THE BIOACTIVE POTENTIAL IN *VIGNA UNGUICULATA*: GENETIC ASPECTS OF ISOFLAVONES PRODUCTION

SICILIANO V.*, CLERICI C.**, NEGRI V.*

*) Department of Applied Biology, University of Perugia  
**) Department of Experimental and Clinical Medicine, University of Perugia

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*Vigna unguiculata* (L.) Walp. (cowpea) is a legume cultivated in many countries all over the world and it has an important role in the diet of many people, especially in the developing nations. Beans have been reported as an excellent source of bioactive compounds. Constituents of various legume seeds have antioxidant, antimutagenic and anticarcinogenic activities and also free radical scavenger properties. The beneficial physiological effects of seeds consumption have recently gained increasing attention on beans as a "functional food". Isoflavones are the most important group of bioactive molecules in *V. unguiculata*. These compounds form a group of distinct secondary metabolites produced predominately in leguminous plants. Many studies link the dietary consumption of the isoflavones genestein and daidzein to a range of health benefits.

Isoflavones play a role in both positive and negative plant-microbes interactions. In plants, isoflavones participate in the defence responses since they are the precursors of the major phytoalexins, antimicrobial compounds that are accumulated in plants after exposure to phytopathogenic micro-organisms. Isoflavones are also involved in promoting symbiotic relationships between legume plants and nitrogen fixing bacteria.

Isoflavones are synthesized as part of the phenylpropanoid pathway. Legumes have a unique enzyme the isoflavone synthase (IFS) opening the way for the production of the isoflavones.

The plant nutritional profile can be influenced by genetic and environmental factors. In the present research, evaluation of the influence of different genotypes on the nutritional quality of *V. unguiculata* have been carried out.

A quantification of isoflavones (genistein and daidzein) content in a collection of *V. unguiculata* accessions has been carried out by High Pressure Liquid Chromatography (HPLC) and Gas chromatography-mass spectrometry (GC-MS).

The gene responsible of isoflavones production in *V. unguiculata* (IFS gene) has been isolated and its expression level has been quantified in different genotypes in order to evaluate the correlation between the gene expression level and the isoflavones production in the plants. Moreover expression pattern, tissue specificity, and inducibility of IFS gene have been characterized with the aim to gain new insight on the factors that contribute to the isoflavones production in plants.

Higher knowledge of the factors that contribute to the food quality and to their potential beneficial effects will be provided.