Characterization of Kunitz Trypsin inhibitors in some Apulian accessions of Cicer arietinum L.: enhancing the value of local legumes.

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Legumes are rich in protease inhibitors (PIs) which are essential for various plant regulatory processes and are also active against pathogens and parasites. Collections carried out in the Apulia region during rural development programs yielded several local and still poorly explored landraces of chickpea (*Cicer arietinum* L.). This germplasm holds potential to improve the sustainability of regional modern farming systems. Chickpea, like other legumes, still requires comprehensive genomic annotation and characterization despite recent advances in genome sequencing. Our aim was to identify functional SNPs in genes encoding PIs and assess their behaviour by analysing their expression levels under conditions of water deficit. Comparative gene sequence analyses across eight landraces revealed lower polymorphic variations among the accessions. The Kunitz trypsin inhibitors, encoded by the CaTPI-1 and CAKTI genes, were analyzed at molecular level in more detail. The former is predominantly transcribed in vegetative organs and is influenced by light and growth stage, whereas CAKTI is known for an anti-metabolic effect on the feeding larvae of the pod borer, *Helicoverpa* *armigera*. Additionally, we analyzed the α-amylase inhibitor gene CASIL, active in pest control and in the prevention of certain human diseases. In summary, differential expression of the genes under study were observed across the local varieties subjected to water stress, in comparison to unstressed plants. Additionally, an unequivocal fingerprint of each landrace was obtained by the use of microsatellite markers. In conclusion, *C. arietinum* shows several defence genes actively involved in plant protection that appear suitable for further exploitation through breeding programs.