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Catalytic pyrolysis for used tire wastes: An opportunity for environmental impact reduction in Bogota, Colombia

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Used tires are emerging as a serious environmental problem around the world, which is increasing due to vehicles industry demand. Although tires remain substantially intact for a long period of time, disposal lands are not enough for them and some of their components can break down and leach in to the environment. Catalytic pyrolysis is a promising method for waste treatment and energy production. In this research, we prepared a diagnostic study about used tires management in Bogota, Colombia. We also aimed to evaluate the liquid-fuel production yield of a fluidized reactor for catalytic pyrolysis. We explored the effect of zeolite-type catalysts, the feedstock, and temperature in this process. We used zeolites obtained from pozzolana and a zeolite type ZSM-5. The experiments were performed by feeding waste tire rubber (WTR) and a mix of biomass and CLU as feedstock. We identified several environmental impacts about inappropriate disposal of used tires in Fontibon, Bogota. High harmful gas emissions, pollution of land and water, effecting the landscape, and health problems were also identified. As a result, pyrolytic oil was obtained with similar properties to a derivate fuel obtained from petroleum. The process is carried out under a heating rate less than 10°/min and a constant flow of nitrogen, assuring bed fluidization and an oxidizing-free atmosphere. A maximum yield of 61%wt was achieved at a temperature of 500°C and using the pozzolana-type catalyst. The characterization of the liquid product was performed by distillation curve analysis and TGA. High degradation rates and low time of ignition were related with distillation products with low molecular weight and boiling point. The fuels obtained have promising use as carburant into a diesel engine, according to characterization performed. This is a huge opportunity to reduce the environmental impact that is generated from Colombian industries and consumers by the application of new recycle technology.

Biography

Juan S Chirivi-Salomon is a Chemical Engineer and Microbiologist, who has acquired expertise in basic Mycology throughout his careers. His work on entomopathogenic fungi, in collaboration with Dr. Tatiana Sanjuan, revealed two new species of *Cordyceps* with notorious potential in pharmaceutical and biofuel industries. In his Master of Science project, he has acquired huge knowledge about metabolomics of fungi, focusing his work in the industrial potential of fungal metabolites. He is researching on the effect of *Cordyceps* metabolites in the laccase production for lignocellulosic biomass treatment. In collaboration with Dr. Rocio Sierra, he is exploring new opportunities in the application of fungi and their metabolites in bioenergy industry. His work hope is to link different academic institutions and social foundations.

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