

Characteristics of durian shell as support media in biofilter.

ABSTRACT

Malaysia is an agriculture-based country that produces a lot of agricultural by-products every year. There are potential agriculture by-products yet to be investigated, which can be used as biofilter carriers. This study investigates the physical and chemical characteristics of Durian Shell (DS), an agricultural waste, in assessing its potential to be used as a biofilter media for removing toxic vapors. Ultimate analysis was performed using an elemental analyzer. The presence of functional groups in samples was determined by Fourier Transform Infrared (FTIR) spectroscopy. The powdered DS was mixed with calcium hydroxide (Ca(OH)₂) in 23:1 ratio (w/w) dry basis for pH adjustment to be within pH 7-8. The sample was then prepared into a pellet (30 mmØ) by hydraulic hand pressure (5 psi). The specific surface area and average pore size were measured based on Brunauer-Emmet-Teller (BET) method and surface morphology was determined by Scanning Electron Microscope (SEM) analyzer. The results showed that DS has a potential alternative to other carriers, especially peat in term of characteristics, which is not available at a low price or in large quantities in Malaysia.

Keyword: Biofiltration; Fourier transform infrared spectroscopy; Scanning electron microscope; Volatile organic compounds; Gas biofiltration application; Agricultural byproducts; Biofiltration process; Biological deodorization system; Adsorption process; Trapping schemes.