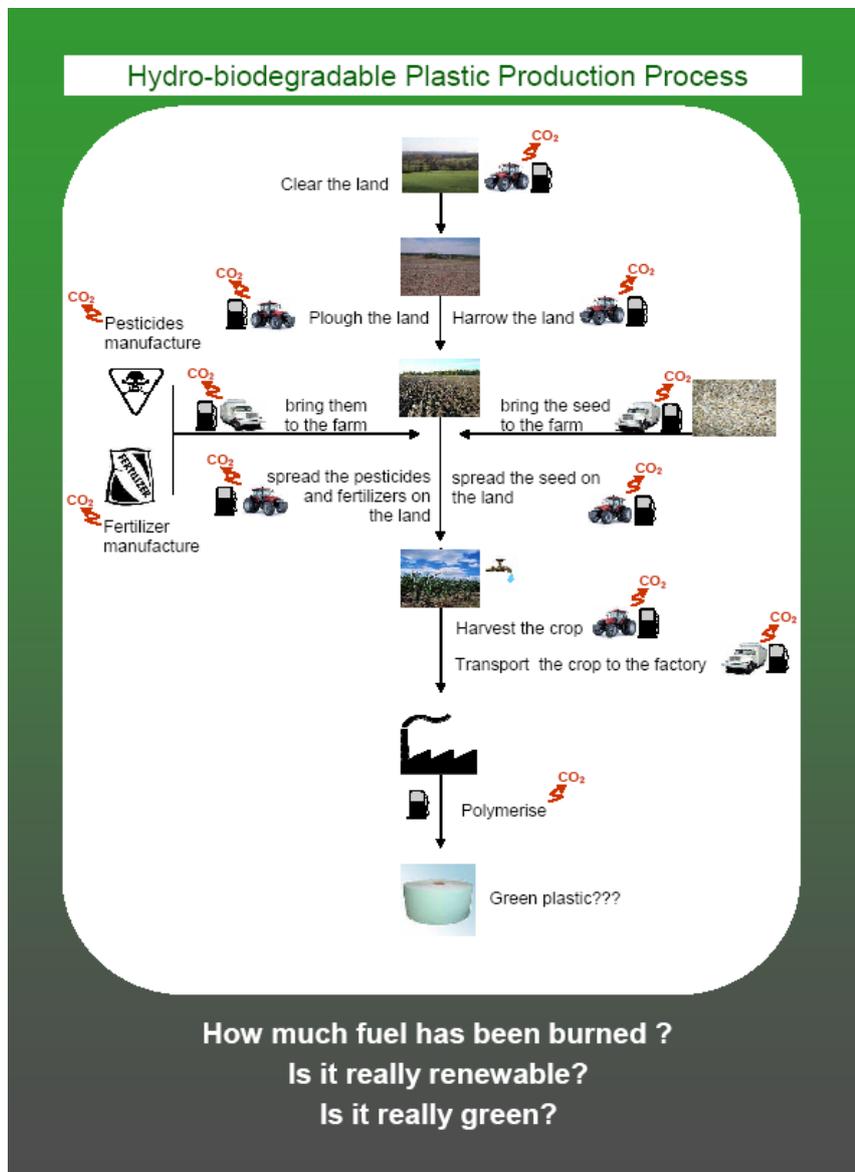


BIO-BASED IS THE WRONG TECHNOLOGY

Bio-based plastics are not “renewable” because the process of making them from crops is itself a significant user of non-renewable fossil-fuel energy and a producer therefore of greenhouse gases. Fossil fuels are burned by the agricultural machinery and road vehicles employed; also by the manufacture and transport of fertilisers and pesticides. Electrical energy, derived often from fossil fuel, is also consumed by the autoclaves which ferment and polymerise material synthesised from biochemically produced intermediates (e.g. polylactic acid from carbohydrates etc). They are sometimes described as made from “non-food” crops, but are in fact usually made from food crops such as corn.



On 18th July 2008 Dr Caroline Jackson MEP¹ issued a press statement as follows:

“the European Parliament is concerned by the use of scarce land and water resources around the world to produce biofuels in competition with food-crops and the same concern applies to growing crops to make biodegradable plastics, so I hope the European Commission will give more positive support to oxo-bio plastics.”

