

Food for the Twenty-First Century
Bioprocessing and Biosensing Center

Winter 2016 Seminar Series

PRESENTER: Ricardo Nogueira, M.S., Visiting Scholar
Agriculture Systems Management, Division of Food Systems and Bioengineering

TITLE: Co-digesting Beef Manure and Waste Materials, Experience in Brazil and US.

ABSTRACT:

Mr. Nogueira will make an introduction of the Brazil beef and sugar cane productions, and report his M.S. and Ph.D. research projects. During his M.S. degree, he evaluated potential and practicality of co-digesting beef manure with sugar cane. His current Ph.D. research involves mitigating cattle enteric methane emission by adding cottonseed in cow's diets, and evaluation of the manure biomethane potential. During his 8-month visit to Missouri, he setup nine laboratory-scale anaerobic digesters (AD), to evaluate effects of hydraulic retention time and co-digesting waste kitchen grease with beef manure. The digesters were made of 3.75-L glass jars, with working volume of 2.75 L, and were maintained at 40°C in incubators. Biogas produced was collected using 10-L Tedlar bags, and measured either daily or every two days for production rate calculation. During the first 45 days, a hydraulic retention time test was conducted to compare the 21, 17.5 and 14 days of retention time, and the corresponding volatile solids (VS) loading rates were measured. Biogas production rates were 1.93, 1.83 and 1.63 L/g-VS and VS reduction was 54.8%, 43.1%, 42.6% for the 21, 17.5 and 14 days retention time treatment, respectively. The 21 hydraulic retention time was performing similar to the commercial digester of 6-7 days retention time based on the measured VS differences before and after the commercial digester system. The 21 days hydraulic retention time was then selected to co-digest with 0%, 0.5%, 1.0%, 1.5% and 2.0% waste kitchen oil. Preliminary results of the biogas production with respect to co-digestion efficiency will be reported and discussed.

BIOGRAPHICAL:

Ricardo Nogueira has major in Animal Science and he did Master of Science in São Paulo State University in Agricultural Energy. He is pursuing a Ph.D. degree in Nutrition and Animal Production in University of São Paulo, Brazil. Currently he is a visiting scholar in the Air Quality and Manure Management laboratory under supervision of Dr. Teng Lim.

DATE • TIME • LOCATION:

Tuesday, January 26, 4:00 PM, 105 Agricultural Engineering Building

The Food for the 21st Century (F21C) program at the University of Missouri (MU) was established in the mid-1980's through state funding. The overall goal of the program is to help Missouri food producers and processors maintain their competitive edge in the global marketplace by conducting cutting-edge research in a number of food-related areas. The program involves faculty researchers from multiple colleges including College of Agriculture, Food and Natural Resources; College of Arts and Sciences; College of Engineering; School of Medicine; College of Human Environmental Sciences; and College of Veterinary Medicine. Based on the research emphases, the researchers are grouped into four Clusters: Plant Biotechnology; Animal Reproduction; Bioprocessing and Biosensing Center; and Human Nutrition.

Bioprocessing and Biosensing Center was formed in 1986. The Center currently consists of 27 faculty members, plus collaborators, support staff, and graduate students from six departments in the College of Agriculture, Food and Natural Resources and College of Engineering. These departments include Bioengineering; Food Science; Animal Sciences; Chemical Engineering; Electrical Engineering; and Mechanical and Aerospace Engineering. This seminar is one of the educational activities in the Bioprocessing and Biosensing Center.

Cluster Co-Leaders: Drs. Sheila Grant and Jinglu Tan

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F21C Seminar Web: <http://fsb.missouri.edu/seminars/>

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