

# Algae as a Feedstock for Energy

## Biodiesel

Biodiesel, made from lipid extracted from microalgae can be used as fuel providing it meets the quality standard. This means that contaminants such as magnesium are below the maximum concentrations set out in the standard.

### EU Standard for Biodiesel: EN 14214 Fatty Acid Methyl Esters for Fuel

[http://standards.cen.eu/dyn/www/f?p=204:35:0:::FSP\\_SURR\\_WI:40952&cs=16800FD6264FC0B1EFAF82E387CB8188E](http://standards.cen.eu/dyn/www/f?p=204:35:0:::FSP_SURR_WI:40952&cs=16800FD6264FC0B1EFAF82E387CB8188E)

### Report on Technical Standards and Test Methods PD CEN/TR 16557:2013

[http://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP\\_PROJECT,FSP\\_ORG\\_ID:39066,6003&cs=17BB5F223794A0C2762A4B5090B07D79A](http://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:39066,6003&cs=17BB5F223794A0C2762A4B5090B07D79A)

## Bioethanol

Bioethanol for fuel is covered by a separate EU standard. Again, this sets out the criteria for purity.

### EU Standard for bioethanol EN 15293

[http://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP\\_PROJECT,FSP\\_ORG\\_ID:29433,6003&cs=12205B3C8F8168AB461AE98EEF3CD3251](http://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:29433,6003&cs=12205B3C8F8168AB461AE98EEF3CD3251)

### Report on Technical Standards and Test Methods CEN/TR 15993:2013

[http://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP\\_PROJECT,FSP\\_ORG\\_ID:34696,6003&cs=1D0CE7D6A814D2C4855A01D1AF2AC67AA](http://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:34696,6003&cs=1D0CE7D6A814D2C4855A01D1AF2AC67AA)

## Methane

EU Standard for biomethane are under development (prEN 16723), but further information can be found here:

[http://standards.cen.eu/dyn/www/f?p=204:22:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:853454,25&cs=1A6E2885FFA69ED2A8C4FA137A6CE F3DA](http://standards.cen.eu/dyn/www/f?p=204:22:0:::FSP_ORG_ID,FSP_LANG_ID:853454,25&cs=1A6E2885FFA69ED2A8C4FA137A6CE F3DA)

## The Renewable Energy Directive

The Renewable Energy Directive (RED) 2009/30/EC contains sustainability criteria that relate to end-products.

Most significantly, the RED states that total CO<sub>2</sub> emissions of biofuels produced should be 35% less than fossil fuel equivalents (rising to 50% from 2017, and 60% from 2017 for new installations). Of importance to algal biofuel production, therefore, is ensuring that fuel products do actually result in emissions reductions.