



Determination of grain quality traits and some chemical properties in the whole grain of spring barley germplasm

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Introduction

Nowadays a strong focus is placed on the high quality of food and input materials. The barley grains could be used as an important source of fibre and mineral substances. The aim of the present study was to investigate grain quality traits and some chemical properties of spring barley cultivars and breeding lines and to compare the concentrations of macro- and microelements in the whole grain of spring barley

Results

During the period 2011-2012, the spring barley genotypes showed variability of protein content from 10.5 to 16.4 %, starch content - 57.1-64.8 %, dietary fibre content - 3.11-7.01 %, fat content - 1.16-2.21 % and ash content - 1.76-3.11%. The concentrations of minerals in barley grain samples varied as follows: P from 2955 to 5370 mg kg⁻¹, K from 4020 to 7630 mg kg⁻¹, Ca from 130 to 600 mg kg⁻¹, Mg from 630 to 1890 mg kg⁻¹, Na from 420 to 880 mg kg⁻¹, Fe from 40.38 to 68.68 mg kg⁻¹, Cu from 3.01 to 4.92 mg kg⁻¹, and Zn from 16.84 to 29.28 mg kg⁻¹. In most cases, there were significant positive correlations among the concentrations of Fe, Zn, Cu, P, Mg. Negative differences were obtained between Mg and Ca. Total ash, P and Cu contents significantly positively correlated with protein content (P < 0.05). Comparison of the two experimental years showed that year as a factor had the greatest influence on fat and Ca content, lesser on starch content. Significantly lower year influence was exhibited on dietary fibre content.

Methods and Material

The spring barley varieties were agronomically assessed at the Institute of Agriculture during 2011-2012. Spring barley were planted in the 10 m² plots with four replications. N₆₀ P₆₀ K₆₀ fertilization was used. A total of 20 samples of spring barley grain were analyzed for protein, starch, dietary fibre, fat, ash contents and concentrations of P, K, Mg, Na, Fe, Cu and Zn.

Grain quality traits and concentrations of macro – and microelements in the whole grain of spring barley, 2011-2012

Variety	Dietary fibre, %	Fat, %	Ash, %	Protein, %	Starch, %	P	K	Ca	Mg	Na*	Cu*	Zn*	Fe*
						mg kg ⁻¹							
Carbona	6.17	1.72	2.31	13.9	60.8	3553	6520	175	1560	560	4.19	24.08	54.91
Luokė	6.83	1.79	2.25	12.9	58.3	3688	7190	255	1590	660	4.92	29.28	50.83
8080-4	5.86	1.77	2.06	12.8	62.2	3508	6840	270	1645	600	3.79	26.62	45.82
8309-4	5.70	1.60	2.15	12.8	61.7	3340	6730	190	1420	420	3.78	25.34	42.26
8380-5	5.12	1.71	2.08	12.3	60.5	3340	6575	355	1445	500	3.57	23.67	53.18
8486-6	5.85	1.72	1.87	12.9	62.3	3123	6225	220	1450	550	3.86	25.96	41.64
8478-2	4.75	1.67	3.02	12.9	62.4	3575	5420	310	1310	580	4.15	23.89	40.38
8509-4	5.99	1.72	2.61	11.8	61.4	3463	6690	340	1495	860	3.51	25.94	45.49
8699-6	5.29	1.61	2.69	11.5	61.5	3745	6295	375	1375	780	3.85	24.02	53.68
8700-3	5.39	1.70	2.53	11.9	60.4	3595	5350	180	1325	740	3.46	20.58	42.40
8700-6	4.89	1.66	3.11	11.9	61.2	3498	5710	345	1155	650	3.59	20.29	42.80
8710-2	6.08	1.77	2.69	12.0	61.6	3485	6045	370	1265	690	3.01	20.38	50.08
8762-3	6.57	1.64	2.15	12.5	62.4	3470	5010	335	1135	760	3.80	21.92	41.36
8762-9	6.21	1.81	2.10	12.2	61.2	3280	4675	340	1055	750	3.05	21.98	42.10
Noja DS	6.15	1.78	2.33	12.3	59.1	3780	5125	310	1160	730	3.74	17.65	50.56
Alisa DS	5.26	1.52	2.18	11.2	62.8	3395	5755	310	1180	730	3.46	16.97	56.07
Arka DS	6.21	1.66	2.34	12.4	62.5	3695	6780	315	1380	620	4.03	17.52	62.37
Aura DS	5.76	1.94	2.10	12.9	59.8	3593	6020	300	1455	580	3.90	16.84	63.50
PR-3528	3.34	1.89	1.93	13.5	61.4	4123	5355	345	1275	880	3.74	18.24	51.54
Lawina	3.92	1.91	2.46	15.3	61.2	5060	6270	345	1805	750	4.83	21.42	68.68
LSD ₀₅	0.749	0.129	0.168	0.674	2.067	404	598	68	327	105	0.14	1.05	5.05
Mean	5.56	1.73	2.41	12.51	61.2	3615	6029	299	1374	670	3.81	22.13	49.98
Min	3.11	1.16	1.76	10.5	57.1	2955	4020	130	630	420	3.01	16.84	40.38
Max	7.01	2.21	3.11	16.4	64.8	5370	7630	600	1890	880	4.92	29.28	68.68

* - data of 2012 year

