



# Academic<sup>th</sup>

## INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“CLEANER PRODUCTION TOWARDS A SUSTAINABLE TRANSITION”

### **Renewable and Sustainable Clean Energy Technology Management of Biomass Waste for Fuel and Food**

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#### **Summary**

Sustainable Development using waste disposal problems should reach acceptable limit of technology impact within the period of assured economic coverage. then also the obtained results of the project developed need to be more relevant that can be used in real scale evaluations bioeconomy from waste. Energy demand and the price for energy is increasing day by day everywhere as global economic problems. Renewable energy from waste is one of the alternative source which can be use parallel to conventional energy resources. Agro industrial wastes pose a major concern today due to the increase of production with time and thus needs ecological solution using principle of closed loop via reuse, recycle and renewal of the material and nutrient flows. This paper deals with tools and methods used to make the small process system design for power and gas production, and also the process optimization for waste minimization using biodrying, biomethanation and bioscrubbing integrated to autothermal gasification process developments. The overall objective of the project is to make possible an internationally oriented collaborative Brazil and India research competency in biomass waste based zero emission biofuel technology with co-products valorization. The project aim is also to study both technological feasibility and economic prospects for new zero emission waste to power. Also the power to biomethane gas was focused with the help of networking and big data of integrated digital incubator of process technology researchers viable projects design development using google online real time team work using google online tools. The system design use Bio thermal process, hydrogen and methane biofuels and internal combustion (IC) engine. For this problem an integrated system, industrial and ecological using the clean Small Integrated Process Systems (SIPS) was used. The Zero Waste,, cleaner product design and green chemistry concept was also applied to the process design using the three basic principles. The first principle is to use all components of the biological organic materials of the wastes. The second principle is to obtain more co-products from the wastes. The third principle is to close the loop via reuse, recycle and renewal of the material and nutrient flows made possible using google spreadsheet and software superpro designer v.4.9. New synergetic concepts of integrated closed loop innovative bio thermal process system have been developed in this work for the integration of renewable power methane plants in biogas plants as well as bio electricity power. Pyrolysis system integrated with fuel cell need more investment compared to internal exhaust engine heat recovery systems. as well as bioelectricity, biogas, feed for animal from micro algae. Thus this integrated biosystem developed will improve the bio economy local development based on the aquatic plants to reduce significantly carbon using the solar energy available in tropical country.

**Keywords:** Bioenergy, biogas, biosystem, Bioelectricity, biohydrogen.