STUDIES ON GAS DIFFUSION IN COMPACTED SOILS

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Abstract
For modeling gas transport in soils and other porous media is necessary to know the diffusion coefficient. Gas diffusion in soil is a dominant process when convective transport is minimal. Gas molecules from soil are constantly moving as the kinetic theory of gases. Soil compaction has a major impact on gas transport characteristics. Over the years many models have been developed for determining the gas diffusion coefficient in soil, defined as the ratio of gas diffusion in soil (D) and the gas in the air (D0). Millington and Quirk (1960) and Moldrup (1999) determined the variation of diffusion coefficient for different soil types, based on Penmann's numerical and empirical models(1940). Diffusion models tend to perform better in some soils than in others. Knowledge of the diffusion coefficient is essential for developing accurate predictive models for gas transport in porous media and to improve our understanding of the basic processes involved in transport. Gas diffusion measurements on different samples of different sizes is an important goal in research diffusion. In this context, based on experimental research and extensive bibliographical studies, the authors determined the relationship between the soil suction curve and moisture. Suction curve was used to estimate the permeability of which is subsequently used in modeling the behavior of soil. Nowadays, significant contributions were made by researchers in determining and measuring suction curve. However, almost all measurement models of suction have deficiency, including such aspects as reliability, cost, method of application and practicality. Therfore, there is still a need for improved techniques for measuring suction.

Key words: gas diffusion, numerical modeling, Millington-Quirk-Moldrup models, suction curve, diffusion coefficient

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