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Targeted Modulation of Brassica Seed Triglycerides Pathway to Produce Plant Oil for Direct Use as Biodiesel

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Energy crises along with environmental concerns are driving researchers to develop viable alternative fuels from renewable resources. The use of *Brassica juncea* oil as an alternative fuel suffers from problems such as high viscosity, low volatility and poor cold temperature properties. The seed of *Euonymus alatus* produces low viscosity oil having unusual triacylglycerol (TAGs) called acetyl triacylglycerol (acTAGs) where the sn-3 position is esterified with acetate instead of a long chain fatty acid. The enzyme *Euonymous alatus* diacylglycerol acetyltransfrase (EaDacT) present in these plants is an acetyltransferase that catalyzes the transfer of an acetyl group from acetyl-CoA to diacylglycerol (DAG) to produce acTAG. In order to reduce the viscosity of *Brassica juncea* oil by synthesizing acTAG, we have developed an efficient and simple agrobacterium mediated floral dip transformation method to generate transgenic *Brassica juncea* plants. A binary vector containing the EaDacT gene under the transcriptional control of a glycinin promoter and with a basta selection marker was transformed into *Agrobacterium tumefaciens* strain GV-3101 through electroporation. Basta is a herbicide which is used as a selection marker to allow us to conveniently screen very young transgenic plants from a large number of untransformed plants. The basta resistant putative transgenic plants were further confirmed by PCR. Biochemical analyses of the transgenic B. juncea seed revealed modified fatty acids profile having no acetyl TAGs. Alternative strategy is in process to silence genes encoding enzymes DGAT/PDAT along with overexpression of *EaDAcT,* that will hopefully produce acetyl TAGs.

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