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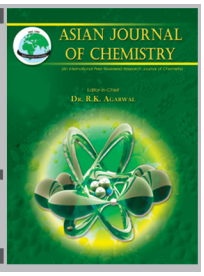

NOTE

Determination of Nineteen Kinds of Mineral Elements Content of Genetically Modified Antidwarf Mosaic Maize by AES, AAS and ICP-MS

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Genetically modified food safety has become a hot issue of food safety assessment since its birth. Genetically modified antidwarf mosaic maize were selected to research the change of mineral elements as a part of genetically modified food safety. The results showed that concentrations of thirteen kinds of mineral elements descend in genetically modified antidwarf mosaic maize compared with its parent, they are K, Mg, Zn, P, Fe, V, Mn, Cu, As, Se, Li, Mo and Cd, especially Zn and Fe reached the significant level; the increasing elements are Na, Ca, Cr, Pb, Co and Ni, in which Na, Ca, Cr and Pb reached the significant level. So genetically modified food safety evaluation should not to be taken lightly, we should always be on the strict control of genetically modified foods as before.

Key Words: Mineral elements, Genetically modified antidwarf mosaic maize, AES, AAS.

Genetically modified organism (GMO) nutrition structure and chemical composition change has become a hot issue of food safety assessment[1-3], so it is extremely necessary to research genetically modified food quality and nutrition. In this study, we selected genetically modified antidwarf mosaic maize and its original parent of non-genetically modified maize as test materials, determined the contents of twenty kinds of trace elements to provide a basis for safety assessment of genetically modified antidwarf mosaic maize.

Genetically modified maize dwarf mosaic resistance and non-genetically modified maize were gifted by Professor Sun Yi of Shanxi Agricultural Biotechnology Research Center, two cultivars were grown under the same conditions and management. Sampling by the five-point sampling method after maturity, dry at natural conditions, smash, screening through 40 mesh sieve, save in the vacuum bag. Three repeated measurements for each sample.

Methods: Determining K and Na by AES[4] and Ca[5], Mg[6], Cu[7], Fe[6], Mn[6] and Zn[8] by AAS. P, V, Cr, Pb, As, Se, Li, Co, Ni, Mo, Cd were determined by ICP-MS[9-11].

Statistical analysis: The data were analyzed by SPSS11.0 software *t*-test, the results were represented ± SE, $p < 0.05$ Indicated that the difference reached significant levels.

The concentrations of mineral elements in genetically modified anti-dwarf mosaic maize and its parent were showed in Table-1. The results suggest that the concentrations of thirteen kinds of mineral elements descend in genetically modified antidwarf mosaic maize compared with its parent, they are K, Mg, Zn, P, Fe, V, Mn, Cu, As, Se, Li, Mo and Cd, especially Zn and Fe reached the significant level ($p < 0.05$); the increasing elements are Na, Ca, Cr, Pb, Co and Ni, in which Na, Ca, Cr and Pb reached the significant level ($p < 0.05$).

Today, genetically modified food safety evaluation is mainly guided by the principle of substantial equivalence in the world, which is a key step in the process of genetically modified food safety evaluation. The so-called "substantial equivalence" principle, mainly refers to the comparison of types and content of main nutrients and the main hazardous substances in genetically modified food and non-genetically modified difference between, if there are significant differences between them genetically modified food safety evaluation is safe, otherwise it is unsafe[12].

Inorganic mineral is a general term for the human body, including beneficial elements and heavy metals. The above research showed that some elements significantly changed between genetically modified food safety and its parent, including beneficial elements (Zn, Fe, Cr, Na and Ca) and heavy metals (Cr and Pb), which is similar to previous findings although variation of every element are not all consistent[13,14]. These changes are not necessarily harmful for the human body,

TABLE-1
MINERALS AND PHYTATE PHOSPHOROUS ANALYSES OF THE MAIZE A (n = 3)

Mineral elements	Contents in GM maize (μg/g)	Contents in non-GM maize (μg/g)	Trends
Na	25.643 ± 0.681	21.533 ± 2.016	↑
Ca	96.483 ± 0.640	80.633 ± 1.338	↑
K	4519.133 ± 308.248	4577.310 ± 118.826	↓
Mg	1171.334 ± 111.580	1258.715 ± 119.754	↓
Zn	37.414 ± 2.181	79.603 ± 8.686	↓
P	3550.46 ± 56.813	3623.186 ± 235.996	↓
Fe	25.186 ± 1.101	38.670 ± 1.491	↓
V	0.0074 ± 0.0008	0.0123 ± 0.0021	↓
Cr	0.3617 ± 0.0611	0.1460 ± 0.0495	↑
Mn	4.6787 ± 0.5850	5.8223 ± 4.2884	↓
Cu	1.3230 ± 1.6610	1.7571 ± 1.8499	↓
Pb	0.2000 ± 0.0247	0.0824 ± 0.0629	↑
As	0.0269 ± 0.0070	0.0426 ± 0.0028	↓
Se	0.0796 ± 0.0107	0.0850 ± 0.1103	↓
Li	0.0412 ± 0.0019	0.1348 ± 0.1752	↓
Co	0.0420 ± 0.0499	0.0297 ± 0.0047	↑
Ni	0.3320 ± 0.4349	0.2910 ± 0.1221	↑
Mo	0.5340 ± 0.1182	0.7600 ± 0.0582	↓
Cd	0.0054 ± 0.0009	0.0097 ± 0.0020	↓

GM = genetically modified

but these suggest that the genetically modified food safety evaluation should not to be taken lightly, we should always be on the strict control of genetically modified foods as before.

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