



## Modified Spent Tea Leaves as Bioadsorbent for Methyl Orange Dye Removal

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### ABSTRACT

In this work, the removal of Methyl Orange (MO) from aqueous solution was studied using a new non-conventional and eco-friendly adsorbent, spent tea leaves (STL). Untreated and acid treated STL were used as bio-adsorbent for removal of MO using batch method. Effects of different STL dosages (1 – 4 g), pH solutions (2–11) and initial dye concentrations (10 – 60 mg/L) were investigated. Adsorption experiments conducted using acid treated STL resulted in higher MO removal efficiency ranging from 79 to 92% for 1-4 g of adsorbent dosage compared to the untreated ones which resulted in only 18 to 56% of removal for the similar amount of dosage. In addition, acidic condition favours the MO removal as compared to alkaline medium. Experimental data were analysed using the Langmuir and Freundlich models of adsorption and it was found that adsorption isotherm was best described by Freundlich model and pseudo-first order equation with high correlation coefficient. Results revealed that acid treated STL, being a waste, has the greater potential to be used as adsorbent for MO removal from aqueous solution.

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### INTRODUCTION

Textile dyeing and clothing is a major industry at present, globally and in Malaysia. Effluents from the textile industry are considered as one of the most problematic wastewaters and its removal has turned into a serious environmental problem. Those wastewaters are characterised by the presence of colour, high total organic carbon (TOC) levels, as well as chemical oxygen demand, mainly