

100% Biodegradable Potato Plastics

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Biofuels, bioplastics, Moss-based drugs and algae for food. All of these are pioneering areas of GreenTech progress. So what are the major developments in this forward-thinking field?

1. 100% Biodegradable Potato Plastics

The Italian company [Bio-On](#) from Bologna is specialized in the production of environmentally sustainable materials, including [Minerv PHAs](#). These are ‘green’ biopolymers with the same thermo-mechanical properties of the substances that make up the traditional plastics, but are instead 100% biodegradable.

Natural elimination of a biopolymers in water in just a few days is a rarely achieved and is an exceedingly tough challenge for Bioplastic researchers. Other bio-plastics manufacturers looking change the GreenTech Polymer industry include [Carbios](#) from France, who recently [opened a new factory](#) in the Auvergne region, and [Avantium](#) from the Netherlands



Polyhydroxyalkanoates (PHAs) are linear polyesters produced naturally by bacterial fermentation of sugars. (Source: Bio-On)

2. Biofuels: Algae for Aerospace, Bacteria for Biodiesel

The University of Munich ([TU München](#)) has built a unique global-climate simulating algal plant on the [Ludwig Bölkow Campus](#) in Ottobrunn (Bavaria). TU München and **Airbus** are particularly interested in the [production of bio-kerosene for aviation fuel](#) from Algae grown in salt-water closed loop systems.

And [synthesizing propane from Bacteria](#) is another avenue being explored by [Imperial College London](#) and [University of Turku](#) (Finland), which are continuing to develop an alternative fuel source with *E. coli* to help stop environmental damage caused by [Fracking](#).

There is also the [re-purposing of tobacco plants](#) using [Deinococcus, which is being used](#) by the French giant [Deinove](#) to make biofuels from organic waste materials with the US Tyton.



Biofuels in Bavaria: Airbus and TU Munchen are using their Algae Greenhouses to investigate Aviation biofuel sources

[3. Bacteria Lighting up your Streets](#)

What if we could use less electricity to light today's civilizations? [Glowee](#) is a French start-up willing to take on this challenge by using genetically modified bacteria to produce light. [Labiotech had the chance to talk](#) with the company's CEO **Sandra Rey** on their [Urban-focused Bioluminescent tech](#).

The [University of Sevilla](#) (Spain) has also patented a method for culturing the bacteria *Vibrio fischeri* and the algae *Pyrocystus fusiformis* in order [to drive bioluminescent devices](#) that emit light without electricity consumption.

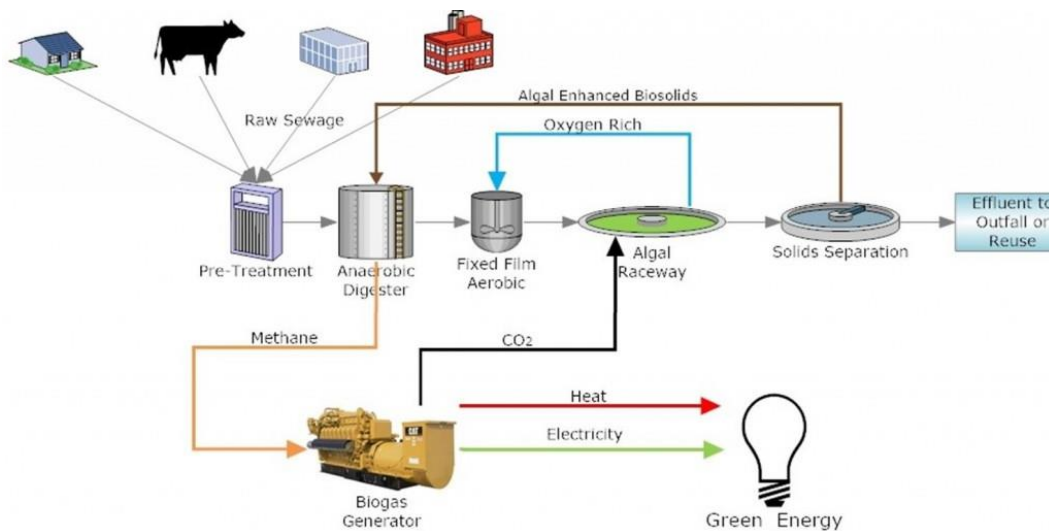


[4. An Alternative Water Source...](#)

[Aquanos](#) has the solution to expensive and energy intensive waste-water treatment. This Israeli Biotech start-up has revamped the pre-existing Microalgae technique for sewage remediation to be far more efficient, and is [well ahead of Cambridge researchers looking to do the same](#).

It also generates biomass products and is being trialed on a Northern Israeli kibbutz, with projections for use in the developing world.

Their two-step bioreactor system (dubbed '**The Gemini**') dramatically cleans out organic waste from industry effluence by 70-80% with one run, and up to **95%** on the second run – amazing!



[5. Returning Medicine to Nature: Growing drugs in Moss](#)

A Heilbronn (Germany) based biotech [Greenovation](#) has managed to [grow a protein which could be used as an enzyme replacement therapy](#) for patients who suffer from **Fabry disease**, a rare genetic lysosomal storage disorder.

Moss-aGal is a recombinant form of human alpha galactosidase. Greenovation has used [its proprietary BryoTechnology to express the moss-aGal protein](#) in *Physcomitrella patens*, which attaches mannose molecules to the surface of the moss aGal protein.



[6. Saving the Oceans: Algae in Sweden is Vegan and GMO-Free](#)

By running an innovative microalgae farm in Hammenhög (Sweden), [Simris Alg](#) produces a vegan and **GMO-free** Omega-3 fatty acid alternative to oily fish derivatives for industry. This Swedish start-up is winning all kinds of awards for their almost too-good-to-be-true approach to dietary Omega-3 oils.

Microalgae have already been established as incredibly valuable to the biotech industry, in part due to their [ancient genetic diversity](#) and resilience, providing a bio-platform for production of food supplements, and cosmetically in textile dye production for design ([Algaemy from Berlin](#)).



The many biotech applications of Algae...The SolarLeaf project in Hamburg (Left – Source: Arup), Textile-printing with Algal dyes (Centre – Source: Blond & Bieber) and production of Omega-3 dietary alternative to fish (Right – Source: Simris Alg)

There is even an ‘Algae Building’ in Hamburg (Germany), which is entirely sustained by an Algae bioreactor system (developed by [Colt International](#)) which encases the building for biomass, insulation from noise, cold and [generates a natural source of heating](#).

[7. Self-Healing Bacterial Buildings](#)

The [University of Cardiff](#) (Wales) leads a team with the [University of Bath](#) (SW England) and the [University of Cambridge](#) in the first *ever* UK trial of a living, self-healing concrete prototype.

Overtime, **bacterial microcapsules** embedded in the walls secrete Calcium carbonate (CaCO_2 —much like reef forming corals) when released, which hardens, supports and seals fissures.

Since it is estimated that around €56Bn a year is spent on building repair and structural maintenance in the UK alone (and **\$2.2 trillion** in the US), [this self-healing organic concrete](#) could change the future of building materials.

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