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Nitrate and ammonium leaching from chili cultivation under growers' fertilization package in Kalpitiya area

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Agriculture is the mainstay of the community and nearly 60% of the population in Kalpitiya is engaged in crop production. The most important cash crops grown in Kalpitiya are red onion, chili and tobacco which bring significant incomes to the farming community. Sequential cropping with three to four crops per year is common at Kalpitiya. The soil is sandy with very low organic matter content and indicates low levels of fertility. Moisture is lost from the soil rapidly due to both infiltration and evaporation. As such water and nutrient holding capacities are low causing low water and nutrient use efficiencies. The groundwater in Kalpitiya is found at low depths and collected by establishing tube wells using water pumps. Farmers in Kalpitiya resort to intensive cultivation practices using large doses of inorganic fertilizers, agro-chemicals, and shallow groundwater resources. The water resources which are used for both agriculture and domestic purposes are being continuously polluted by these inputs. The overuse of water, fertilizers, and other chemicals due to inadequate use of soil and moisture conservation measures have caused many environmental and health problems in the area. Hence, it is important to control this situation in order to sustain the farming system. The aim of this study was to quantify the nitrate and ammonium leaching from chili cultivation under grower-managed fertilizer practices (T1) compared to the Department of Agriculture Recommendation (T2). The MICH1 chili variety was established in the field where lysimeters were installed. Grower managed fertilizer application and DOA recommendation were selected as treatments. Irrigation was done twice a day. Manual weeding and other cultural practices were done as recommended by the DOA. The chili harvest was recorded, and data were statistically analyzed. leachate was collected at weekly intervals and leached volume was measured. Nitrate and ammonium concentrations of the collected leachate were measured using ion selective electrodes. Both treatments showed higher levels than WHO permissible level of nitrate (50 mg/L) and lower levels than WHO permissible level of ammonium (35 mg/L) for drinking water. The total nitrogen leaching percentage of T2 (66%) was lower than T1 (89%) even though the crop yield of T2 was lower. However, both systems showed leached nitrate concentrations above the safe limits recommended by WHO which urges the need for a novel nitrogen fertilizer management for chili on sandy regosols.

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