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Genome editing for improvement sunflower oil quality – possibilities and problems

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Modern sunflower breeding dedicate a great attention in altering oil quality. Sunflower oil gain importance due to the frequent transition to the Mediterranean diet (using oils rich in oleic acid), and the requirements of biodiesel industry, preferring the use of high-oleic sunflower oil for biodiesel production compared to the standard sunflower oil. Although sunflower oil is one of the finest plant oils, sunflower breeders have reacted to market demands and managed to make certain changes in sunflower oil quality, concerning fatty acid composition and tocopherol content. Besides mid and high oleic acid content, “new” traits such as, both low saturated and high saturated fatty acid content and different combinations of increased levels of beta-, gamma-, and delta-tocopherol have been developed. Combination of “new” and “old” traits for oil quality enables their accumulation in one genotype and use for various purposes. Recent breakthrough in sunflower genome sequencing is expected to facilitate the use of genomics and other new breeding techniques, including genome editing, and work on understanding the molecular mechanisms. Genome editing could provide new perspectives for more efficient breeding, especially complex phenotypic traits, such as oil quality traits.

Key words: *sunflower, oil quality, genome editing, oleic acid, tocopherols*