

U.S. Department of Agriculture <b>Accomplishments Report AD-421</b> U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions			Date (Month, Day, Year)  01/08/2013		
1. Accession  0208164	Agency Identification No.  2. CSREES 3. LAB		5. Work Unit/Project No.  LAB93817		6. Status  Final Report
7. Title  Laboratory Testing, Chemistry, and Bioavailability of Nutrients in Soils and Soil Amendments					
12. Investigator Name(s) (Last Name and Initials)  Wang, J. J.; Gaston, L. A.; Henderson, R. E.; Stevens, J. C.					
20. Termination Date 06/30/2012			40. Period Covered (mo/da/year): 07/01/2006 TO 06/30/2012		
Outputs:  Total, the project generated 18 refereed research publications, 3 book chapters, and 18 presentations at national and international meetings during the project period. The significance and impact of the research project was discussed with peer researchers at the national and international meetings including the 11th International Conference on the Biogeochemistry of Trace Elements in Florence, Italy and the 3rd International Symposium on Soil Organic Matter in Leuven, Belgium. The research results were also disseminated in three articles through Louisiana Agriculture.					
Outcomes/Impacts:  The Soil Testing and Plant Analysis Laboratory (STPAL) conducted routine tests on soil, plant and water samples. Results were reported back to producers with formulated fertilizer and lime recommendations. Routine test samples were increased significantly in 2010-2012 due to the improvement in handling and outreach effort on samples from home consumers. During the project period, research evaluated methodology of soil phosphorous fractionation and biological oxygen demand (BOD). It was shown that commonly measured BOD at 5 days of incubation (BOD5) were best described by $BOD5 = 20.8 \ln(TOC) - 42.9$ . Several field studies determined nutrient availability in different soils. Significant residual interactions for the third year between liming and K fertilization on soybean growth in acidic soils such as Gigger silt loam. The regression analysis between post-harvest soil test data and corn yield also indicated that the critical level of Mehlich 3 P was around 35 ppm in these acid soils. Results on uptake efficiency helped producers develop fertilization programs for efficient production. An effort was made to evaluate the fate of antibiotic compounds and organic pollutants in manure-affected soils. The fate of tylosin, a commonly used antibiotic compound in poultry production, degraded the most at +50 mV during 20-day incubation. Furthermore, the potential of using bauxite residues in reducing the release of P, organic carbon (OC), Cu and Zn from manure-impacted soils to the environment was investigated. Various bauxite residue amendments reduced water-extractable P by 58-95%, Cu by 2-98%, and Zn by 10-90% in manure-impacted soils. Research was focused on the conversion of sugarcane and rice residues to biochar as a soil amendment. Biochars of crop residues were produced at different temperatures and characterized. Initial results showed that biochars exhibit differential elemental, molecular and surface characteristics. Treating soils with sugarcane biochar increased sorption of atrazine, a commonly used herbicide in sugarcane production. Overall, these results are import to the understanding of nutrient availability and environmental consequence of various amendment applications.					
Publications:  Jeong, C.Y., J.J. Wang, and S.K. Dodla. 2012. Effect of biochar amendment on tylosin adsorption/desorption and transport in two different soils. <i>J. Environ. Qual.</i> 41:1185-1192. doi:10.2134/jeq2011.0166.  Li, R., J.J. Wang, Z. Zhang, F. Shen, G. Zhang, R. Qing, X. Li., and R. Xiao. 2012. Nutrient transformations during composting of pig manure with bentonite. <i>Bioresource technology</i> 121:362-368.  Jia, C., R. Li., Z. Zhang, and J. Wang. 2011. The transformation of phosphorus forms during co-composting of sludge and wheat straw. In <i>Selected Proceeding of the Fifth International Conference on waste management and Technology (ICWMT5)</i> . 2011:462-466.					



Participants:

Jim Wang, (PI); Rodney Henderson, Dodla Syam, Changyoon Jeong, M. Ali, and S Mudi, LSU AgCenter.

Target Audiences:

Target audiences for this project include agricultural and environmental professionals.

Project Modifications:

Not relevant to this project.

Approved (Signature)	Title	Date
		