

Abstract

The energy demand in Pakistan is mostly provided from conventional energy sources. The use of non renewable energy sources outcomes substantial social and environmental cost, hence attention is being diverted towards new and renewable sources. This study was conducted to assess and compare the environmental impacts of bagasse and furnace oil in sugar industry in the Punjab. A sample of 200 persons from the study area was randomly surveyed with the help of semi structured questionnaire to collect information about the social-economic and health impacts of sugar industry. Emission levels of CO, SO_x, NO_x and PM were measured from five different sugar mills by using multiple Gas Analyzers PG-250, Eurotron Greenline 8000 and PM Sampling kit. All the measurements in the experimental test were made under the normal working conditions by using the furnace oil and bagasse as fuel.

47% of the people from the study area have unpleasant feelings while about 60% have direct or indirect benefits due to sugar mills. 41% people were of the view that sugar industry caused air and water pollution and majority (40%) said the respiratory problems. 77% people observed the ash during the working of sugar industry. Average CO levels were 3192.6 mg/m³ & 1180.6 mg/m³ for bagasse & furnace oil respectively. The average value of NO_x for bagasse fuel was 156 mg/m³ while average value of NO_x for furnace oil was 810 mg/m³. The average value of SO_x for bagasse was only 165 mg/m³ as compared to average SO_x value of furnace oil was 2056 mg/m³. The average PM value of all the sugar mills for bagasse fuel was 1661 mg/m³ that are higher than the permissible limit (NEQS of 500) mg/m³) whereas the average PM value of sugar mills was 596 mg/m³. The CO and PM levels were 2.70 and 2.78 times higher respectively in bagass than furnace Oil emissions. While the levels of NO_x and SO_x were 5.19 and 12.40 times higher respectively in furnace oil emissions than bagass emissions.

Results of the study showed that environmental impacts of bagasse and furnace oil has resulted the health problems and has also affected the flora and fauna of study area. Comparatively the environmental impacts of bagasse are low as compared to furnace oil when used as fuel in boilers. Advanced and efficient technologies usage is needed to control problem of environmental pollution.