

THESIS

**MOBILITY OF POLLUTANTS TO GROUNDWATER AT VARIOUS  
DISPOSAL SITES IN LAHORE**

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## **ABSTRACT**

# **MOBILITY OF POLLUTANTS TO GROUNDWATER AT VARIOUS DISPOSAL SITES IN LAHORE**

Water pollution is one of the major problem of Pakistan because it directly affects the health of human beings, land and crops. Lahore is the second largest city as well as second biggest commercial center of Pakistan. This city generates 2600 tones of garbage annually on the average and out of this a major portion remains uncollected on the streets and roads of the city. This causes environmental problems like air, land and water pollution at the site and all around. There is hence a need to provide guidelines to the authorities for the safe disposal of the solid waste.

For this purpose seven sites were selected where garbage is being thrown by municipal authorities namely Mahmood Booti, Baghatpura, Amin Park, Saggian Bridge, Sheikhpura Road, Babu Sabu and Harbenspura. In all one hundred and forty soil and thirty eight water samples were collected from and around these sites.

Soil analysis from these samples included particle size, moisture contents, saturated hydraulic conductivity, bulk density, various soil and water quality parameters like pH value, electrical conductivity, calcium plus magnesium, sodium, potassium, carbonates, bicarbonates, chlorides, sulphate and heavy metals (zinc, copper, manganese, iron, lead and chromium). Pollutant transport experiment was carried out on these

samples using tracer monitoring techniques. The results from these experiments were compared using Miscible Displacement Computer Model called MISCIB.

The results showed that the soil texture at all the waste disposal sites varies from sandy loam to silt loam. It was also observed that soil moisture contents are very much favorable for mobility of pollutants through vadose zone and finally towards groundwater. It was found that bulk density is low, hydraulic conductivity is high, retardation factor is low and breakthrough time is very short, so contaminants transport to groundwater are very quick.

The results of water analysis showed that groundwater is polluted with lead that has reached to groundwater which is considered toxic to health.

From this study it was concluded that groundwater quality at solid waste disposal sites in Lahore is badly affected and may result serious consequences for the people residing at or around these sites and using shallow groundwater for domestic needs. Finally from our analysis these sites cannot be used as such for solid waste disposal purposes due to soil texture (sandy loam to silt loam), low bulk density, high hydraulic conductivity, low retardation factor and short breakthrough time.

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