

## **Optimizing hydrogen production from the Landfill Leachate by electro-coagulation technique**

### **ABSTRACT**

The loss and impact of non-renewable fossil energy on global warming concerns are prompting to intensive research to find viable, less emissions-oriented alternative energies. The present work aims to study the potential of hydrogen gas production (for renewable energy) by electrocoagulation process from landfill leachate. The Design-Expert software for response surface methodology (RSM) was used to investigate the process variables in the hydrogen production system. The effects of three independent variables; namely pH (4-8) and voltage (3-9 V), using different types of electrodes (Al, Fe, and Ni) were studied. At the optimal condition of voltage 9V and initial pH 6 at 20 minutes, the Al electrode recorded an upturn maximum H<sub>2</sub> yield of 697 ppm, while 554 and 551 ppm were obtained with Ni and Fe electrode, respectively. Moreover, the coefficient of determination ( $R^2$ ) showed a good relationship between actual and expected results.

**Keyword:** Optimization; Electro-Coagulation; Hydrogen gas; Landfill leachate; Response surface methodology (RSM)