

Understanding Algae As An Alternative Fuel Source: Will The Real Algae X Please Stand Up

7 September 2008, by Mary Anne Simpson



Courtesy UC Berkeley

The recent creation of AXI, LLC is an alliance between Allied Minds, Inc. a seed investment company and the University of Washington. The alliance came about because of Professor Rose Ann Cattolico PhD, an algae-to-fuel expert. Professor Cattolico has been on the faculty and conducting algae research since 1975. Her research includes, chloroplast genome architecture and gene function in non-chlorophyll containing algae and functional genetic diversity within stramenopile population. Professor Cattolico has discovered a unique patented technology, she calls Algae X.

The technology will be utilized in the development and creation of various algae species targeted to high yield per acre and high levels of usable alternative oil for heating and fuel. All algae is not equal in terms of creating an alternative to fossil fuels or reliance on foreign oil supplies. Algae X meets the threshold criteria and goes one better. It appears to have no adverse effect on food supply economics and it does not increase green house gas emissions.

According to the AXI LLC web site, Professor

Cattolico's technology is the basis for the licensing agreement with the University of Washington and she will play a major role in AXI. In a press release, Professor Cattolico states: " Our proprietary methodology for developing specific growth and productivity traits will help in any algal production system improve its output of inexpensive, oil-rich algae as the raw material for the generation of biofuel." An important note is the current concern of corn-based ethanol impacting the cost of livestock, poultry feed and basic food production. Algae can be grown in the terrain unsuitable for grain, corn or soybeans. In addition, algae production will not impact the cost of feed or food production.

Current estimates by experts in the Bio-fuel industry and the Department of Energy report that algae fuel can yield up to 30-times more energy per acre than land crops such as soybeans. The estimates reported in Bio-fuel Digest show Algae can produce 1,800 to 9,000 gallons of bio-fuel per acre (GPA) compared to Tallow, Chinese at 970-GPA, Palm Oil at 508-GPA, Coconut at 230-GPA and Soybean at a maximum of 98.6-GPA. Algae has the additional benefit of absorbing SO_x and NO_x two compounds which cause acid rain. The adaptability of the thousands of types of algae to a range of world-wide land/water masses is another major benefit.

Standing on The Shoulders of Others:

The idea that algae could be used as an alternative fuel source began in the 1950s. President Carter in 1978 initiated the Solar Energy Research Center in Golden Colorado in response to the energy crises of the 1970s. He consolidated all energy related departments into what we know today as the DOE or Department of Energy. A sub-part of the Solar Energy Research Center was founded the National

Renewable Energy Laboratory. Studies and research into the uses of plant life as a source of biofuels began in this period. Particularly relevant to the discussion of algae as a biofuel began in the Carter Administration and reached its mecca for funding under the Reagan administration.

Enormous breakthroughs occurred in narrowing down the nearly 3,000 species of algae to a core 300 species for research and development during the DOE's funding period of 1978-1995. Important field research was conducted in New Mexico, Utah, California and Hawaii which produced patented technologies. More importantly, scientists were able to move lab experiments to the field and determined that lab results were not borne out in the field. By virtue of the combined efforts of lab scientists and tests in the field new strains of algae were produced which increases the lipid content necessary for oil production and increased the all ready rapid growth of algae.

Initially the focus was to use algae to produce hydrogen. In the early 1980s the focus turned to using algae as a substitute for bio-diesel. In 1995, under pressure by budget constraints, nearly all funding was lost for the algae-related ongoing projects. Instead the DOE refocused its small alternative fuel funds in bio-ethanol projects. Even during the height of the program's boom years of 1985 and 1986 this ahead of it's time wing of government only received \$2.75-million annually. Most years the algae program received less than \$2-million. Parenthetically, in the early 1990s funding shrunk to \$500,000 or less. It was during this time in which the algae research began to show great dividends for meeting it's original mission to develop a low cost, high in oil, fast growing algae ideal for alternative fuel sources. A wind-up report was published recently outlining the origin and evolution of the Department of Energy's algae work. [Click to see.](#)

Necessity Is The Mother of Invention:

When the likes of Boone Pickens a lifetime oil man expresses concerns about supply and demand shortages in fossil fuels and consumers begin feeling the pain at the gas pump and record high heating oil prices, something happens. That

something is dusting off the research of the past 50-years and beginning an earnest examination of alternatives to fossil fuels. In recent years, a huge algae project is underway in the State of Texas. The National Algae Foundation is located in Texas. The University of Virginia has launched three-algae to fuel research projects. In the private sector, Ceres, Solazyme, PetroSun and others are in full speed with research and development of algae-to-fuel projects. Japan, Argentina, Australia and Ireland are involved in the research and development of varying types of algae for use as bio-fuel. International oil companies and airlines have joined in the algae band wagon over the past year by allocating resources and funding. In a perfect world, the call of scientists would have avoided what has turned out to be inevitable.

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