



Jatropha: A Sustainable and Profitable Source for High Quality Crude Plant Oil

Jatropha curcas is a non-edible shrub that is native to Central America. Its seeds contain high amounts of oil that can be used for a variety of bio-based materials including biodiesel and feedstock substitutes for the petrochemical and jet fuel industries. Because it is non-edible and can be effectively harvested on marginal land that is considered undesirable for food crops, it does not compete with global food supplies. The sustainable cultivation of *Jatropha* can bring economic benefits to communities while reducing the environmental impacts typically associated with other feedstocks.

Currently one of the most profitable and sustainable feedstocks, *Jatropha* is an undomesticated crop that is poised for a quantum leap in yield improvements and enhanced agronomics.

Current Yields

Current oil content of *Jatropha* seeds range from between 30 and 40 percent. First-generation elite varieties of *Jatropha* developed by SG Biofuels have projected yields of more than 350 gallons per acre (3,200 liters per hectare) per year -- eight times that of soy and four times the yield of rapeseed (canola) with only a fraction of the input costs.

Additional breeding and biotechnology advancements promise further yield increases over the next several years. The successful sequence of the *Jatropha* genome will allow for the rapid introduction of new traits that will further increase yield, reduce costs and drive profitability. SG Biofuels has also successfully developed hybrid seed production technology – a significant achievement resulting in greater and more consistent yields, uniformity and a stronger plant.

Oil Quality

Once harvested, the seeds are crushed and the resulting oil can be processed to produce high-quality biodiesel for a standard diesel engine (U.S. ASTM 6751 and E.U. EN14214 standards) bio-jet fuel or biomaterials. Successful test flights by Air New Zealand, Continental, Boeing, Rolls Royce and others have validated *Jatropha* as a superior source of jet fuel, in large part due to its superior performance at cold temperatures. *Jatropha* oil produced by SG Biofuels has been independently evaluated for its biodiesel qualities and verified to be a clean, stable source of fuel for biodiesel that meets or exceeds strict European specifications.





Sustainability

SG Biofuels is developing *Jatropha curcas* because it does not compete with food production, lends itself to sustainable and environmentally positive development and enables carbon neutral energy production. Independent life-cycle analysis shows Jatropha-based biodiesel provides at least a 70% reduction in greenhouse gas emissions over petroleum-based diesel. Our Jatropha is grown on marginal land that is considered undesirable for other crops. Jatropha can be fertilized with processing waste or “seedcake,” reducing requirements for chemical and petroleum based fertilizers. When grown in appropriate climates, Jatropha can be effectively cultivated primarily with rainwater, minimizing the need for irrigation or use of groundwater supplies.



Market Opportunity & Commercial Viability

The global market for biodiesel is expected to reach \$250 billion by the year 2020 (Pike Research). The total market for renewable jet fuel alone is predicted to increase to more than \$100 billion over the next decade, requiring the production of more than 30 billion gallons of sustainable fuel per year. Additionally, the biochemical industry is estimated to grow to between \$250 billion and \$500 billion by the year 2025. Jatropha has been identified as one of the most viable feedstocks to meet this demand. Pike Research predicts that Jatropha will be making a significant contribution to the global biodiesel market by the year 2014.

SG Biofuels can sustainably produce Jatropha oil at a more competitive cost than other feedstocks, including palm and soy. SG Biofuels has identified that the emerging economies of Latin America, as well as areas of India, Africa and Southeast Asia present a unique opportunity to plant Jatropha. These countries have an abundance of low-cost land that is well-suited for Jatropha cultivation, as well as an ideal climate.