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ORIGINAL PAPER

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Relationship between dicotyledone-amaranth, quinoa, fagopyrum, soybean and monocots- sorghum and rice based on protein analyses and their use as substitution of each other

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Abstract Comparative protein studies of cereals and pseudocereals are important, especially in cases of cereal protein allergy when pseudocereal substitution is unavoidable. Therefore, ten species and cultivars belonging to different *Angiosperms* families (*Oryza sativa* normal Poaceae, bran Poaceae and Jasmin Hom Dokmali Poaceae, *Sorghum technicum* Battand et Traubt Poaceae, *Glycine max L.* Merr. Fabaceae, *Fagopyrum esculentum* Mnch. Polygonaceae, *Chenopodium quinoa* Wild *Chenopodiaceae, Amaranthus hybridum v.1004* Amaranthaceae, *cruentus v.* R104 *Amaranthaceae and hypochondriacus v.*1023 Amaranthaceae) were examined by sodium dodecyl sulphate (SDS-PAGE) seed protein markers, fluorescence, circular dichroism (CD) spectra and Fourier transform infrared (FT-IR) measurements. A high degree of polymorphism of all species and cultivars was found. Amaranth species have very similar seed protein electrophoretic profiles. According to UPGMA algorithm the examined species and varieties could be clustered into two similarity groups. Soybean, quinoa, buckwheat and Amaranth (as a genus) can be considered as phylogenic distant taxa. The fluorescence properties of amaranth, soybean, quinoa, rice and buckwheat soluble protein fractions were measured by fluorescence of tryptophan at 295 nm, light intensity, peak response and shift in the maximum of emission. Relative structural stabilities of native proteins were estimated by CD and FTIR. Similarities were found between these plants, which could make them a substitution of each other as well as for cereals.

Keywords Cereal and pseudocereals · Proteins · Diversity · Similarity

Introduction

Cereals and to a less degree pseudocereals meet the major dietary requirements in proteins of the world population