Lignin removal from Aqueous Solution using Calcium Lactate: the effect of Polymers and Magnesium Hydroxide as a Flocculant aids

Abstract

Palm oil mill effluent (POME) which is mainly associated with lignin has becoming a major concern due to its highly coloured appearance. The main colourant, i.e. lignin particles are difficult to be degraded in oil palm conventional biological ponding system. Coagulation/flocculation could remove the lignin prior to biological treatment and is considered vital to minimize the recalcitrance nature of palm oil mill effluent particles. In this study, the coagulation/flocculation process was investigated to remove lignin particles from aqueous solution. A non-toxic and biodegradable chemical i.e. calcium lactate was utilized as a destabilizer for the removal of lignin with an addition of several flocculants aid i.e. anionic polyacrylamide (APAM), polydimethyldiallylammonium chloride (polyDADMAC) and magnesium hydroxide. The effect of coagulant and flocculant aids dosage was investigated. From this study, it was found that the optimum condition was at 0.7g/L of calcium lactate and 0.5-1.0mg/L of APAM with ~64% of lignin removal. At concentration of 4 mg/L, the removal of lignin for APAM and polyDADMAC is similar. This result shows that the calcium lactate has potential as a coagulant and the efficiency can be enhanced with an addition of polymeric flocculant aids.