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Correlation study between vehicular load and NO_2 concentration of Ajmer (Raj.)

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Abstract
Clean air is the main concern of today's life and government/other social agencies in urban cities of India working on it. Increase in industries, vehicles on the road and urbanization are few factors which directly affect the air quality. Present study is a piece of work to determine the possible correlation between vehicular load and NO_2 concentration of the Ajmer city. Standard method was followed for the determination of NO_2 in the present study. Four study area i.e., commercial, residential, industrial and sensitive were selected. Correlation was analyzed using MS–excel. R^2 value of this relation showed as commercial area (R^2 – 0.571) residential area (R^2 – 504), industrial area (R^2 –0.350) and sensitive area (R^2 –0.372). Results of present study indicate positive correlation was observed between NO_2 concentration and vehicular load. Trends of present results also indicate that commercial and residential area showed maximum correlation while sensitive area showed minimum correlation.

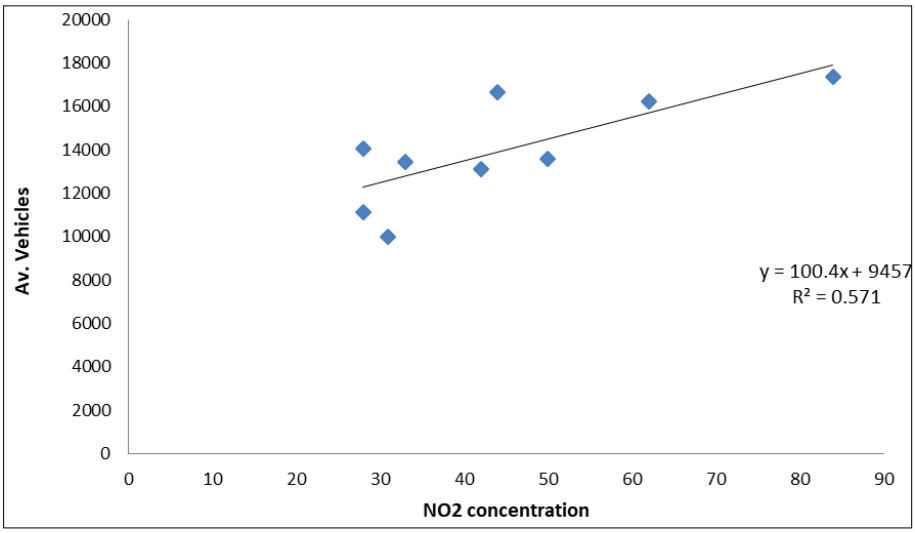
Keywords: correlation, NO_2, vehicular load

Introduction
Air pollution simply means the presence of particles or substance in the air which are harmful for the human and other living organism of the earth. Air pollution considered as an immense and global issue; it is not just for people living in smog-choked cities: through such things as global warming and damage to the ozone layer, it has the potential to affect us all. In recent past the quality of air has become more important in the urban population (Al-Jeelani, 2013) [1].
The major reason of air pollution in developing countries like India is the increase in motor vehicles whether it is number of engines, buses, aircraft, scooters etc. The smoke coming out of these vehicles is continuously getting into the atmosphere, thereby polluting the atmosphere. Discharge of particulate matters from automobiles, consists of nitric oxide and NO_2 (where termed as NOx), carbon monoxide (CO), organic composites and even lead. The stages of the air pollutants are quickly progressing in both the urban and rural locations in most of the cosmopolitans. There are several reasons of outdoor and indoor air pollution such as urban areas vehicles, industries and power plants, usage of biomass as fuel (Watson and Chow, 2015) [2].
In past few decades it was observed that the ambient air quality of India has progressively deteriorated. This may be due to explosive urbanization, unauthorized industrial development, lack of education, lack of awareness, motor vehicles use and poor infrastructure facilities (Shrinivas and Purushotham, 2013). Keeping above views in mind present study was conducted to study correlation between vehicles and NO_2 concentration of four study area of the Ajmer city.

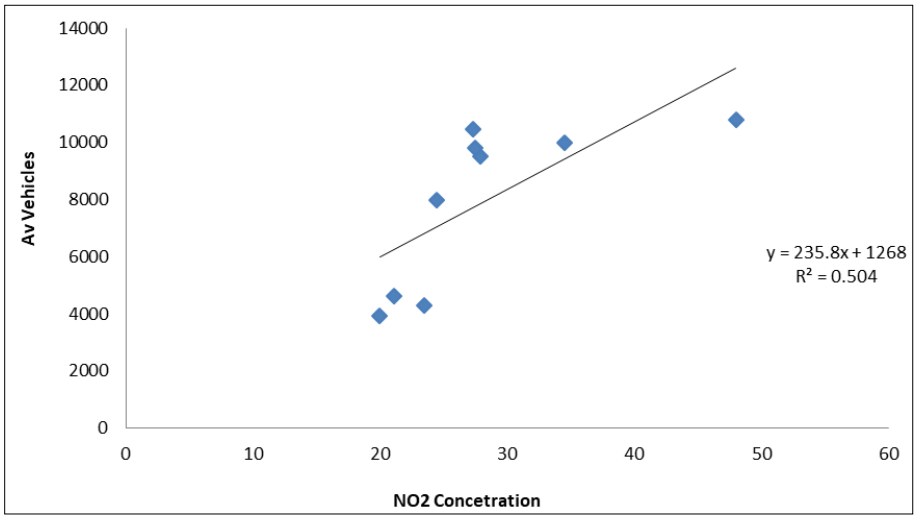
Materials and Methods
For the present study four areas i.e., commercial, residential, industrial and sensitive were selected for the air samples collection. After the collection of air samples NO_2 was determined using standard method (Jacob & Hoehheiser Method/ Blacker and Brief, 1972). MS–excel software was used for the correlation study.

