

EFFECT OF TEA WASTE AS A UREASE INHIBITOR IN SOIL

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By

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ABSTRACT

Most Sri Lankan farmers use Urea as the principal source of Nitrogen (N) in their fields as nitrogen is one of the major nutrient required by plants. However, efficiency of Urea rarely exceeds 50%, as most of it is lost as ammonia and CO₂. Urease enzyme is responsible for this break down. Excessive release of ammonia is toxic to plants, especially younger plants. Urease is a ubiquitous enzyme which can be found in both plants and animals. Hydrolysis of urea into ammonia by Urease is one of the major health concerns and previous researches have shown that chemical compounds in drinking Tea can inhibit Urease enzyme to a greater extent. This research was designed to study the possibility of using refuse Tea to inhibit the soil Urease enzyme and slow down the hydrolysis of Urea. Tea waste is a readily available waste product in Tea factories. Although the chemical composition is similar to that of made Tea, it is not good for consumption due to high content of fiber. Three experiments were carried out during this research. The first experiment was carried out to determine the optimum amount of Tea waste to be incorporated with soil. Different amounts of Tea waste were mixed with a constant amount of urea and a constant amount of soil and released ammonia content was measured after 24 hours. The second experiment was designed to study the inhibition of Urease by Tea waste with time. A fixed amount of Urea was mixed with a fixed amount of Tea waste and soil. Released ammonia content was measured after 24 h, 48 h, 72 h, 96 h and 120 h. The third experiment was designed to study the effects on growth conditions and conservation of urea after inhibiting Urease enzyme in the soil. Soil and tea waste mixtures (10:1.5) were prepared in polythene bags with different amounts of urea as 50%, 75% and 100% from the recommended amount and chlorophyll content and inter nodal length were measured at two weeks intervals with "Thilina" tomato variety. A control was prepared without Tea waste and with 100% Urea. Complete Randomized design was applied. The optimum amount of tea waste to be incorporated was determined as 1.5 g per 10 g of soil and per 50 mg of urea as this combination showed a 50% average inhibition. Inhibition of urea hydrolysis by tea waste exhibited a positive correlation with time with r^2 0.976. It was found that the treatment containing 50% urea showed a significant increase in chlorophyll content than the control with p value 0.003. There was no significant difference among the treatments for intermodal length as well as time taken for flowering. With the results of this research, it can be concluded that the application of Tea waste successfully control the hydrolysis of Urea and it does not have any negative effects on growth parameters of "Thilina" tomato variety. It has also exhibited a positive effect on chlorophyll content.

Key Words: Urease, Inhibition, Tea Waste, Urea