ABSTRACT

Hydrogen is one of the most abundant elements and can be easily obtained through various methods, including electrolysis. Electrolysis is a technique used to decompose water molecules (H_2O) into hydrogen and oxygen with the aid of an electrolyte, which enhances the activation of the separation process. Hydrogen possesses a high octane rating of 130, enabling it to generate significant energy output. This study aims to investigate the influence of electrode plates on flow rate, torque (Nm), and power (Hp) through an experimental approach. The HHO generator utilized in this research is of the wet cell type, where all electrode plates are submerged in the electrolyte solution. Sodium hydroxide (NaOH) was added in a quantity of 100 grams to enhance the electrolysis process. The study examined three variations: a standard system (without an HHO generator), SS304, and SS316, under controlled current conditions of 2A, 3A, and 4A.The results indicate that SS304 outperforms SS316, with a 1% higher efficiency at 2A and 3% at 3A. Torque (Nm) testing demonstrated that SS304 exhibited superior performance at 4A, with an average increase of 10.78% compared to the standard system. Additionally, the highest power (Hp) improvement was observed in SS304, showing a 17.49% increase over the standard configuration. In the third test, conducted at 3A, SS304 demonstrated a 10.27% increase in power compared to the standard system. Furthermore, the best emission reduction results were recorded in SS316 at 2A, showing the most significant decrease in hydrocarbon (HC) emissions. These findings highlight the potential of SS304 in enhancing engine performance while SS316 contributes to improved emission reductions.

Keywords: HHO Generator, HHO Flow Rate, Vehicle Performance, Vehicle Emissions