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Waste to methanol conversion: The bio-methanol circular economy

With the increasing of population, waste management is becoming more and more a serious problem. The conversion of municipal solid wastes into a valuable and large consumer product could be a successful strategy. On this scenario the waste to bio-methanol route may be a valid alternative to a WtE concept, providing not only an effective waste disposal system but also contributing to the reduction of the greenhouse gases (GHG) emission. The proposed technology infact may account for a reduction of GHG emission up to 54% if compared to waste incinerator and conventional methanol production systems. Main steps involved in this conversion process include high temperature RDF gasification, syngas purification treatment and conditioning up to methanol synthesis. The strength of the proposed technology is enclosed in the gasification method itself, where the adopted operating conditions avoid any production of toxic substances. Moreover the produced syngas is synthesized into methanol molecule and any discharge to the chimney is avoided. When no other external sources are involved, about 50% of the carbon incoming with waste is fixed into methanol product with a synthesis conversion ratio equal to 2.4 ton of RDF per Ton of methanol. The resulted purified biofuel-grade methanol could impact on the market with about 450 €/ton price by exploiting the double counting directive, making it more catching in a bio-fuel economic view. The techno-economic analysis showed that the proposed technology is a valuable and sustainable example of a circular economy, approaching the target of a zero-emission plant.

Biography

Annarita Salladini is a Project Manager currently working for Processi Innovativi, an engineering company owned by KT-Kinetics Technology (Rome, Italy). She received MSc in Chemical Engineering and a PhD, both from the University of L'Aquila (Italy). She joined Processi Innovativi in 2009 and since then she was involved in R&D project and engineering project focused on hydrogen production, renewable energy exploitation, and waste conversion processes. Since 2011 she is Tutor Assistant at the University Campus Biomedico of Rome in the field of Analysis and Simulation of Industrial Chemical Processes. She co-authored several scientific papers in refereed journals and chapters in international books.

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