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## **Morphological characterization and bioactive properties of selected legumes**

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Legumes are nutritionally valuable, as a source of proteins with essential amino acids, dietary fibre and complex carbohydrates while low in fat. Therefore, it is important to develop quality improved species that are resilient to climate change, tolerant to adverse abiotic & biotic factors and with high productivity, for the effective utilization of legumes as food crops. Wild relatives of crops are containing a wealth of important traits due to their adaptation to a diverse range of habitats. However, scarcity of information on phenotypic variability and phytochemical properties of these crop wild relatives have hindered the establishment of quality improved legumes. Therefore, the objective of the study was to interpret the relationships of the selected legume species of *Vigna*, *Phaseolus*, *Mucuna*, *Canavalia* and *Lablab* using morphological and chemical characterization and, evaluation of their antioxidant properties. Specimens of fresh plant parts of *Vigna radiata* (S: Mung, E: Green gram), *Vigna unguiculata* subsp. *sesquipedalis* (S: Polon mae, E: Asparagus bean), *Mucuna pruriens* (S: Wanduru mae, E: Velvet bean), *Phaseolus vulgaris* (S: Butter bonchi, E: Butter beans), *Phaseolus* sp., *Phaseolus lunatus* (S: Pothu dambala, E: Lima bean), *Lablab purpureus* (S: Halmassan dambala, E: Hyacinth bean) and *Canavalia ensiformis* (S: Awara, E: Jack bean) were collected from different localities, in Sri Lanka. Selected legume species were characterized using 16 qualitative and quantitative morphological descriptors. Cluster Analysis (CA) was performed to derive phenetic relationships among the species and a clear variation was observed with respect to the important phenetic traits. Total seed protein content was estimated using Lowry assay and Total Phenolic Content (TPC) of seeds was estimated using Folin Ciocalteu method while Total Flavonoid Content (TFC) was estimated by aluminum chloride colorimetric assay. 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay was used to evaluate the antioxidant properties of seeds. Significant difference was observed in the total protein content, TPC, TFC, and antioxidant properties of the seeds of selected legumes. *M. pruriens* exhibited a comparatively high total protein content ( $46.82 \pm 1.58$  mg/g), TPC ( $40.75 \pm 1.74$  mg GAE/100g), and TFC ( $11.76 \pm 0.38$  mg RE/g) in seeds. *L. purpureus* showed the highest mean % radical scavenging activity ( $91.42 \pm 0.65$ ). *M. pruriens*, followed by *V. unguiculata* subsp. *sesquipedalis* contained a high amount of phenolics and flavonoids in the seeds. Findings suggests that, *M. pruriens* can be used as a good protein source in human diet due to high total protein, phenolics, flavonoid contents and antioxidant activity. However, due to heavily haired pods and pubescence plant parts *M. pruriens* is less popular among consumers as a food crop. Therefore, the derived knowledge on morphological relationships can be used in designing breeding strategies for future crop quality improvement programmes to establish cultivars with better consumer preference by eliminating non favored features.

**Keywords:** Legumes, Wild relatives, Morphological descriptors, Antioxidant properties