

## Engineering “Seed Tobacco” Oil for different Applications

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“Seed Tobacco” plants, contrary to the tobacco for the cigarette industry, maximize the production of flowers and seeds to the detriment of the leaves production and are currently grown for energy applications. Oil accounts for 40% of seed biomass and is suitable for the production of biofuel, its major components being linoleic acid (74.80%), oleic acid (12.80%), palmitic acid (8.40%) and stearic acid (2.80%). Tobacco plants are extremely robust, able to grow in various climates and soils, and very amenable when it comes to being modified with genetic engineering techniques. Projects are underway to (1) select varieties producing higher quantities of seeds, (2) increase tobacco oil resistance to oxidation by engineering the carotenoid biosynthetic pathway in the seeds and (3) change the fatty acid composition of the seed oil to make it suitable for different applications. In particular seed specific up-regulation or downregulation of enzymes determining the amount and composition of seed triglycerides is expected to result in lines producing higher amounts of oil, and/or oil with different lipid makeup. Numerous genes, including synthases, thioesterases, desaturases and transferases were targeted for seed specific up-regulation and/or down-regulation with RNAi constructs. The effect of these modifications on seed oil composition will be discussed.