Neem, Mahua and Sesame Seed Cakes, and Tamarind Husk Powder on Improving Nitrogen-Use Efficiency in Rice Variety Bg 300 Grown in Reddish-Brown Earth Soil

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The rate of nitrogen (N) fertilizer application depends on the crop species and expected yield. When applying N fertilizers, it is important to improve N-use efficiency (NUE) and minimize the negative impacts to the environment. Therefore, this experiment was conducted to examine the possibilities of improving NUE of rice variety Bg 300 when grown in reddish brown earth (RBE) soil after mixing urea with plant-based by-products. For this, field and pot experiments were conducted in a randomized complete block design at Mahailluppallama, Anuradhapura. The treatments were, control without urea application (C), urea alone (U), urea + neem (UN), urea + mahua (UM), urea + sesame (US) and urea + tamarind (UT). Neem, mahua and sesame seed cakes, and tamarind husk powder were mixed with urea at 1:5 ratio (w/w) for each application. Fertilizer application was made according to the recommendation of the Department of Agriculture. Soil and plant samples were collected at three, five, seven and nine weeks after broadcasting. Results revealed that plants receiving UN had a higher shoot dry weight, shoot N concentration, and shoot N content compared to other treatments. After the nine weeks of growth the NUE of UN, UM were 9.3%, 9.1% respectively while that of U was 7.8% at the latter part of vegetative stage. Soil N concentration was similar among treatments in most of the tested time points. In the pot experiment, plants in the control treatment had higher root DW than most of the other treatments at third week after seeding, while the root lengths and root diameters were similar among other treatments. Use of soil amendments, particularly neem seed cake shows promise in improving growth and nitrogen nutrition of Bg 300 rice variety.

Keywords: Leaching, Neem seed cake, Nitrification inhibitor, Nitrogen-use efficiency, Urea

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