신진과학자-1

Development and Characterization of Novel Rapeseed (*Brassica napus* L.) Mutant Lines through Mutation Breeding

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Rapeseed (*Brassica napus* L.) is one of the most valuable oilseed crop in the world. It is widely used in various industries, such as food, animal feed, energy and chemical industries. In order to improve the industrial requirements for rapeseed, useful agronomic characteristics (higher yields and disease resistance etc.) and modified oil traits (fatty acid composition and fat content) are important in rapeseed. However, Korea has limiting genetic resources of novel traits in rapeseed. In this research, novel rapeseed mutant genotypes by mutation breeding was developed. The mutant lines were generated by the treatment of the seeds of the original cultivar 'Tamra' with 700 Gy of gamma-ray (^{60}Co). Mutants showing varied in flowering time, crude fat content, seed yield and fatty acid content that exhibited stable inheritance of the mutated characteristics from M_5 to M_7 generations were selected. We investigated genetic variation using SNPs identified from GBS analysis in rapeseed mutant lines derived from the gamma-ray, and interactions between the major agronomic and the oil traits. Significantly associated SNP loci were explored along with candidate genes using SNPs obtained by GBS analysis. As a results of association mapping, a total of 322 SNPs were significantly associated with agronomic traits (155 SNPs) and oil traits (167 SNPs). A total of 70 genes were annotated from agronomic characteristics SNPs; among them 7 genes significantly enriched in developmental process, and a total of 70 genes were annotated from crude fat content and fatty acid compositions SNPs; among them, 11genes were significantly enriched in biosynthetic process. These results could be used for the selection of rapeseed cultivar with enhanced qualities and potential economic benefits.

[본 연구는 한국원자력연구원 첨단방사선연구소의 산업소재 생물자원 방사선육종 및 소재활용연구의 지원에 의해 이루어진 결과로 이에 감사드립니다.]

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