在整合式厭氣/好氧生物處裡反應器內利用固定化菌體顆粒同時去除染整廢水的色度集COD研究

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摘 要

在厭氧狀態下許多細菌可將偶氮染料還原成芳香胺類化合物，而這些芳香胺類化合物於厭氣環境下是很難被生物所分分解的，但是卻可在好氧環境下將這些芳香胺類化合物分解成較無害的最終產物。因此，若要完全分解偶氮染料，連續厭氧-好氧處理系統似乎為一具吸引力與必然的選擇。 本實驗室之前已證實利用兩階段之厭氧-好氧生物處理系統來進行研究，以第一階段之脫色反應器 (厭氧流體化床反應器)於厭氧狀態下以脫色顆粒來還原偶氮染料形成芳香胺類化合物，再利用第二階段之去毒反應器以固定化污泥顆粒來好氧分解這些芳香胺類化合物，至目前，實驗結果顯示兩階段之厭氧-好氧生物處理程序結合固定化菌體顆粒系統對於同時去除染整廢水中之色度及COD具有相當的展潛力。在考量台灣土地取得不易以及為了使二階段生物處理系統更經濟化，擬將之前開發之兩階段處理單元結合成一個單一反應器，稱之為anaerobic-aerobic hybrid reactor (AnAHR) 。這個創新反應器設計不但可結省曝氣所花費的成本，更可以減少土地空間之使用。在本研究主要分為3個主要研究主題。 第一部份主要是AnAHR之設計與架設，並探討不同曝氣比、循環數與初始染料濃度對色度與COD去除效率之影響。第二部份主要是在最適操作條件下，探討多種染料廢水的脫色效率。第三部份主要是以實際染整廠廢水為對象進行脫色實驗，檢討固定化流體化床反應器系統實際應用的可行性。本研究的結果不僅可提供對於利用anaerobic-aerobic hybrid reactor以間歇曝氣方式操作使偶氮染料完全分解有完整的了解，為日後進行反應器實際操作及scale-up的主要參考依據。

關鍵詞 : 厭氧-好氧 ; 染整廢水 ; 色度 ; 固定化技術 ; 間歇曝氣

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