

Characterization of silica nanoporous structures of freshwater diatom frustules

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ABSTRACT:

A phytoplanktonic unicellular alga known as diatoms belonging to the class Bacillariophyceae, possess a distinct, highly ornamented siliceous cell wall consisting of two overlapping halves. Diatoms are found both in marine and freshwater environment and also in moist habitats. A study was designed to assess and examine the morphology of diatoms in *Chapanala* and *Jiajuri*, two silica rich sites in Nagaon district of Assam as reported by Geological Survey of India. Samples were collected from aquatic and semi-aquatic habitats of the study sites and immediately transferred to Diatom specific Media. The samples were then subjected to acid wash treatment for detailed microscopic observations. Nanoporous structures of freshwater diatom frustules have been well characterized through extensive SEM analysis. The prominent forms include - *Pinnularia* sp., *Navicula* sp., *Achnantheidium* sp., *Nitzschia* sp. and *Eunotia* sp. The SEM micrographs very clearly showed the presence of fine nanostructure pores, the valve view and distinct raphe of the diatoms. In the present study, the sizes of nanoporous silica were found in the range of ~60-170 nm under SEM observations, suggesting the potentiality to use the diatoms in various nanotechnological applications.

Keywords:

Freshwater diatom, Frustule, Silica, SEM, Geological Survey of India.