435b Utilization of *Triadica Sebifera* as a Novel Biodiesel Feedstock

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Triadica sebifera, commonly known as the Chinese Tallow tree, was introduced into the United States from its native China as early as the 1700s. Chinese Tallow grows quickly in a variety of soils. The fruit of the tree is a white seed that, according to literature, contains approximately 40% extractable material. This extract can be used to produce a number of products, including biodiesel. One hectare of Chinese Tallow trees can produce approximately 12,500 kg of seed, which could potentially yield 5,500 kg of oil. This amount of oil per hectare is almost 15 times that of soy oil, which is the most commonly oil for making biodiesel in the United States.

Unfortunately, the tree's nonnative characteristics allow it to easily overrun and displace native foliage. Despite its attractive appearance and valuable oil content, many regions have placed restrictions on the distribution of the tree, as it has invaded areas throughout the southeastern United States.

Initial extractions have been performed with a variety of solvents and solvent mixtures using hexane, chloroform, and methanol. These extractions yielded over 45% extractable material. The exact composition of the extract has not yet been determined but does contain both oil and wax. Gas chromatography with flame ionization detection has revealed that the oil extracted from *Triadica sebifera* contains over 50% palmitic fatty acid, along with some oleic, linoleic and linolenic fatty acids. These fatty acids can be base transesterified to form biodiesel. Future research will determine the exact composition of the extract and will study various seed processing and extraction techniques to optimize the production of biodiesel from the seeds. Also, the resulting biodiesel will be tested for compliance against the appropriate ASTM standards.

Making biodiesel from Chinese Tallow oil would accomplish two major goals. The invasive Chinese Tallow tree would become a useful, commercially viable crop. Also, the biodiesel produced from Chinese Tallow would allow the United States to decrease its dependence on imported energy by displacing foreign petroleum with a domestic source of biodiesel that would not increase the necessary crop acreage.