adjusted the pH to 1 by using 6N HCl and stirred for 2 hours. Whatman No.41 ashless filter paper was used to filter the solution. The residue obtained was washed with water and subsequently dispersed in 60 ml 1N NaOH solution. The resultant solution was boiled with