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Czech J. Food Sci.

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Extention of the spectra of plant products for the diet in coeliac disease

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The authors studied an extension of the sources of plant products for the diet in coeliac disease. This disease is induced by the components of glutenin proteins. In a collection of crops, they examined the contents of the total and protein nitrogen, the composition of protein fractions, the electrophoretic composition of reserve gluten and prolamine proteins, and the immunological determination of the gliadin amount using ELISA test. By immunological tests, gliadin content below 10 mg per 100 g of sample was found in the following species: amaranth (*Amaranthus hypochondriacus* and *A.*

cruentus) followed by quinoa (*Chenopodium quinoa*), sorghum species – grain sorghum and sweet sorghum (*Sorghum bicolor* and *S. saccharatum*), millet (*Panicum miliaceum*), foxtail millet (*Setaria italica* ssp*. maxima*), broadrood (*Digitaria sanguinalis*) and buckwheat (*Fagopyrum esculentum*). These species can be considered as suitable for the diet in coeliac disease. Below-limit values were found in triticale (*Triticosecale*) and some oats varieties; this, however, will need some other tests. The analysed samples differred by the contents of crude protein and fraction structures of the protein complex. In pseudocereals amaranth, quinoa and buckwheat, the proportion of the soluble fractions of albumin and globulin was 50 – 65%. In grain sorghum, their proportion was 20.5%, in sweet sorghum 7.8%. In millet, foxtail millet, and broadrood, their proportion amounted to 12 – 13%. The proportion of prolamines was higher in sweet sorghum than in grain sorghum. Pseudocereals and millet contained 3 – 6% of prolamines, Italian millet 38.7%, and broadrood 23.1%, respectively. The two latter species had, however, lower

contents of glutenins. In the other species studied, the contents of glutenins ranged from 12 to 22%. Electrophoretic analysis PAGE of prolamine proteins or SDS-PAGE ISTA, developed for gluten proteins, confirmed the results of immunological tests on the suitability of quinoa, grain sorghum, sweet sorghum, buckwheat, amaranth, broadrood, millet and foxtail millet for the diet in coeliac disease. These species did not contain prolamins or the content of -prolamins was negligible in the given samples. The tested species of wheat, triticale, and oats species were manifested as substandard or unhealthy for the diet.

Keywords:

coeliac disease; gluten-free diet; amaranth; quinoa; sorghum; millet; foxtail millet; broadrood; buckwheat; fraction composition of proteins

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