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Evaluation of nitrate leaching from leafy red onion cultivation on regosols in Kalpitiya area

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Red onion (*Allium ascalonicum* L.) is one of the most widely grown cash crops in Sri Lanka mainly in the northern and eastern parts of the country. A promising problem in red onion cultivation is the leaching of nutrients, especially nitrogen, since this crop is mostly grown in sandy textured soils. Kalpitiya in the North Western province is an intensive vegetable cultivating area where the dominant soil type is sandy regosols. This study was conducted to quantify nitrate leaching from leafy red onion cultivation in Kalpitiya under the management practices of growers. Lysimeters with 0.28 m² area were installed 90 cm below the soil surface before the cultivation and allowed the soil to settle for two weeks. There was a 60 cm soil column above the drainage collection reservoir. The Jaffna local variety was cultivated under sprinkler irrigation and fertilizer was applied according to grower's practice, which was four split applications of urea at 40 kg/ac, onion fertilizer (12:9:9) at 50 kg/ac, blue granules (12:12:17) at 25 kg/ac and calcium nitrate at 25 kg/ac at ten-day intervals. This was replicated three times in 7.2 m² plots. Leachate samples of each replicate were collected from lysimeters at weekly intervals and leached volume was measured and the nitrate concentration was analyzed. Applied irrigation water volume and its nitrate concentration were also measured. Leafy onions were harvested 48 days after planting and the weight was recorded. The mean cumulative leached nitrate amount from a 7.2 m² area was 234.8 g. The concentration of nitrate in irrigated water was 6.88 ppm, which was also accounted for as an input source of nitrogen. According to the calculation, 400 g of nitrogen was leached per 100 kg of leafy red onion harvested according to growers' practices of fertilizer. These findings highlight the need for a novel fertilizer management approach for reducing nitrogen leaching in this cultivation system.

Keywords: Fertilizer, groundwater, nitrate leaching, sandy regosol

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