

# Quality of Agricultural Soil in the Vicinity of Brick Kilns at Faridabad

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**Abstract**—Brick kilns are a cause of concern for agricultural soil as it reduces the nutrient availability and causes contamination of heavy metals. In our study, the macro nutrients N, P and K of soil near the brick kilns of Faridabad region were determined. Soil samples at the depth of 0-15cm were taken from 3 brick kiln sites (Bhuapur, Nacholi and Bhopani) and 1 control site in every 3 month (March, June, September and December) for one year. The range of nitrogen, phosphorous and potassium content of all the 3 brick kiln soil samples are 0.0042 - 00.58%, 11.2 - 15.8ppm, 36.2 - 52.4ppm respectively which was found to be lower than the control site. The reduced availability of nutrients due to brick kiln pollution adversely affects the growth and yield of crops.

## 1. INTRODUCTION

Brick kiln is one of the booming small scale industries in India [6]. India is a developing country with increasing population and the demand of bricks is high due to urbanization. The growth of brick kiln industries will increase the economy of our country but at the cost of our environment. The major problem of these brick kiln is that it degrades the soil quality [10] and also releases harmful air pollutants [9]. Mostly, the agricultural soils are used for making the bricks [7]. Various studies have been conducted for the comparison of burnt soil and unburnt soil and it has been found that the burnt soil losses its nutrient value and also gets contaminated with heavy metals [4]. Due to which the land around brick kiln area becomes unsuitable for agriculture purpose.

Brick kilns also releases harmful pollutants in the air such as particulate matter, CO, NO<sub>x</sub>, SO<sub>x</sub> [1], heavy metals [8], fly ash etc due to the incomplete combustion of the fuels. These pollutants finally settle down in the ground and contaminate the top soil. The top soil is the most fertile soil but due to contamination it hampers the growth of vegetation.

N, P and K are the macronutrients which is required for the normal growth of crops. These nutrients are present in different forms in soil. Available N, P and K are the only form which plants uptake through their roots. Therefore, in our study we have analyzed the available N, P and K in the soil.

## 2. STUDY AREA

Faridabad is one of the industrialized cities of Haryana and also lies in National Capital Territory of Delhi. Three sites Bhuapur, Nacholi and Bhopani around the brick kiln within 250m have been selected for the sampling of soil. The control site is taken where there is no brick kiln and has low pollution.

## 3. METHODOLOGY

Preliminary study was conducted in the villages of Faridabad. The soil samples were collected from the depth of 0-15cm in zipper polythene bags. It was air dried and sieved to obtain fine soil particles for the analysis. Available nitrogen was done by Kjeldahl Method, available phosphorous by Brays Method and available potassium by Flame Photometer.

## 4. RESULT

Total 48 soil samples from four sites at consecutive time interval of three months for one year have been analyzed. Three macro nutrients nitrogen, phosphorous and potassium of soil samples have been determined.

### 4.1 Nitrogen

The range of nitrogen content of all the 3 brick kiln soil samples is 0.0042 - 00.58% while in the control site the range was found to be 0.0084-0.0095%.

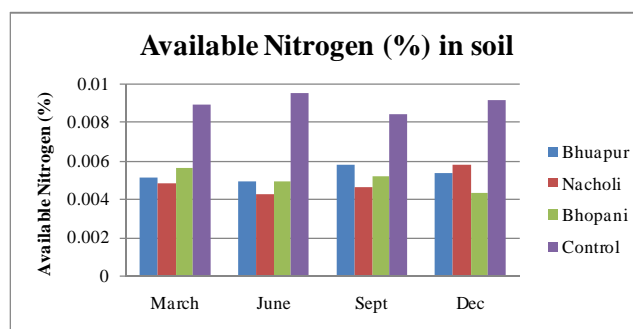


Figure 1: Available Nitrogen in soil

The average reduction of nitrogen in brick kiln soils as compared to control site is 70.6%, 85% and 80.6% for Bhuapur, Nacholi and Bhopani respectively.

#### 4.2 Phosphorous

The range of phosphorous content of all the 3 brick kiln soil samples is 11.2 - 15.8ppm while in the control site the range was found to be 29.4 - 31.5ppm. The average reduction of phosphorous in brick kiln soils as compared to control site is 110%, 151.8% and 127.3% for Bhuapur, Nacholi and Bhopani respectively. The available phosphorous of brick kiln soil is in the low category while in the control site it falls in the medium category.

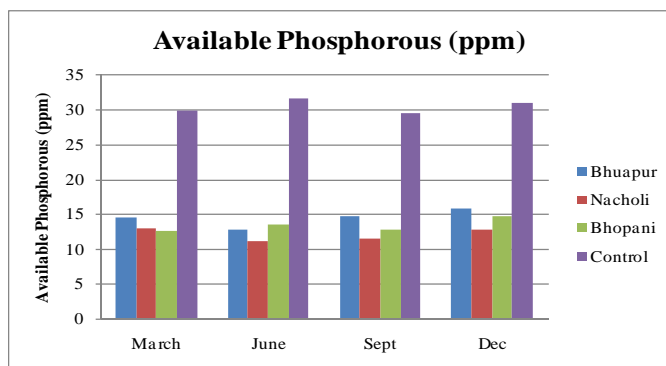


Figure 2: Available Phosphorous in soil

#### 4.3 Potassium

The range of potassium content of all the 3 brick kiln soil samples is 36.2 – 52.4ppm while in the control site the range was found to be 88.4 – 93.2ppm. The average reduction of potassium in brick kiln soils as compared to control site is 86.6%, 131.2% and 103.8% for Bhuapur, Nacholi and Bhopani respectively. The available potassium of brick kiln soil is in the low category while in the control site it falls in the medium category.

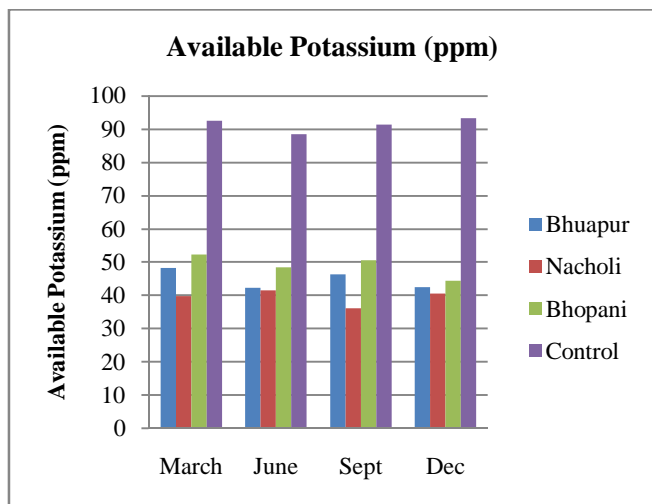


Figure 2: Available Potassium in soil

## 5. DISCUSSION

There has been loss in nutrients due to burning of soil for manufacturing of bricks. Degradation of soil quality near brick kiln has been reported by many researchers [2, 5]. The physiochemical properties of the soil around brick kiln get altered due to damaging of the nutrients present in the topsoil [3].

## 6. CONCLUSION

Brick kilns seem to have adverse affect on soil fertility. The maximum nutrient loss was observed in Nacholi followed by Bhopani and Bhuapur. The average reduction in nutrient shows that the crops grown in those areas are nutrient deficit and may have low yield.

## 7. ACKNOWLEDGEMENTS

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