



## DI 02 Low-cost media for permeable reactive barriers to treat landfill – Leachate

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The availability and the cost are important criteria in selecting reactive materials for permeable reactive barriers (PRBs). In this study a laboratory scale column experiment was conducted to study the removal efficiencies of organic matter and nitrogenous compounds in PRBs with low-cost reactive materials such as coconut coir fibre (CCF), rice straw (RS), saw chips (SC) and rice husks (RH) in treating landfill-leachate. The column experimental set-up consisted of 4 columns. There were three experimental series. In first two series, each column was loaded with CCF, RS, RH and SC, respectively. Each reactive material was mixed with laterite soil so that soil to reactive material ratio became 4:1 on weight in series 1 and 2. The second series was conducted several days after the 1<sup>st</sup> series without unloading the columns. In 3<sup>rd</sup> series, each column was loaded with 'RH - SC', 'RH - RS', solo laterite soil and bentonite, respectively. In 'RH-SC' and 'RH-RS' combinations, the same mass was used from each medium. Except column with laterite soil, each medium in other three columns was mixed with laterite soil according to the same ratio as series 1 and 2. RS and SC reduced COD concentration to greater than 80 percent within two days of application in series 1. According to the mass balance of COD in series 2, RS removed the highest mass of COD throughout the series. The mass balance of COD in series 3 showed that the 'RH-RS' combination was better in removing COD than that of 'RH-SC' combination. The combinations of 'RH - RS' and 'RH - SC' performed extremely well compared with that of the solo laterite soil in removing biodegradable organic matter. The mass balance of Total-N in series 2 and 3 showed that SC and the 'RH-SC' combination gave the highest removal efficiencies, respectively.

**Keywords:** column tests, Leachate, nitrogenous compounds, organic materials, reactive media