

ABSTRACT

Trend of using CNG as vehicular fuel has been rising all over the world and is considered as a clean fuel to minimize the urban air pollution. Pakistan has highest number of CNG vehicles in the world. It is important to investigate any improvement in the environmental conditions and to conduct a comparison of different vehicles for the decrease in their emission. Pollution load of 15 different vehicles including bus, motor cycle, car, wagon depending on different fuels and stroke has been studied. Five parameters CO, SO₂, Smoke Opacity, NO and hydrocarbons of vehicular emissions were investigated. A diesel bus is responsible of emitting 5.45 times more SO₂, 1.82 times more NO, 20 times less CO, 3.2 times more smoke opacity and 14 times more hydrocarbons than a CNG bus respectively, in the air. Overall a diesel bus is 4.9 times more polluted than CNG bus. NO emissions of CNG rickshaw are 1.4 times higher than 4 stroke petrol rickshaw, while NO emissions are almost nil for a 2-stroke LPG rickshaw. A 2-stroke rickshaw is responsible for 4.7 times and 1.6 times higher smoke opacity, 2.2 and 1.83 times higher SO₂, 18.6 and 4.4 times more hydrocarbon than 4 stroke CNG and petrol rickshaws respectively. Overall CNG rickshaw is 5.4 and 1.8 times less polluted than petrol and LPG rickshaw respectively. CNG wagon emits 33 and 10 times less hydrocarbons, 1.67 times less and 1.09 times more smoke opacity, 5 and 1.22 times less SO₂, 16 times more and 1.85 less CO, 1.23 and 1.3 times less NO than diesel and petrol wagons respectively. Overall diesel wagons are 4.4 and 1.66 times more polluted than CNG and petrol wagons respectively. Two stroke motorcycle emits 4.1 times more hydrocarbon, 1.75 times more smoke opacity, 2.14 times more SO₂, 2.9 times more CO and 1.3 times more NO than a 4 stroke motor cycle respectively. In this way 2-stroke motorcycle is found to be 2.45 times more polluted than 4-stroke motorcycle. CNG car is responsible for 1.44 and 50 times less hydrocarbons, 1.2 and 5 times less smoke opacity, 1.24 and 5 times less SO₂, 1.13 less and 16 times more CO, 3.46 times more and 2.8 times less NO than petrol and diesel car respectively. Overall CNG car is accountable for 7.7 times less pollution than diesel car and 1.8 times less than petrol car respectively. The most polluted vehicles found are diesel bus and two stroke LPG rickshaw. Diesel vehicles are responsible for high hydrocarbons, smoke opacity, SO₂ and NO in the air. CNG vehicles minimizes non methane hydrocarbons, smoke opacity and SO₂ to a great extent, but enhances NO and CO in the exhaust emissions. Pollution load for petrol vehicles is little bit higher than CNG vehicles. LPG two stroke rickshaws are responsible for high hydrocarbons, smoke opacity, SO₂ and CO emissions. Overall CNG vehicles are much environmental friendly vehicles, particularly in minimizing Smoke, SO₂ and non methane hydrocarbons in the ambient air.