# DNA BASED AUTHENTICATION OF *SOLANUM MELONGENA VAR INSANUM* (V. ELA BATU) ROOTS IN HERBAL MEDICINE MARKET TO CIRCUMVENT THE USE OF NOXIOUS ADULTERANT, *SOLANUM MELONGENA* (V. EGGPLANT) ROOTS

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*Solanum melongena* var insanum (Prain) known as *Elabatu* is an important herbal medicine and a vegetable. *Elabatu* is popularly being used in ailments of bronchitis, asthma, rhinitis, oedema, dysentery, dysuria and also in depressant of nervous system. *Dashamoolarista, Vyaghriharitaki, Chavanaprashavelaha, Kalyanaka ghrta, Eranda saptaka qwata* are few formulations that use *Elabatu* root as one of their ingredients. The popularity for natural products had increased the demand for herbals in the herbal drug market. This had caused constant substitution or adulteration of other species or varieties that are morphologically and phytochemically indistinguishable. The roots of *S. melongena* var insanum *(Elabatu)* are frequently been adulterated with *Solanum melongena* L. (eggplant or Brinjal) which is widely cultivated as a vegetable crop in every corner of Sri Lanka. Eggplant is not a significant drug or an ingredient in any ayurvedic formulation, besides it has indicated certain negative effects including its allergenic potential and prohibit it's consumption in certain disease conditions like respiratory diseases. No studies have been conducted to date to find the illegal adulterations to Elabatu roots in herbal medicine marker and therefore, the aim of the present study was to optimize a protocol to extract DNA from dried roots and to use DNA marker-based fingerprinting and DNA barcoding for accurate identification of *Solanum melongena* var insanum (*Elabatu*) from eggplant varieties. Also an attempt was also made to confirm the general observation that morphological traits cannot be used to discriminate the *Elabatu* from commonly grown eggplant cultivars in Sri Lanka.

Ten *Solanum* spp. Cultivars including *Elabatu* were grown in a greenhouse trial to measure the morphological parameters and to collect authenticated dried root samples. Different methods were tried to optimize a protocol to extract PCR amplifiable DNA from dried roots. Three SSR markers and one ISSR marker were used in PCR based DNA fingerprinting to differentiate *Elabatu* from other eggplant cultivars. DNA barcoding was done with plant specific universal primer pair *matK* followed by DNA sequencing. Morphological data were analyzed using statistical package SAS 9.1, DNA fingerprinting data were compared among *Elabatu* and eggplant culitvars and DNA sequences were aligned to identify the nucleotide diversity between *Elabatu* and eggplant using the sequence alignment package Clustal W 2.1.

The morphological parameters cannot be used to discriminate *Elabatu* from other eggplant cultivars. An efficient method of dried-root grinding for DNA extraction and a DNA extraction procedure were identified for DNA based authentication of *Elabatu* roots in the herbal medicine market. The three SSR markers, *emg01G23*, *emi02E03* and *emd24G09* are monomorphic across eggplant cultivars and *Elabatu* thus, cannot be used to find adulterations to *Elabatu* roots with eggplant roots. The marker *ISSR09* is very highly polymorphic showing individual cultivar identities thus cannot be used to differentiate

*Elabatu* from the adulterants. DNA barcoding with *matK* primers shows that it is possible to discriminate *Elabatu* from eggplant referring to *matk* region DNA sequences. However, independent sequence replicates are required to set up the *matK* sequence DNA barcodes and then they can be used in the routine testing for possible adulterations to authenticate *Elabatu* roots.