

Energy and Resources (A2)

Scope

to apply chemistry knowledge to extend the life of existing resources and to improve the efficiency of energy production and use.

Alternative energies

1. Biofuels
2. Fuel cells
3. Nuclear power.

4. Hydrogen

Biofuels : diesel and ethanol fuels

The use of ethanol as a fuel has received much attention in recent years as a potential alternative to oil-based fuels.

It makes use of local resources and is less polluting.

For many years Brazil and Columbia have powered their cars with ethanol made from sugar cane.

Many countries are overproducing grain crops.

They are researching ways of using such crops for the production of fuels.

In South Africa, chemical plants are being constructed to produce ethanol from maize.

The ethanol is blended with petrol in proportions ranging from 10% to 85%.

In the US, the sugar in maize is also being used to produce ethanol.

In Europe, sugar beet is being used to produce ethanol and oil seed rape is being used to provide a fuel suitable for diesel-powered engines.

Beside being used to produce ethanol, biomass can be used as fuel in other ways.

Example: In Mauritius, 'bagasse', the solid waste from sugar production, has been used to power electricity stations, allowing for more efficient use of biomass.

Bioethanol - green energy?

The biggest surprise has happened in the US.

The incentive to use bioethanol is to help mid-west farmers make use of the grain overproduction.

Approximately 40 million tonnes of maize are being converted to bioethanol and the market is growing.

The fuel is being sold as E85, where 85% is ethanol and the remainder petrol.

The energy available from this fuel only just exceeds the energy used in the farming to produce the crop.

The crop results in 1-2 units of energy.

There is a small net gain of 0.2 units of energy.

The process is not as efficient as it could be.

There is option to make better use of the bioethanol.

Instead of using it all for transport, it can be used to generate electricity.

Biodiesel

There are other alternatives to oil-based fuels.

These are being researched and used.

Biodiesel is one of these.

The term biodiesel refers to fuels that can be used in place of diesel.

That are usually made from vegetable oils or animal fats.

Exercise

Find three other materials, other than sugar cane, sugar beet and maize, that can be used to produce bioethanol.

Workings

starch source : rice, potato, sweet potato,
wheat etc