VARIABILITY OF MICRONUTRIENT CONTENT IN SWEET CORN HYBRIDS AFTER BOILING

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Sweet corn is a highly consumed in many parts of the world and can serve as source of nutrition as well as phytochemical compounds. Before consuming, the sweet corn is thermally processed, whether in fresh or frozen form. Different processing methods result in changes of the nutritional profile of sweet corn, which vary by nutrient content and genotypes. The effects of boiling on carotenoid and tocopherol content of twelve sweet corn (three commercial ZP504su (FAO 500), ZP 355su (300), ZP 347su (400), and nine experimental ZP 471/2su (500), ZP 475/2su (500), ZP477/2su (600), ZP481/1su (500), ZP482/1su (600), ZP483/1su (400), ZP484/1su (500), ZP485/1su (400), ZP486/1su (600)) were investigated. β-carotene, lutein+zeaxantin and tocopherols (δ-T, β+γ-T, α-T) content was determined by HPLC.

Hybrids	Lutein+ Zeaxantin before boiling	Lutein+ Zeaxantin after boiling	β carotene before boiling	β carotene after boiling
ZP504su	19,14±0,46	27,23±0,73	0,44±0,01	0,34±0,01
ZP 355su	12,72±0,20	25,71±0,54	0,25±0,01	0,28±0,01
ZP 347su	16,95±0,24	24,24±0,64	0,26±0,01	0,31±0,01
ZP 471/2su	23,88±0,47	41,46±0,69	1,12±0,03	1,58±0,05
ZP 475/2su	17,95±0,32	31,22±0,72	0,76±0,02	1,09±0,04
ZP477/2su	21,35±0,41	36,74±0,84	0,87±0,03	1,01±0,04
ZP481/1su	21,96±0,32	35,28±0,85	0,48±0,01	0,60±0,02
ZP482/1su	23,75±0,44	41,35±1,02	1,13±0,03	1,59±0,06
ZP483/1su	19,12±0,27	37,24±0,80	0,34±0,01	0,67±0,02
ZP484/1su	16,93±0,32	33,24±0,62	0,40±0,01	0,61±0,02
ZP485/1su	14,31±0,26	38,42±0,72	0,38±0,01	0,62±0,02
ZP486/1su	27,02±0,64	44,09±1,13	0,75±0,04	1,19±0,05

$LSD_{0.05}$ (lutein+zeaxantin)= 1.24; $LSD_{0.05}$ (β carotene)= 0.02

Hybrids	α tocopherol before boiling	α tocopherol after boiling	γ tocopherol before boiling	γ tocopherol after boiling	δ tocopherol before boiling	δ tocopherol after boiling
ZP504su	3,29±0,03	4,11±0,05	21,09±0,16	38,83±0,49	0,55±0,04	0,96±0,04
ZP 355su	3,34±0,04	3,50±0,04	14,16±0,18	28,38±0,36	1,00±0,01	1,15±0,05
ZP 347su	2,74±0,01	3,11±0,05	12,54±0,05	19,82±0,31	0,53±0,02	0,80±0,01
ZP 471/2su	4,55±0,03	5,19±0,08	15,95±0,11	26,02±0,60	0,76±0,01	0,95±0,02
ZP 475/2su	2,16±0,01	3,96±0,06	10,30±0,07	21,14±0,34	0,95±0,03	0,64±0,01
ZP477/2su	5,52±0,06	5,40±0,03	9,31±0,10	14,69±0,28	0,37±0,02	0,41±0,02
ZP481/1su	4,57±0,05	4,12±0,07	11,77±0,14	15,57±0,27	0,76±0,01	0,49±0,02
ZP482/1su	2,03±0,01	3,63±0,04	7,98±0,05	17,84±0,18	0,27±0,03	0,66±0,02
ZP483/1su	3,27±0,05	5,01±0,04	11,59±0,17	29,08±0,26	0,78±0,01	0,88±0,03
ZP484/1su	5,18±0,03	5,95±0,09	20,78±0,12	27,60±0,46	0,44±0,04	0,73±0,01
ZP485/1su	2,85±0,03	4,55±0,03	14,04±0,14	25,54±0,19	0,37±0,03	0,67±0,04
ZP486/1su	6,89±0,07	6,55±0,04	18,19±0,20	35,38±0,20	0,64±0,01	1,06±0,09

$LSD_{0.05}$ (α tocopherol) = 0.02; $LSD_{0.05}$(γ tocopherol) = 0,29; $LSD_{0.05}$(δ tocopherol) = 0,21

After boiling an increase in the total carotenoid and lutein+zeaxanthin content was observed in all hybrids. The largest increase in the total content of carotenoids was recorded in hybrids ZP 355su and ZP485/1su. Content of lutein + zeaxantin ranged from 12.72 (ZP 355su) to 27.02 μg/g (ZP486/1su), and β-carotene 0.25 (ZP355su) to 1.13 μg/g (ZP482/1su). Hybrids ZP 471/2su and ZP482/1su have high content of lutein+zeaxantin (23.88 μg/g and 23.75 μg/g, respectively) before boiling as well as hybrid ZP 471/2su high content of β carotene (1.12 μg/g). After boiling hybrids ZP 471/2su, ZP482/1su have high content of lutein+zeaxantin 41.46 μg/g and 41.35 μg/g, respectively and hybrid ZP482/1su (1.59 μg/g) had the highest content of β carotene.

The highest content of total tocopherols before boiling had hybrid ZP484/1su (26.40 μg/g.) and after boiling hybrid ZP504su (43.90 μg/g), the lowest content before boiling have hybrid ZP482/1su (10.27 μg/g.), and after boiling hybrid ZP481/1su (20.19 μg/g). Content of δ-tocopherol in sweet corn hybrids ranged from 0.29 to 1.01 μg/g, β+γ- tocopherols 7.98 – 21.09 μg/g and α-tocopherol 1.16 – 6.89 μg/g. The highest content of α tocopherol had hybrid ZP486/1su, and hybrids ZP477/2su and ZP484/1su had high content. After boiling same hybrids kept high content of α tocopherol. The highest content of β+γ- tocopherol have ZP504su in kernel before and after boiling.

The boiling resulted in a significant increase in the concentration of carotenoids and tocopherols for all hybrids, except hybrid ZP504su for β-carotene, as well as hybrids ZP481/1su, ZP486/1su and ZP477/2su in which content of α-tocopherol decreased after boiling.

The results show that the trend of increasing of micronutrient content depends on the genotype of sweet corn. This study confirmed that boiling enriches nutrition's in sweet corn and gives it an added value in terms of functional foods. The results of this study may also be useful to breeders to improve the nutritional characteristics of genotypes of sweet corn.