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ACCUMULATION OF NITRATE IN SELECTIVE CROPS AND WELL WATER IN KALPITIYA AS AFFECTED BY CHEMICAL FERTILIZER INPUTS

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Chemical fertilizers, particularly nitrogen based fertilizers are known to contaminate soil, food and water and affect environmental health. This study was conducted to assess the impact of different fertilizer application practices on the nitrate (NO_3^-) accumulation in selective crops under controlled conditions and levels of NO_3^- in well water in the Kalpitiya area.

A pot experiment was conducted using Sandy Regosols collected from the Kalpitiya area. Onion, capsicum and radish were grown with three different fertilizer practices as recommended by the Department of Agriculture (DOAR), namely fertilizer mixture of CIC Agribusiness (Pvt.) Ltd. (CICR); and fertilizer regime practiced by the farmers (FP) for each crop. The plants were uprooted eight weeks after planting and fresh weight recorded. Sub samples were chopped, NO_3^- -N in tissues was extracted with water and assayed colourimetrically. Samples of selected crops collected from different farms at Kalpitiya and markets in selective cities were analyzed for NO_3^- -N content. Eighteen well water samples were collected from different locations in the Kalpitiya area and they were analyzed for NH_4^+ and NO_3^- -N content. Mean comparisons were done by Duncan's New Multiple range test at a significance level of 0.05 using the statistical software SPSS.

Total NO_3^- -N content in the onion plants and capsicum pods were in the order of FP> CICR> DOAR which is the same order with respect to the quantity of fertilizer addition. The Nitrate content in onion and radish did not differ between fertilizer treatments. The NO_3^- -N content in almost all the onion and radish samples were within the range of 1000-2500 mg/kg which is considered as 'high' category. Organically grown onion leaves (706 mg/kg) and bulbs (898 mg/kg) showed significantly lower NO_3^- -N contents. Among the crops tested, onion accumulated more NO_3^- -N and among the fertilizer practices, FP resulted in comparatively higher NO_3^- -N levels. The NO_3^- -N contents of the market samples were not above the maximum permissible levels introduced by different countries. Among 12 water samples used for domestic purposes, three showed NH_4^+ -N levels above 1.5 mg/L and seven showed NO_3^- -N levels above 10 mg/L which are the maximum permissible levels recommended by World Health Organization. All the water sources used for irrigation showed NO_3^- -N levels higher than 10 mg/L suggesting that the ground water has been contaminated heavily with fertilizer residues.