

## Chemistry and Sources of Solid Biofuel Derived Ambient Aerosols during Cooking and Non-Cooking Hours in Rural Area of Khairatpur, North-Central India

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**Abstract :** Air pollutants emitted from solid biofuels during cooking are the major contributors to poor air quality, respiratory problems, and radiative forcing, etc. in rural areas of most of developing countries. The present study reports the chemical characteristics and sources of ambient aerosols and trace gases during cooking and non-cooking hours emitted during biofuel combustion in a village in North-Central India. Fine aerosol samples along with gaseous species (Sox, NO<sub>x</sub>, and NH<sub>3</sub>) were collected during September 2010-March 2011 at Khairatpur village (KPV) which is located in the Uttar Pradesh state in North-Central India. Results indicated that most of the major ions in aerosols and Sox, NO<sub>x</sub>, and NH<sub>3</sub> gases were found to be higher during cooking hours as compared to non-cooking hours suggesting that solid biofuel combustion is an important source of air pollution. Results of Principal Component Analysis (PCA) revealed that combustion of solid biofuel, vehicular emissions, and brick kilns were the major sources of fine aerosols and trace gases in the village. A health survey was conducted to find out the relation between users of biofuels and their health effects and the results revealed that most of the women in the village were suffering from diseases associated with biofuel combustion during cooking.

**Keywords :** ambient aerosols, biofuel combustion, cooking, health survey, rural area

**Conference Title :** ICACPNA 2018 : International Conference on Atmospheric Chemistry, Physics, Nucleation and Aerosols

**Conference Location :** Sydney, Australia

**Conference Dates :** January 29-30, 2018