Results and Discussion
For the determination of possible correlation between NO_2 and vehicular load present study was conducted and results are showed in the Graphs. Graph–1 represents the correlation (positive) of NO_2 concentration with vehicles at commercial area. Similarly Graph–2 shows the correlation at residential area of Ajmer city. Yadav *et al.*, (2012) [3] conducted similar type of study to assess the ambient air quality status in urban residential area of Jhansi city and rural residential area. They reported that SO_2 and NOx levels in urban residential areas and rural residential areas remain under prescribed limits of CPCB, New Delhi. Various researchers also agreed with this agreement that vehicles increase the pollution load particularly SOx and NOx (Joshi *et al.*, 2006; Chauhan and Joshi, 2010) [6, 5]. Graph–3 and 4 show the corrleation between NO_2 and vehicles at industrial and senstive area

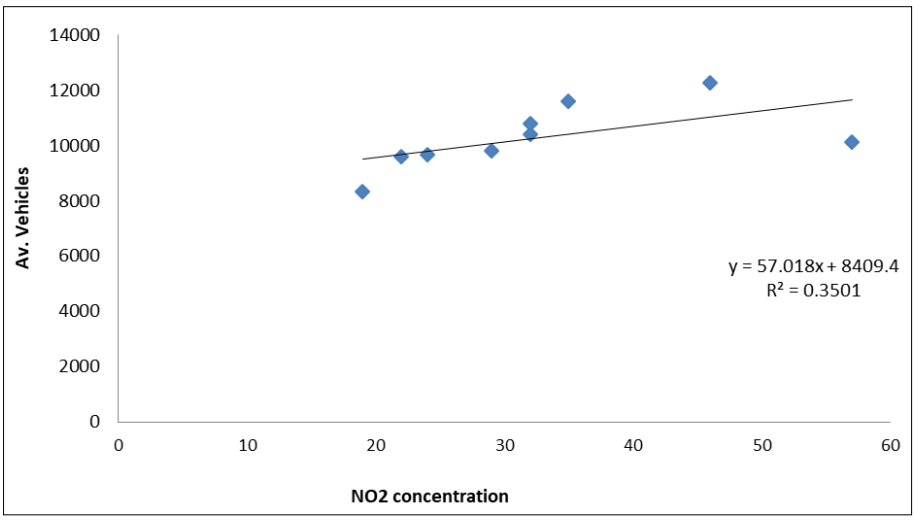
respectively. According to Shinde and Karjinni (2015) [6], explosive economy, increase in wealth of individuals, switch to public to private transport, the government's encouraging policies like, open car market, easy loan schemes, etc. are mainly responsible for vehicles load on the road in Indian cities and Ajmer is not exception of this. Present study reveals that as the vehicles increase the NO_2 concentration also increase and this is supported by various researchers.



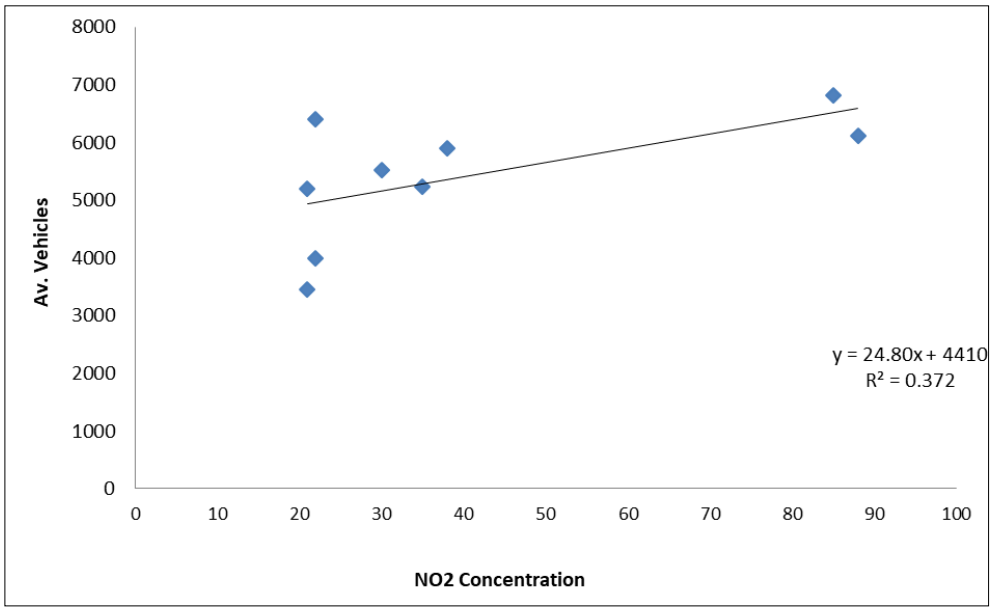
Graph 1: Correlation between NO2 and Av. Vehicles at commercial area



Graph 2: Correlation between NO2 and Av. Vehicles at residential area



Graph 3: Correlation between NO2 and Av. Vehicles at Industrial area



Graph 4: Correlation between NO2 and Av. Vehicles at Sensitive area

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