

## **Executive Summary of UGC –Major Research Project**

**F. 42-987/2013(SR) dated 14.03.2013 sanctioned to Dr. Sonia**

In the perspective of nutritional benefits and nutraceutical attributes of legumes, characterization and compositional analysis of legumes seeds are of great importance. The phytochemical load of legumes depends both on genetics and environment, including growing conditions, harvest, storage, processing and meal preparation. Then, it is necessary to ensure information on profiles of nutrients and bioactive compounds before planning strategies for conventional breeding programmes as well as development of functional food for improving consumer's health. The present study was undertaken with the aim of evaluation of the nutritional and phytochemical properties of diverse cultivars of pigeon pea and cowpea for effective utilization for human nutrition.

Indian genotypes of pigeonpea and cowpea were analyzed for content of minerals viz. Fe, Zn, Cu, Na, Ca and Mg following standard protocol. Pigeon pea cultivars rich in iron, magnesium, zinc and copper were identified. These cultivars were found to contain higher amounts of minerals as compared to previous reports. Similarly, cow pea cultivars with high content of iron and magnesium were identified. Pigeon pea and cowpea were also assessed for content of alpha and delta tocopherols. Both alpha and delta tocopherols were present in varying amounts in all the tested genotypes of cowpea. All the tested pigeon pea cultivars were found to contain varying amounts of delta tocopherols in contrast alpha tocopherols were not detected in any of the cultivars.

For the determination of total phenolic content, total flavonoid content, condensed tannin content and antioxidant activity, seed extract was prepared in three different solvents i. e. 80% acetone, 70% ethanol and 100% methanol. Both the legumes were found to contain phenolic compounds, flavonoids and tannins, however their content varied significantly among diverse cultivars. Significant differences in total phenolic content, total flavonoids and antioxidant activity were observed under the influence of different extraction solvents. Both pigeon pea and cowpea exhibited wide range of antioxidant activity as influenced by the genotype and the type of extraction solvent. In case of pigeonpea, strong correlation was found between phenolic content and antioxidant activity as exhibited by FRAP, ABTS radical scavenging assay, hydroxyl radical scavenging assay, hydrogen peroxide scavenging assay and metal chelating activity. In case of cowpea the flavonoids were found to be correlated with FRAP, reducing power and metal chelating activity and the phenolics were correlated with DPPH scavenging assay and reducing power.

The study has been successful in the identification of pigeon pea and cowpea cultivars with high content of iron, magnesium, calcium, and zinc. These findings would be helpful in planning of breeding programmes for enhancement of nutritional quality of pigeon pea and cowpea.

All the genotypes of pigeonpea and cowpea exhibited varying degree of antioxidant activity. The phytochemical profiles of pigeon pea regarding total phenolic content strongly correlated with the antioxidant activity. In case of cowpea the flavonoids as well as phenolic content exhibited correlation with antioxidant activity. Results of the present study may also be helpful in assessing pigeon pea and cowpea genotypes for their potential health benefits and tolerance towards abiotic stresses with respect to correlation between the phytochemical content and antioxidant activity of these cultivars.