In February 2011 a Life Cycle Assessment by Intertek² was published by the UK Environment Agency which shows that **oxo-biodegradable plastic bags have a better LCA than paper bags or compostable plastic bags**. In May 2012 a further LCA by Intertek³ comparing oxo-biodegradable plastic with bio-based plastic and conventional plastic put oxo way ahead in its potential to reduce the plastic waste problem and its less harmful impact on the environment and on global warming. In its ability to reduce plastic litter, oxo-bio scored 75% better than conventional plastic, and bio-based plastics were worse than oxo in all 11 environmental impact categories.

In June 2009 a study was published⁴ by Germany's Institute for Energy and Environmental Research (IFEU), which concluded that “The current bags made from bioplastics have less favourable environmental impact profiles than the other materials examined” and that this is due to the process of raw-material production.

A disproportionate amount of land would be required to produce sufficient raw material to replace conventional plastic products, and a huge amount of water, which is in such short supply in so many parts of the world.

It is sometimes said that bio-based plastics are preferable because the crops from which they are derived absorb CO² when they are growing, but so did the vegetation which was there before.

Residues from some native starches can be seriously toxic; bitter cassava for example (tapioca) has a high level of hydro-cyanic glucoside present, which has to be removed by careful washing. During growth the plant is toxic to wildlife. Cassava is exhaustive of potash⁵.

Some bio-based plastics have high starch content and it is sometimes said that this justifies the claim that they are made from renewable resources. However, many of them contain up to 50% of synthetic plastic derived from oil, and others (e.g. some aliphatic polyesters) are entirely based on oil-derived intermediates. Genetically-modified crops may also have been used in the manufacture of hydro-biodegradable plastics.

Many articles in the international press have drawn attention to the danger of using “renewable” resources derived from plants as a substitute for petroleum products. They focus on the use of corn and palm oil to make “biofuels” for motor vehicles, but the same danger arises from the use of corn and other agricultural products to make hydro-biodegradable plastics.

1 Dr. Jackson was Chairman of the Environment, Public Health, and Food Safety Committee of the European Parliament, and was the Rapporteur for the EU Waste Framework Directive. See also www.packagingnews.co.uk/News/833174/MEP-Jackson-calls-EC-support-hydro-oxo-biodegradable-plastics/

² http://degradable.net/files/uploaded/Carrier_Bags_Report_EA.pdf

³ [http://www.biodeg.org/files/uploaded/Intertek_Final_Report_15.5.12\(9\).pdf](http://www.biodeg.org/files/uploaded/Intertek_Final_Report_15.5.12(9).pdf)

⁴ (<http://www.kunststoffverpackungen.de/en/news/LCA%20waste%20bags%20-%20Study%20Extract%20B.pdf>)

⁵ Pyxis CSB “Comparative Life Cycle Analyses for a variety of Degradable Food Packaging Materials” June 2007

The Charity "Actionaid" is campaigning against the use of land and water resources to produce bio-fuels⁶ They say "Biofuels are causing hunger:

- **by pushing up food prices** - burning huge amounts of food in our cars reduces the amount available to eat, causing global food prices to rocket.
- **by fuelling land grabs** - people are forced off their land to make way for biofuels plantations, leaving them unable to grow food to feed themselves or to sell.
- Despite originally being promoted as a solution to climate change, there's now scientific consensus that most biofuels are worse for the planet than fossil fuels."

The International Herald Tribune wrote on 31st January 2007 "*Just a few years ago politicians and green groups in the Netherlands were thrilled by the country's adoption of "sustainable energy" by coaxing electricity plants to use biofuel. Spurred by government subsidies, energy companies designed generators that ran exclusively on this fuel, which in theory would be cleaner than fossil fuels because it is derived from plants.*

*But last year, when scientists studied plantations in Indonesia and Malaysia, this **green fairy-tale began to look more like an environmental nightmare.** Rising demand for palm oil in Europe caused the razing of huge tracts of southeast Asian rain forests, and the over-use of chemical fertilisers there. Worse still, space for the plantations was often created by draining and burning peat land, which sent huge carbon emissions into the atmosphere.*

