Coagulation efficacy of a tannin coagulant agent compared to metal salts for paint manufacturing wastewater treatment

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ABSTRACT

Paint manufacturing wastewaters (PMW) contain highly toxic and organic biorefractory compounds and have adverse effects on human health. Jar-test experiments are conducted in order to assess the efficiency of natural and synthetic coagulants on the treatment of PMW. For this purpose a tannin-based polymer (TBP), iron chloride (FeCl₃), and aluminum sulfate (Al₂(SO₄)₃) have been used. The results indicate that TBP is more effective than coagulant salts. Coagulation–flocculation involving TBP does not require any pH adjustment either on raw or on treated wastewater. TBP achieves more than 87% of COD and 99% of color removal and produces less volume of decanted sludge than metal salts. The ranking of the efficiency of coagulant agents is as follows: TBP > FeCl₃ > Al₂(SO₄)₃. TBP as a natural coagulant can be a potential substitute for synthetic products on paint manufacturing wastewater treatment.

Keywords: Coagulation–flocculation; Paint manufacturing wastewater; Tannin-based polymer