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New Biomass Fertiliser System Development Using Urea Incorporated *Wrightia zeylanica* (Wal-Idda) Wood Chips**Bhagya P.V.G.S.* , Premaratne W.A.P.J.**

¹*Department of Chemistry, University of Kelaniya, Dalugama, Sri Lanka.*
**sachinibhagya606@gmail.com*

Abstract

Urea is highly water soluble, simple organic molecule which is widely used nitrogen fertiliser due to its high nitrogen content (46%) and comparatively low-cost production. But excessive leaching of urea can cause severe soil and water pollution that can lead to considerable resource and economic loss. In order to overcome the complications, slow release biomass fertilisers can be used. Using biomass fertilisers is the best method to avoid the shortcomings arising due to polymer based fertilisers such as their low degradability in the environment. Present study is focused to determine the nitrogen (N), phosphorous (P), potassium (K), ash and moisture contents in leaf, root, bark and stem of the *Wrightia zeylanica* (Wal-idda) plant and to study the capability of using urea incorporated Wal-idda wood chips (combination of stem and bark due to their capillary structures) as a slow releasing biomass nitrogen fertiliser. The new fertiliser system was prepared treating Wal-idda wood chips (<5 mm) with saturated urea solution. Soil columns were prepared using soil matrix (200.0 g) and urea incorporated wood chips (10.0 g) to study the leaching of nitrogen in aqueous medium (pH 6.5). Nitrogen leaching was studied for 19 days. Each experiment and analysis were carried in triplicates. According to the experimental results the level of nitrogen in different parts of the wal-idda plant varied from 6,230±400 mg kg⁻¹ to 18,620±300 mg kg⁻¹. It was found that phosphorous and potassium content in wal-idda plant varied from 40±10 mg kg⁻¹ to 530±50 mg kg⁻¹ and from 1,700±60 mg kg⁻¹ to 13,600±800 mg kg⁻¹ respectively. According to the leaching experimental results 98% of nitrogen from the applied commercial fertiliser was leached during the studied period. When urea was directly applied to the soil 43% of nitrogen from applied amount was leached out and when urea was incorporated with wood chips, only 29% of nitrogen was leached out after 19 day. Therefore, the present investigation indicated that Wal-idda wood chips has increased the retain ability of nitrogen fertiliser in the soil matrix by 14% with a slow release pattern. Experiment results has indicated that urea incorporated Wal-idda woodchips have a potential to further develop as a urea incorporated slow release biomass fertiliser system.

Keywords: Biomass fertilisers, Wal-idda, Slow-release pattern, Urea, Nitrogen