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sciforum-100237: Proteomic profiling of lentil varieties by discovery high-resolution tandem mass spectrometry: nutritional, safety and authenticity perspectives

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Lentil is one of the major pulses produced in the world, and, as an excellent source of protein with a low fat content, it has a pivotal role in replacing meat products in the human diet. This communication will present a comparative analysis of the proteomic profile of four lentils varieties, namely Crimson, Eston, Laird and Black lentils, focusing on multiple objectives: (i) complete food profiling, (ii) *in silico* allergenicity assessment and (iii) screening of candidate varietal markers for authenticity purposes. Several protein accessions were unequivocally detected by untargeted HR-MS/MS analysis and software-based identification. The proteins were grouped based on protein families, with cupins representing the major component for all lentil profiles. Classification into families highlighted statistically significant differences among the lentil varieties studied; e.g., the highest vicilin abundance was reported for the Eston and Laird samples and the lowest abundance for Black and Crimson samples. Conversely, legumins were overexpressed in Black lentils compared to the other lentil samples. The Eston and Laird samples presented the highest values for the 7S/11S ratio, which is strictly correlated to seed nutritional quality. On the contrary, the same varieties presented safety warnings in terms of allergenicity prediction for sensitized individuals, according to sequence alignment with known allergens. Among the most important proteins that presented strong allergenic potential by *in silico* immunoreactivity prediction, a key role was played by the cupin family, i.e., 7S-vicilins and 11S legumins (about 43–44% and 14% of total proteins, respectively). It is noteworthy that the differential expression disclosed in specific protein accessions paved the way to the identification of candidate markers for varietal discrimination. Multivariate statistical analysis was carried out on the acquired abundances aiming at perspective application for authenticity studies. The significance of the reported investigation was very high due to the novelty of achieving multiple objectives via a one-shot analytical approach.



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