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Targetted engineering of brassica seed biochemistry 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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