

Signal to Noise Ratio Analysis for Potential versus Time of the Under-Utilized Fruit Plant *Dovyalis hebecarpa* (Ketambilla) Under the Stimulus of Moisture Supply

ST Warusavithana^{1,2}, JAS Chathurika³, RGPT Jayasooriya⁴, and NPW Rathuwadu^{1#}

¹Institute for Combinatorial Advanced Research & Education, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

²Faculty of Graduate Studies, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

³Faculty of Urban and Aquatic Bioresources, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

⁴Faculty of Technology, Rajarata University of Sri Lanka, Mihintale, Sri Lanka

#rathuwadunpw@kdu.ac.lk

Abstract

Ceylon gooseberry (*Dovyalis hebecarpa* or Ketambilla) is an under-utilized fruit crop in Sri Lanka. It produces a deep purple berry, that is rich in antioxidants, pigments and vitamins serving numerous medicinal and commercial applications. Plant electrophysiology is the study of electrochemical phenomena of plant tissues in response to stimuli. This study aimed to investigate how the electrophysiology of three versions of Ketambilla, bud, seed and cuttings plants, changed upon application of moisture as an external stimulus. The plant electrophysiology data was obtained throughout the study as in vivo potential variations versus time through a non-destructive method. Platinum microelectrodes were inserted into the plant stem as working and reference microelectrodes and the data was recorded using a Potentiostat/Galvanostat. Potential versus time and overlay plots were constructed. The data was analysed by calculating the Signal to Noise Ratio (SNR) and SNR (dB) values. The results showed that all the experiments produced peaks, where the SNR (dB) value was above 0 dB, indicating that signal level was greater than noise level. The experiments conducted on bud plants with 20 ml of moisture, cuttings plants with both 10 ml and 20 ml of moisture, showed a notable change in the working electrode potential upon addition of stimuli. Overall, Ketambilla bud plants gave the best response with the highest SNR (dB) as 1.184 (SNR 15.274) at 20 ml of moisture stimulus. The findings on the dependence of plant electrophysiology upon an external stimulus, can be utilized to understand the stress response of the plant better.

Keywords: *Moisture stimulus, Signal to noise ratio, Plant electrophysiology*