J. Sci. & Technol. Agric. & Natur. Resour., Water and Soil Sci., Vol. 19, No. 72, Summer 2015, Isf. Univ. Technol., Isf., Iran.

Decreasing Water Repellency in a Petroleum-contaminated Soil Using Zeolite

M. Farzadian, S. Hojati*, Gh. A. Sayyad and N. Enayatizamir[1]

(Received: June 22-2014 ; Accepted : Feb. 10-2015)

Abstract

One of the major problems associated with petroleum-contaminated soils is water repellency, especially in arid regions of the world. Hence, a variety of methods such as clay addition has been proposed to improve the hydrophobicity of soils. This research was conducted to evaluate the influence of zeolite application on water repellency of an oil-contaminated soil from Khuzestan Province under various treatments including initial soil moisture content (0, 10, 20, and 30 weight %), the amount of applied zeolite (2, 4 and 8 weight %), size (25-53 and <2 μm), and exchangeable cation (Sodium and Calcium). The hydrophobicity of soil sample was determined using Water Drop Penetration Time (WDPT) method. The results showed that by increasing the amount of applied mineral WDPT decreased, where the application of 2 percent of zeolite led to the reduction of WDPT by about 27 percent less than the control. The results also indicated that soils treated with sodium-saturated zeolite had less WDPT than the calcium-treated samples, where the average of WDPT in sodium and calcium treatments decreased by 23% and 5% compared with the control, respectively. The initial moisture content of 30 percent showed the best performance with the decreasing WDPT of about 67 percent. Furthermore, the effect of mineral particle sizes showed a meaningless reduction in WDPT.

Keywords: Hydrophobicity, Oil pollution, Zeolite, Size, Exchangeable Cation, Moisture.

1. Dept. of Soil Sci., College of Agric., Shahid Chamran Univ., Ahvaz. Iran.
*: Corresponding Author, Email: s.hojati@scu.ac.ir

[DOR: 20.1001.1.24763594.1394.19.72.6.6]
[DOI: 10.18869/acadpub.jstnar.19.72.6]