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Chemical compositions and antioxidant characteristics of Korean maize hybrids in different cropping seasons

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Abstract

The climate change impact has facilitated double cropping system on maize production in Korea. The objectives of this study were to investigate the chemical composition changes according to the sowing dates on double cropping in 8 dent type, 2 intermediate type, and 4 semiflint type of Korean maize (*Zea mays* L.) hybrids and evaluate its antioxidant characteristics. Fourteen maize hybrids were sown on April 5 and July 5 of 2015. The average crude protein contents in dent and semiflint type maize sown on April 5 were higher than those sown on July 5 ($p<0.05$). There was no significant difference in average of total amino acid contents in all types of maize according to the sowing dates. Major amino acid in maize hybrids were glutamic acid followed by proline, alanine, and aspartic acid, which has no significant difference according to the sowing dates. The average crude fat contents in semiflint and intermediate type maize sown on April 5 were higher than those sown on July 5 ($p<0.05$). The average composition of saturated fatty acid in dent type maize sown on April 5 was higher than those sown on July 5. However, the average unsaturated fatty acid composition showed the opposite result ($p<0.05$). Fatty acids were mainly composed of linoleic acid (C18:2) and oleic acid (C18:1) in maize hybrids. The average oleic acid percentage of dent and semiflint type maize sown on April 5 were higher than those sown on July 5, while the average linoleic acid was lower. The average amylose content of all types of maize sown on April 5 was higher than those sown on July 5. On the other hands, the average carotenoid contents had the opposite result ($p<0.05$). There were no significant differences in total average of polyphenol contents and DPPH and ABTS radical scavenging activities in all types of maize based on the sowing date. Total polyphenol contents had positive correlation with DPPH ($r=0.33$, $p<0.01$) and ABTS ($r=0.50$, $p<0.0001$) radical scavenging activities. In conclusion, the kernel composition affects maize quality. These data are useful for maize breeding program and cultivation and food processing industry.

Keywords: maize, kernel, quality, sowing date

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