

## ***Integrated mariculture for production of algae biofuels and food***

### Abstract

Algae have captured the imagination of the entrepreneurs because they can sustainably produce vegetable oils without competing against food crops for arable land and fresh water. These oils can be then converted to biodiesel for use in diesel engines. The primary barrier is, of course, the economics of algae production with the algal oil cost of production estimated at \$10-40/gallon using conventional chemical engineering operations. One of the fundamental technical challenges is harvesting the algae at dilute concentrations often ranging from 100 – 500 ppm in open pond systems. At such low concentrations, approximately 20,000 gallons of water must be processed to produce 1 gallon of oil. The challenges with water processing are twofold. First, the pumping costs for moving the 'green water' to and from central facilities located miles away at any meaningful commercial scale are simply prohibitive without significant in-situ dewatering. Second, the physical separation of algae from water, and then oil from algae presently require filters, centrifuges, and solvent extraction systems that are both too energy intensive and costly. LiveFuels' integrative mariculture approach overcomes these obstacles to co-produce biofuels and food while maintaining a positive net energy balance.

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