In Mexico on 25th January the **financial newspaper "24 ORE"** asked "*Food or fuel? Is maize better on the table as tortillas or in the tanks of cars, converted into ethanol and then bio-fuel? The price of the cereal has doubled in a year because of the high demand for ethanol obtained from maize to produce bio-fuels. It has created a real food crisis because the price of tortillas has increased greatly. They used to cost seven pesos per kilo but now exceed 18 pesos. Tortillas are the basic element of the Mexican diet.*

According to the **Earth Policy Institute**, "*The trade off between food and fuel risks creating chaos in the world market of food products" and they predict that **shortages and higher food prices will lead to starvation and urban riots***

Business Week 5 Feb 2007 edition "*The rise in the price of corn that's hurting US pig farmers isn't caused by any big dip in the overall supply. In the U.S., last year's harvest was 10.5 billion bushels, the third-largest crop ever. But instead of going into the mouths of pigs or cattle or people, an increasing slice is being transformed into fuel for cars. The roughly 5 billion gallons of ethanol made in 2006 by 112 U.S. plants consumed nearly one-fifth of the corn crop." US chicken producers are also being hit. The industry's feed costs are already up \$1.5 billion per year. Ultimately, these increases will be passed on to consumers, and there could be dramatic inflation in food costs.*

The UK House of Commons Environmental Audit Committee found⁷ that "**the stimulation of biofuels production by the [UK] Government and EU is reckless in**

⁶ <http://www.actionaid.org.uk/food-not-fuel>

⁷ Report 15th January 2008 (HC 76-1 of 2007-08). Para 53 <http://www.publications.parliament.uk/pa/cm200708/cmselect/cmenvaud/76/76.pdf>

the absence of effective mechanisms to prevent the destruction of carbon sinks internationally”

The Committee continued⁸ ***“A large biofuel industry based on current technology is likely to increase agricultural commodity prices and, by displacing food production, could damage food security in developing countries.”***

The use of biofuels in the EU has come under assault once again, this time from the European Commission's own scientific institute, the Joint Research Centre.⁹ An unpublished internal report from the research body questions whether the cost of their use is worth the benefits.

The report buttresses worries over biofuels expressed by environment Commissioner Stavros Dimas and research from environmental campaign groups that suggests biofuels may actually contribute to global warming through the deforestation and peat bog burning that is required for biofuel sources such as corn or oil palm trees.

On 3rd April 2009¹⁰ Dr. Peter Brabeck, Chairman of Nestlé said “The water issue comes back to three simple things. The first is infrastructure. If you look worldwide it's about 60% of fresh water that we are losing due to insufficient infrastructure. The second is political decisions. **It is absolutely unacceptable that we are using food for biofuels. We need 9,100 litres of water to produce one litre of pure diesel. This is not sustainable.**”

Friends of the Earth Europe said on 9th July 2008¹¹ **“The political tide in Europe is now turning against biofuels.** This vote [in the European Parliament] gives a clear political signal that an expansion of biofuels is unacceptable.” Originally viewed by both European leaders and environmentalists alike as an alternative to fossil fuels, biofuels have in the last year become something of an eco-villain, with countless reports showing how production of the fuel source in fact can result in greater greenhouse gas emissions and is a key cause of skyrocketing food prices.

The British Royal Society for the Protection of Birds is also highly critical of using land and water resources for this purpose¹² “Driven by the thoughtless policies of governments around the world, biofuels production is decimating swathes of important habitat and threatening the survival of many species, including Sumatran tigers, orang utans and countless bird species.

Biofuels advocates justify this destruction by citing their potential for combating climate change. However, whilst biofuels can play a part, many of those on the market today don't deliver the greenhouse gas savings they promise and some are even more polluting than the fossil fuels they're meant to replace.¹³ There is also evidence that taking land used for growing food, and converting it to growing biofuels, is reducing the amount of food produced and contributing to increasing prices.”¹⁴

On 6th March 2008 the United Kingdom's Chief Scientific Adviser warned that **if this continues the world will soon be unable to feed itself.**¹⁵

⁸ ibid para 63

⁹ EU Observer.com 18 Jan 2008

¹⁰ Financial Times http://www.ft.com/cms/s/0/fafa0d4a-1fe5-11de-a1df-00144feabdc0.html?nclick_check=1

