

PUERTO RICO WATER RESOURCES AND ENVIRONMENTAL
RESEARCH INSTITUTE

104B SECTION RESEARCH PROGRAM

3rd Quarterly Progress Report

Date of the report: December 2nd, 2005

For Quarter Ending: December, 2005

Project Title: 'Removal of Inorganic, Organic and Antimicrobials Contaminants from Aqueous Solutions by Waste Tire Crumb Rubber'

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Percentage of work completed in this period (%): 40%

Accumulative Percentage of work completed (%): 65%

Completion Date: February 28th, 2006

Project status: Schedule ___ Suspended X Delayed ___ Cancelled ___ Completed
Activities progress: (according to work schedule submitted with application)

Task #	Major Activity	Date started	% Completed	Estimated date of completion	Date Completed	Dependant on task(s)
01	Sorption tests of Xylene	April 1 st , 2005	100	June 30 th , 2005	June 30 th , 2005	
02	Sorption tests of Toluene	April 1 st , 2005	100	October 15th, 2005	November 15th, 2005	
03	Sorption tests of Etilbencene	April 1 st , 2005	100	October 15th, 2005	November 25th, 2005	
04	Sorption tests of Tetracycline at different pH's	April 1 st , 2005	50	February 20 th , 2006		

Summary of Progress on Project this Quarter: The progress can be summarized as follows

- New tests on the chemical stability of crumb rubber as a function of particle size and pHs were completed. Preliminary results suggested that crumb rubber will not pollute aqueous solutions with inorganics or organic species.
- Verification of the reproducibility of the sorption tests with Xylene
- Completion of the sorption tests with Toluene.
- Completion of sorption tests with Ethylbenzene.
- Continuation of sorption tests with Tetracycline at different pHs. Preliminary results suggest the sorption of tetracycline although there are still some problems related to the reproducibility of the results due to the high concentrations of tetracycline solutions.
- A new undergraduate student, from Civil Engineering will join the research group starting in January 2006.
- The first drafts on sorption of inorganics (F. Calisir, O. Perales) and organic solvents (L. Alamo, F. Roman) are being completed with more recent data.
- Presentation at the Senior-ACS Conference, November, 2005, La Parguera, Puerto Rico
- Presentation at the last AIDIS Conference, September 30th 2005, Isla Verde, Puerto Rico).
- The Interamerican Society of Sanitary Engineering and Environmental Sciences (AIDIS) awarded **the First Prize on Research** to the work: “Remoción de BTEX por Partículas de Goma Recicladas en Soluciones Acuosas”, presented by UPRM-PRWRERI last September 2005.
- Recently, the Waste Management Authority (ADS) awarded \$140,000 for the acquisition of major instrumental equipment. The grant is for instrumentation only. The instrumentation to be purchased will allow us to analyze concentration at the parts per billion (ppb) levels, as required for studies on mercury and arsenic (these two species are addressed in the present proposal as a complement to our studies on heavy metals).

Problems encountered and/or assistance need:

- Although the HPLC/GC-MS methods for tetracycline were standardized, it works only for highly concentrated solutions (above 50ppm).
- In order to be able to evaluate the sorption behavior at more dilute tetracycline concentrations (<10ppm) a direct measurement by GC-MS must be considered. The corresponding adaptations for these direct analyses are being attempted.

Certifications:

As the Principal Investigator, I certify that the information contained within this quarterly report accurately reflects the status of this project.



Dr Oscar Perales-Perez, PI
Associate Professor

December 2nd, 2005