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Biochemical characterization of maize landraces for grain quality improvement

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Exploring natural biodiversity, as a source of novel alleles to improve the productivity, adaptation, quality and nutritional value of crops is of prime importance in on-going breeding programs. Phenotypic variation stored in landraces significantly facilitates genetic screening of kernel traits and grain quality, thus leading to one of the most important breeding goals -improvement of grain composition. The main objective of this work was to evaluate whole kernel biochemical composition of 54 differently coloured maize landraces from Maize Research Institute Zemun Polje gene bank. Phytochemical characterisation was conducted for total proteins and tryptophan content, as well as antioxidants properties (carotenoids, tocopherols, phenolics), phytate and inorganic phosphorus content. Significant differences in biochemicals content were observed between analysed landraces. According to Kjeldahl method, total proteins content ranged from 9.58% to 14.46%. The obtained results showed that the lowest and the highest values for tryptophan were 0.041 and 0.069, respectively. Inorganic phosphorus (Pi) concentrations were between 0.05 and 0.22 mg/g, while variability in kernel phytate content values was from 1.58 to 5.75 mg/g. High Performance Liquid Chromatography (HPLC) was used for quantification and determination of total carotenoids, including also total tocopherols, with detected range from 2.44 to 16.88 µg/g and 20.58 to 44.75 µg/g, respectively. The genotypes that were identified as sources of kernel quality can be used in breeding programs for improved grain quality.

Biography

Danijela Ristić completed her under-graduation and PhD studies in Biology, University of Belgrade. She is a Scientific Associate at Laboratory of Molecular Genetics and Physiology at Maize Research Institute Zemun Polje.

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