¹¹ <http://euobserver.com/19/26463/?rk=1>

¹² <http://campaigning.rspb.org.uk/eactivist/user/userJ.jsp?CLS@74YQcNH906cWOsj3K3>

¹³ Compostable plastics can emit methane, which is a greenhouse gas 23 times more powerful than CO₂

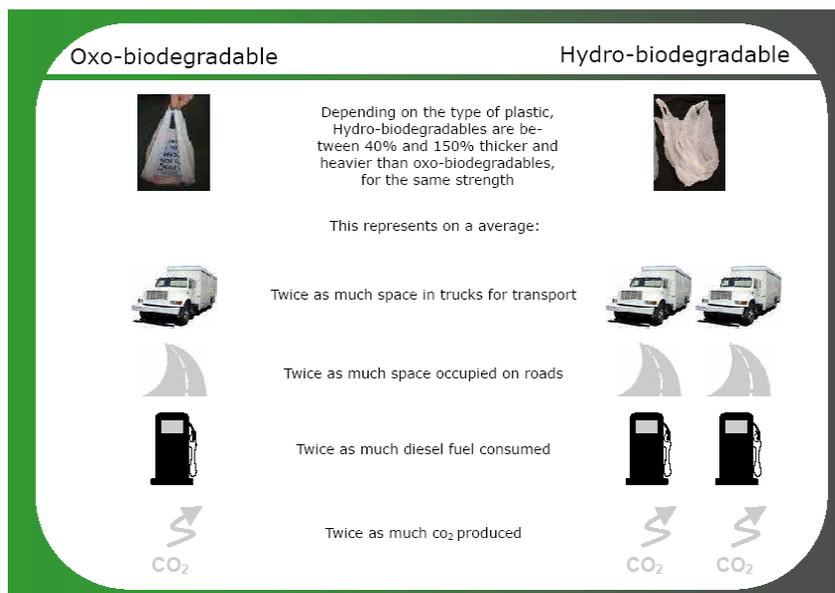
¹⁴ See also <http://www.slate.com/id/2283299/>

¹⁵ The Times 7th March 2008 <http://www.timesonline.co.uk/tol/news/environment/article3500954.ece>

As the use of renewable resources for polymer production increases, so does the impact on eutrophication due to the application of fertilisers to the land and run-off of nutrients into waterways.¹⁶

Vegetable-based “Compostable” plastics are up to 400% more expensive, and they are sometimes not strong enough for use in high-speed machinery. Usually they are not strong enough for weight-bearing packaging unless mixed with oil-based plastics. Also, it is wrong to use land, water and fertilisers to grow crops for bioplastics and biofuels, which drives up the cost of food for the poorest people. See also The Guardian 26th April 2008¹⁷

Bio-based “compostable” plastics can emit methane under anaerobic conditions in landfill, and methane is 23 times more potent for global warming¹⁸ than CO₂.



Compostability of plastics is really an irrelevance. The packaging technical manager of Tesco (Britain’s largest supermarket) said on 20th October 2009 that the supermarket “does not see the value in packaging that can only be industrially composted” and that “local authorities do not want to touch it, as it can contaminate existing recycling schemes.” A few days earlier, Tesco’s head of waste and recycling had told a conference that the supermarket group was “not taking compostable packaging any further.”

“Compostable” plastics are usually made from crops, and are marketed as compostable, although thick cross-section products, over 150 microns, will usually fail to meet the composting standards.

What is the point of bio-based or “compostable” plastics if they cannot be made into compost (because they are required to convert to CO₂ gas within 180 days), if they should not be sent to landfill (because they can generate methane in anaerobic conditions), if they cannot be recycled with ordinary plastic, if they are not really renewable (because some of them contain oil-derived materials and fossil fuels are used in the agricultural and polymerisation process), if they use scarce land and water resources, and if they are more expensive and less versatile?

¹⁶ ExcelPlas (Australia) 2004

¹⁷ <http://www.guardian.co.uk/environment/2008/apr/26/waste-pollution?gusrc=rss&feed=networkfront>

¹⁸ IPCC (Inter-Governmental Panel on Climate Change) Report page 47

www.ipcc.ch/pub/wg1TARtechsum.pdf

