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## **Efficacy of slow-release system for improving the quality of water in streams affected by mining activities**

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Acid mine drainage (AMD) is considered as one of the most prevalent environmental problems worldwide and remediation of AMD-affected streams remains a major challenge due to the large affected areas, large volume of polluted water, poor accessibility, and lack of financial supports. Advanced oxidation processes (AOPs) have been widely investigated as potential remedial options for contaminated water bodies of variety of settings, such as groundwater and waste discharges. This study presents a novel cost-effective approach for utilizing AOPs on improving quality of AMD-affected streams. Slow-release cylinders and pellets were created using polymeric binder and reagent salts that release strong oxidant and alkalinity upon dissolution in water. Results of column tests demonstrated that release durations were over 29 days and up to 100% iron removal was achieved within 20 minutes. Field-scale slow-release forms were manufactured and applied to an AMD site in southeast Ohio, USA for a 29-day demonstration study. Narrow channels were constructed for installation of slow-release forms and characterization of quality and flow of mine seeps and AMD stream during low subsurface flow periods. Results of field investigations suggest that the slow-release forms can be used to rapidly remove metals from AMD, as well as improve water parameters such as pH and minimize ecological impacts of remediation within the system in cost-effective manner.