

## ABSTRACT

Bamboo (renewable) and coal (non-renewable), the useful resources are abundantly available in the north eastern part of India. As per the latest inventory of Geological Resources of Coal in India reported by the Geological Survey of India, about 1471 Million Tonnes of coal have so far been estimated in the region. The North-Eastern region of India also has a great diversity of bamboo resources, out of 130 bamboo species available in India, 63 species are found in the region alone. The estimated annual output of bamboo from this region is about 3.23 million tones, which represents one-fifth of the country's total bamboo production. However, due to lack of proper management, huge amounts of bamboos are wasted every year in the region. At present, North-East coals are mainly used in the coke, cement, brick-kiln and tea garden industries, where as bamboo mostly is used in the paper and rayon industries apart from bamboo craft industries in particular. Although North East coals can be utilized for energy application for power production, but high sulphur content (2-7%) is a major environmental concern.

To explore the possibility of gainful utilization of these two resources (bamboo and NE coals) in the field of energy and environmental applications, an attempt has been made to prepare activated carbon from bamboo and North East coal with microwave irradiation technique. In the present investigation, activated carbon was prepared from bamboo and coal by microwave treatment with a strong basic media. The study also includes the influence of carbonization temperatures (450<sup>0</sup>–600<sup>0</sup>C) and impregnation ratios of char: basic activating agents (1:1) of the prepared activated carbon on the pore development and yield were investigated. The operational variables including chemical impregnation ratio, microwave power and irradiation time on the carbon yield were studied. Characterization of activated carbon thus prepared was carried out by Fourier Transform Infra-Red Spectroscopy (FTIR), X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM) and iodine number apart from their physico-chemical analysis. A comparative study between the microwave irradiation and other processes also been made for the preparation of activated carbon and reported.

The study has revealed that microwave irradiation, an efficient process for the production of activated carbon from these two energy resources.