



## Hydrocarbon chemistry 1: Coconut oil

### Components

	NAME	DESCRIPTION	AUDIENCE
	<i>Coconut oil</i> teacher guide	This guide shows how biodiesel may be used to engage students' interest and introduce concepts of organic chemistry through the context of biodiesel. Questions for discussion are suggested.	teachers
	<i>Coconut diesel</i> video	The video shows the process by which diesel oil was produced from coconuts on Bougainville Island.	students
	<i>What is biodiesel?</i> background sheet	This background sheet for teachers has information about biodiesel and its uses.	teachers
	<i>Biodiesel dilemma</i> fact sheet	A student worksheet introduces biodiesel as an example of an organic compound that has social issues associated with its production.	students
	<i>Thinking about biodiesel</i> worksheet	This worksheet questions students' understandings on merits of using biodiesel.	students

### Purpose

To **Engage** students' interest in organic chemistry by looking at how diesel can be created from nature in a home set-up.

### Outcomes

Students will be able to:

- define organic chemistry, and understand that living organisms contain carbon;
- explain what biodiesel is; and
- give advantages and disadvantages of the use of biodiesel.

### Activity summary

ACTIVITY	POSSIBLE STRATEGY
Show video, <i>Coconut diesel</i> .	whole class
Discussion of video (see <b>Using the video</b> below)	small group discussion
Distribute and read fact sheet, <i>Biodiesel dilemma</i> .	whole group
Students complete worksheet, <i>Thinking about biodiesel</i>	individuals

### Technical requirements

A modern browser (eg Internet Explorer 9 or later, Google Chrome, Safari 5.0+, Opera or Firefox) is required to view the video. A high quality MP4 version of the video is available by download from the SPICE website.

The guide, worksheet, fact sheet and background sheet require Adobe Reader (version 5 or later), which is a free download from adobe.com. The worksheet is also provided in Microsoft Word format.

## Using the video

The video *Coconut diesel* is an extract from the film *An Evergreen Island* by Fablo Cavadini and Mandy King (Frontyard Films, 2000). It can also be accessed through the Australian Screen website at <http://australianscreen.com.au/titles/evergreen-island/clip3/>. Low, medium and high quality versions of the video can be downloaded from this website to your computer.

An uprising in Bougainville started in 1988 as a result of disputes over profit-sharing from mining activities. In 1990 Papua New Guinea, which had sovereignty over Bougainville, imposed a blockade on the island.

The video engages the interest of students in biodiesel production. It shows how local people on Bougainville Island used coconuts to produce oil for use in diesel engines when the island was blockaded.

Following the video, students may be posed questions to discuss as a whole class, or in smaller groups.

QUESTION	ANSWER
What is an alternative fuel?	one made from a renewable resource
What is a biofuel?	an alternative fuel made from a renewable biological resource
What are some other sources of biofuel?	canola, soybean and rape seed
What process was used in the video to produce biofuel?	collect coconuts, dehusk, separate flesh, ferment in old fridges, extract oil by boiling
What are some advantages of using coconut diesel over petroleum diesel?	cheap coconuts readily available less environmental pollution produced coconuts are a renewable resource
What are some disadvantages of using coconut diesel over petroleum diesel?	A large number of coconuts are needed to make a small amount of fuel (200 coconuts for five litres of fuel). Coconut oil solidifies at 25 °C, so a dual-tank system is usually needed, with petroleum fuel used at the start and end of a journey. Unless coconut diesel is refined it will damage an engine over time, although newer diesel engines have been altered to manage this.

Teachers may like to share a few other interesting facts about coconut diesel with the class:

- Coconut diesel was used in World War II by the military on both sides when petroleum diesel was in short supply.
- In 2004 the Philippines government started using coconut diesel in government vehicles.
- Biodiesel releases 93% more energy than is required to produce it.
- Coconut diesel is now a commercial concern in a number of Pacific islands, see <http://www.kokonutpacific.com.au/CoconutBiofuelKP.php>

## Associated SPICE resources

*Hydrocarbon chemistry 1: Coconut oil* may be used in conjunction with related SPICE resources to address the broader topic of organic chemistry.

DESCRIPTION	LEARNING PURPOSE
<i>Hydrocarbon chemistry</i> This learning pathway shows how a number of SPICE resources can be combined to teach the topic of organic chemistry.	
<i>Hydrocarbon chemistry 1: Coconut oil</i> This resource engages students in organic chemistry by showing them how fuel can be made from plants in a very basic home set-up.	Engage
<i>Hydrocarbon chemistry 2: Biodiesel</i> This resource further explores biodiesel production as students make their own biodiesel and compare its properties with those of other fuels.	Explore
<i>Hydrocarbon chemistry 3: Naming hydrocarbons</i> This resource explains to students how hydrocarbons can be drawn and systematically named.	Explain
<i>Hydrocarbon chemistry 4: Hydrocarbon economy</i> Australia uses a wide range of hydrocarbons for domestic and industrial purposes. How is this range supplied from available sources?	Elaborate

## Acknowledgements

Original concept design: Don Marshall and Sally Harban (John Curtin College of the Arts).

Thanks to Amanda King and Fabio Cavadini for the videoclip from *An evergreen island*, and Dr Steve Verhey (Central Washington Biodiesel) for assistance with the aerial image of land clearing for palm oil production (used in *The biodiesel dilemma*).

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