

AGTANE (AGricultural ceTANE): An economically viable bioenergy product for compression ignited engines

A. Spataru*^a, J. Monnier^b

^aThe ADEPT Group, Inc., 1575 Westwood Boulevard, Suite 200, Los Angeles, CA 90024-5620
Fax: (310) 478-5658; adept@adeptgroup.net

^bCANMET Energy Technology Centre

Scientists at the Canadian Centre for Mineral and Energy Technology (CANMET) laboratory, Ontario, Canada, have proven at lab scale a process to convert yellow grease (YG) and tallow (and possibly poultry fat, and wastewater plant-generated lipids) to a **low sulfur, high cetane premium diesel blending stock**. This is a proprietary high-temperature and high-pressure based on a refinery process called hydro treating. The principal output is a diesel blending stock called AGTANE (for AGricultural ceTANE) in English speaking countries (e.g., United States, United Kingdom, Australia, etc.), and BIOZOLE (for bio and gasole) in French speaking countries.

AGTANE, a mix of long-chained paraffins, is *not* a biodiesel (e.g. methyl or ethyl ester). California refiners who analyzed the final product classify AGTANE as a “synthetic diesel.” Paraffins are normally found in diesel blends; esters are not. When AGTANE is blended with regular diesels, the resulting fuel burns more efficiently and with cleaner emissions. Particulate matter and NO_x emissions are significantly lowered. AGTANE complements and reduces the volume of traditional cetane improvers.¹

Convergent global trends favor production of AGTANE from low-cost or discarded fats and waste oils and greases. Diesel prices have risen and are likely to remain high. There is increased regulatory pressure towards diesels with low sulfur content and higher cetane value.

CANMET commissioned research proved synergy between AGTANE and “traditional” cetane improvers.² This demonstrated synergy increases AGTANE’s value. It is anticipated that AGTANE will be added from 3 to 12% of volume for the final fuel mix.

The test results proved that AGTANE:

- (1) linearly raises the cetane of unadditized diesel *without* a top-end limit;³
- (2) can linearly raise the cetane of “non-responsive”⁴ diesel blends;
- (3) is synergistic with traditional cetane improvers;
- (4) has a low sulfur content (~15 ? 5ppm⁵); and
- (5) increases end-product volume by the added AGTANE volume.

¹ Cetane improvers are man-made chemicals that are added at the refinery level to diesel blends to raise the blend’s cetane number. Cetane is an indicator of a diesel blend’s combustion performance in compression-ignited engines (same as “octane” for spark-ignited engines). As with octane, higher numbers are desirable.

² The “traditional” cetane improver used for these tests was Octel CI-0801.

³ The cetane value enhancing effects of traditional cetane improvers level off at some point (after an 8 or 9 point rise in cetane value).

⁴ “Non-responsive” means that certain diesel stocks turn out not to respond well to increasing cetane value when traditional cetane additives are mixed in.

⁵ 15-ppm max. S₂ in on-road diesel is a South Coast Air Quality Management District requirement by 2005.

There is a growing trend to exclude YG and tallow out of the food and feed chains due to *bovine spongiform encephalopathy*, commonly known as “mad cow disease.” Because YG contains a significant amount of animal fat, its sales as an animal feed component are increasingly restricted. According to rendering industry experts, there is an unprecedented surplus of YG in North America. Over 100 loads of YG per week are being incinerated as fuel for boilers at rendering plants. This process is neither optimized for energy efficiency nor for air pollution control. This YG outlet is thought to be viable only in the short-term. Smaller rendering plants have closed, raising health and environmental concerns in those areas where other renderers have not been able to cover.

Large-scale production and commercialization of AGTANE will allow the rendering industry to cease being simply a gross polluter and instead become a pollution remediator as well. The broad use of AGTANE in on-road and off-road diesel applications will significantly reduce both NO_x and particulate matter, something not possible with biodiesel, or by burning YG in boilers. Also, by participating in the disposal of wastewater treatment plant-generated lipids, the rendering industry becomes part of the water clean-up solution.

Based on its bottom line appeal, AGTANE production can be readily implemented in major urban areas where large rendering operations are located within 50 miles of petroleum refining facilities. The profitability of AGTANE plants will be further enhanced by tax breaks/incentives that are currently extended to biodiesel.

Numerous inquiries following October 2000’s AGTANE technology presentation conducted at the First World Renderers Association meeting in California and the publication of an article in *Render* magazine (February 2001 issue) indicated that there is worldwide interest in this technology. Exchanges with leading petroleum refiners also indicate strong interest in AGTANE.

AGTANE may prove to be a timely solution to help meet US energy and environmental needs, while helping the agricultural sector deal with food chain concerns. As it proportionally reduces the use of petroleum-derived diesel fuel, AGTANE is a step in the right direction towards reducing dependence on foreign oil and increasing domestic energy security.