

Commercial Products of Algae: Biofuel & Agar

Dr. Sugandha Tiwari
sugandhatiwari7@gmail.com

Biofuel

Biofuels

Fuel derived from biomass (plants or algal material or animal waste) is known as biofuel.

Biofuels are **renewable form of energy**.

Biofuel

First generation biofuels- **ethanol**, primarily produced from food crops containing sugar and starch and **biodiesel** from oil seeds.

Second generation biofuels produced from non-food feedstocks such as **microalgae**.

Algal Biofuels

Microalgae have relatively high oil content and rapid biomass production.

Average **lipid content** varies between 1% and 70% but under certain conditions in some species it can reach 90% of dry weight .

Algal biomass can be grown in open ponds or closed photobioreactors.

Algal species	Oil Content (% dry wt.)
<i>Botryococcus braunii</i>	25-75
<i>Chlorella sp.</i>	28-32
<i>Cryptocodinium cohnii</i>	20
<i>Cylindrotheca sp.</i>	16-37
<i>Nitzschia sp.</i>	45-47
<i>Phaeodactylum tricornutum</i>	20-30
<i>Schizochytrium sp.</i>	50-77
<i>Tetraselmis suecia</i>	15-23

Algal biofuels

Botryococcus braunii accumulates long-chain hydrocarbons and ether lipids, similar in many ways to crude oil, in its extracellular matrix.

B. braunii accumulate up to 86% of dry weight hydrocarbons as well as methyl squalenes, both of which can be readily converted to biofuels.

Algal biofuels

Algal biofuel production was **still too expensive** to be commercialized in the near future.

Currently, algal oil production is still far more expensive than petroleum diesel fuels.

Agar

Agar-agar

Agar-agar is a complex polysaccharide.

It is extracted from certain species of red algae belonging to *Gelidium*, *Gracilaria*, *Gigartina*, *Hypnea*, *Pterocladia*, *Eucheuma*, *Chondrus* and other genera which produce and store it along with cellulose in their cell walls.

Agar-agar

The most extensive use of agar is as a **base for culture media** for algae, fungi, bacteria and tissues.

It melts between 90-100°C and becomes solid at low temperature.

It is resistant to attack by almost all microorganisms.

Agarose, a neutral gelling component obtained from agar, is now used as a gel in chromatographic and electrophoretic studies.

Agar-agar

Agar is also used as a **stabilizer or emulsifier** in food, cosmetics, leather and pharmaceutical industries.

Agar also finds good application in the **canning of fishes, sizing of fabrics** and in the paper industry.

It is often given as a **laxative** and is sometimes prescribed for treating a prolapsed stomach.