

15th IconSWM-CE & IPLA GF 2025



Zero Waste and Circular Economy 2025

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Prof. Narpinder Singh,

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Dr. Rachn Karmakar, Dr Sutripta Sarkar,

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International Society of Waste Management, Air and Water (ISWMAW)
International Partnership for Expanding Waste Management Services of Local Authorities
IPLA (A SDG Partnership)**

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Energy Potential of Briquettes Produced with Different Biomass and Cow Dung Mixture

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ABSTRACT: Indian water bodies are plagued with water hyacinth due to its aggressive and invasive growing characteristics; destroying ecological balance of the water bodies. The eradication of water hyacinth by physical means has not been effective, but when considered as a biomass source, the removal process can become sustainable with economic benefits. The plant has rapid growing characteristics and contains high level of cellulose, hemicellulose and lignin indicating reasonable potential for energy production when processed properly. Thus, the study carries out an experimental analysis of briquettes, prepared from dried water hyacinth, cow dung as a binder with different agro waste comprising of rice husk, wheat husk and rice straw. The five components were varied in different percentages by mass. The samples were prepared by developing a homogeneous mixture of different ratios and analysis were carried out to evaluate the calorific value and residence time of the briquettes. The study revealed high calorific value and high residence time of the briquettes with high economical potential and biomass utilization enhancing circular economy approach. The optimum composition as revealed from the experimental results, if commercialized with a proper economy of scale, can lead to utilization of biomass mainly the water hyacinth, which was otherwise remained unutilized. The briquettes produced with optimum composition showed the potential of substituting the traditional fuels in captive power plant, cement plant and bricks manufacturing plant as a source of alternative fuel. Although numerous literature exists but study specifically dealing with water hyacinth, cow dung, rice husk, wheat husk and rice straw mixture briquettes was not reported. The study thus reveals the sustainability of the briquettes manufacturing with the biomass enabling circular economy.

Keywords: Biomass, Water hyacinth, Briquettes, Sustainability.

Co-processing of Hazardous Industrial Waste in Cement Kiln- Findings from Multiple Experimental Studies

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ABSTRACT: Disposal of hazardous waste is a major challenge for different industry across the globe. Traditionally, hazardous wastes are disposed of in a dedicated expensive thermal treatment plant. India annually generates 7.2 million tonnes of hazardous waste, requiring economical solutions. The cement industry due to its inherent characteristics of production process provides an impeccable solution to the hazardous waste disposal problem. India is the second largest producer of cement with annual installed capacity of more than 600 million tonnes; with this enormous capacity cement plants more specifically cement kiln can provide an effective solution. Co-processing of the hazardous waste can be done with added advantage of resource recovery from the hazardous waste. Thus, co-processing of Purified terephthalic acid (PTA) waste mix and Acid Tar Sludge (ATS) in cement kiln as an alternative method of disposal and resource recovery was analysed based on a five-day trial in two different cement plants. During the trial, feed rate of PTA Waste Mix and ATS was maintained at 22 t/day and 9.6 t/day respectively with an average coal feed rate of 1200 t/day and 252 t/day respectively. No impact on emission was noticed; all the parameters were within the normal emission range during the co-processing trials. The trials at the two different cement kiln also revealed no process disruption. The analysis of the final product showed zero impact as the quality of clinker and cement were as per the standards and no deviation was reported. Thus, co-processing of hazardous waste like PTA Waste mix and ATS in cement plant can be an effective way to address the hazardous waste disposal problem in developing countries.

Keywords: Hazardous waste, industry, Co-processing, Acid Tar Sludge (ATS)