

Application of an electric potential to retain soil nutrients around the root zone in rice (*Oryza sativa* L.) using carbon electrodes

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Leaching of soil nutrients from the root zone into the deeper layers affects the crop production: especially in waterlogged rice cultivation causes problems to environmental and human health. This study aims to evaluate the effect of electric potential in retaining soil nutrients around the root zone of rice. A leaching column study was carried out to compare ion retaining ability in the presence of an electric field using different electric potentials, 2V, 5V and 8V with time combinations of 4h, 8h and 12h. Effect of applying an electric potential to retain soil nutrients around the root zone was evaluated by assessing the effect on soil properties, growth and yield of rice. A lowland rice variety BG250 was used for pot experiment. Amount of nutrients leached was analyzed by a leach column study. The results revealed that the nutrients have retained in the upper part of the leaching column where the electrodes were positioned. The pot trial results suggested that, applying 2V electric potential was the best among combination of treatments in retaining nutrients around the root zone. All the growth and yield parameters were positively influenced by application of an electric potential compared with control. The increase in the rice yield percentages in the 2V and 5V, were 24%, and 5% respectively compared to the yield in the control. Therefore, application of an electric potential could be recommended to reduce leaching of nutrient and improve crop productivity. Future studies are needed to investigate effect of electric potential on different crop types, electrode types and electrode positioning distances for better outcomes.

Keywords: leaching, electric potential and electrodes

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