

Nutrient losses through runoff from several types of fertilisers under mature oil palm

ABSTRACT

This study was conducted to understand the effects of fertiliser type (straights, compounds and controlled-release fertilisers) on N, P, K and Mg losses by surface runoff. The study was conducted in a mature oil palm field using three 20 m by 6 m erosion plots containing two palms per plot with the soil type being Typic Kandudults and slopes ranging from 5.5° to 7.5°. Nutrient losses were measured in the eroded sediment and runoff water for every rainfall event over a period of 24 months. Nutrient losses were higher in the runoff water than in the eroded sediments. Broadcast application of controlled-release fertilisers and its slow dissolving nature made it prone to washing down the slope. Hence, higher nutrient losses were observed in the controlled-release fertilisers compared to other treatments. Compound fertilisers showed lower total losses for N (4.96%), K (3.95%) and Mg (0.65%) compared to straight fertilisers. Lower P losses were observed in the straights compared to the compound fertilisers due to higher percentage of soluble P in the compound fertilisers. Controlled-release fertilisers recorded high nutrient losses in the sediments caused by the washout. Except for nitrogen, controlled-release fertilisers recorded higher losses for P (56.56%), K (19.83%) and Mg (10.36%) compared to straight fertilisers. Nitrogen losses were 18.15% lower in the controlled-release fertilisers compared to straights. Compound fertilisers showed lowest losses for N and K compared to straight fertilisers. Based on the data, it is postulated that compound fertilisers can lead to better nutrient uptake compared to straight fertilisers. However, this hypothesis needs to be tested through field experiments measuring nutrient uptake and its effect on oil palm productivity.

Keyword: Nutrient loss; Surface runoff; Oil palm; Fertilisers; Erosion