



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: Unsaturated soil behavior under the combined influence of water-absorbing polymer and vegetation

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Thesis Submitted to the Department/ Center : Civil Engineering

Date of completion of Thesis Viva-Voce Exam : 19 – 04 - 24

Key words for description of Thesis Work : Water-absorbing polymer, SWCC, fertilizer, stomatal conductance, photosynthetic yield, drying-wetting, degradation

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SHORT ABSTRACT

This study deals with the study on soil-WAP-vegetation-atmosphere interaction under drought or water stress condition and its impact on unsaturated soil behavior. The WAP interaction with soil and external ionic materials (such as fertilizers) significantly affects their water-absorbing capacity and overall performance. Therefore, the combined interaction of WAP- fertilizers and WAP degradation may inhibit the functionality of WAP, which needs to be thoroughly investigated by observing the changes in the SWCC of WAP amended soil. It is well-known that plant physiological parameters (stomatal conductance (SC) and photosynthetic yield (PY)) undergoes changes during the period of drought stress. However, there is lack of understanding on how these changes (SC and PY) can be linked with the unsaturated soil properties. Therefore, this study investigated the drought stress stages by establishing the relationship between plant's physiological characteristics and soil suction (SS).

Furthermore, the short-term influence of WAP on the soil microbiota has been explored in this study. The performance of WAP and reduction in water retention capacity of WAP-amended soil was investigated for 12 alternate drying-wetting SWCC cycles. The result indicates the potential of WAP as an efficient soil conditioner even in the presence of fertilizer for countering the negative impacts of water stress conditions. The combined effects of WAP, plant presence, and drought had pronounced influence on the soil bacterial community. The study clearly demonstrated the usefulness of WAP amended soil that has its utility in bioengineered slope, green infrastructure/urban green planning and arid region agricultural practices.