Applying knowledge to improve water quality
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Nitrogen and Phosphorus Removal by Shale from wastewater and its reuse

The wastewater from mine spoil, food industries, meat processing and animal waste facilities contain significant amount of nitrogen (N) and phosphorus (P). Presence of these excess nutrients in the wastewater and their release in to the water bodies without pretreatment causes serious distortions in the natural balance of the environment. Therefore, effective technologies need to be developed to remove N and P from wastewaters. This study focuses on the removal of P and N from wastewater using shale and the feasibility of using the nutrients adsorbed material as slow releasing fertilizers. Adsorption experiments were conducted by using shale (2mm and 2-4.7mm). Results indicated that 60 to 97 % adsorption of P occurred with 0 to 50 mg/L P concentration in solution. With increasing solution P concentration above 50 mg/L a decreasing P adsorption was found. A correlation (R^2=0.95±0.02) was observed between the phosphorus in solution concentration (0-1000 mg/L) and phosphorus adsorption onto shale. Maximum adsorption of N was approximately 225±10 mg of N per gram of the adsorbent, shale.

Author: G. B. Reddy
University Affliation: North Carolina Agricultural and Technical University
Co-Author(s): Johnsely S.Cyrus