

## Science and Technology Brief

# Oil from Microalgae

### Background

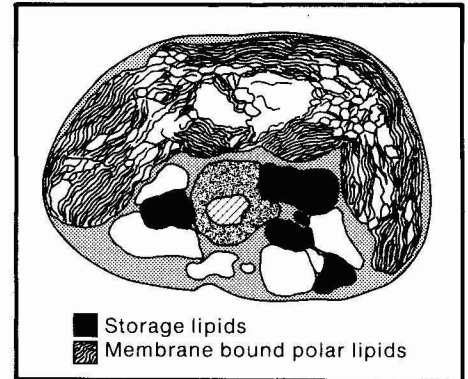
Many species of aquatic microalgae, when stimulated through environmental stress, convert a large part of their cell mass into lipids or oils that can be processed into gasoline or fuel oils. Furthermore, these algae have growth rates as high as five times those of most terrestrial plants, and some species flourish in saline or brackish water unsuitable for human or agricultural use.

Species that combine the features of high growth rates with high lipid yields and salinity tolerance need to be identified and characterized so that oil production will be possible on otherwise unproductive, arid lands.

### Accomplishments

Researchers from the Solar Energy Research Institute's Biofuels Program have collected and studied more than 100 species of microalgae from desert and saline environments. From these, SERI researchers have identified a number of lipid-producing species and have made cultures and literature concerning them available to researchers through its microalgae culture collection.

A systematic method of evaluating microalgal lipid productivity has been developed also. This system involves isolating dominant species, categorizing them by growth rate and ability to withstand and adapt to environmental stress, and investigating



Location of lipids in algal cell

their behavior under conditions similar to those likely to occur in commercial oil production.

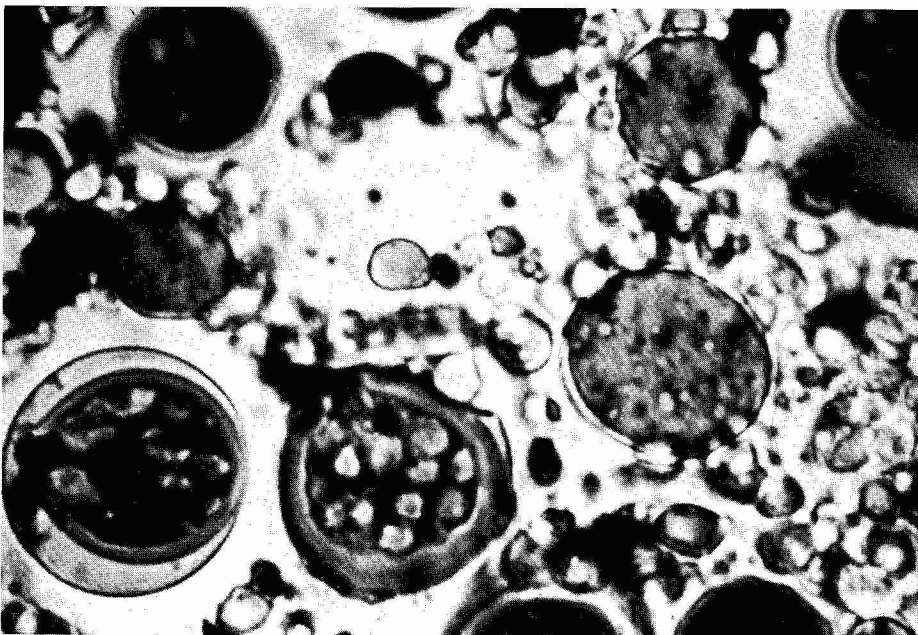
Information gained is being used to develop new culture techniques appropriate to large-scale production. SERI researchers have achieved consistently high lipid production in several species of algae.

### Applications

The algal collection and screening results, in combination with improved technologies for the production and harvesting of microalgae and the refinement of lipids, should make large-scale production of oils from microalgae feasible within the next 20 years.

### Benefits

Recent results suggest that microalgae production goals of 70 dry tons/acre year and lipid content of 60% can eventually be achieved. Thus, oil produced by microalgae could be competitive with the DOE mid-range projected oil price for 1998 of \$60/barrel.



Photomicrograph of algal cells

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## **Additional Information**

### **Publications**

*SERI Aquatic Species Program 1984 Annual Report*. (March 1985).  
SERI/PR-231-2659. 59 pp.

*Microalgae Culture Collection 1984-85*. (September 1984). SERI/SP-  
231-2486. 63 pp.

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