



CLEAN AND GREEN

RICHARD LOCK TELLS OLIVER STALLWOOD WHY HE LEFT BEHIND A SECURE, WELL-PAID JOB TO JOIN THE FIGHT AGAINST FOSSIL FUELS



Clean bill: Richard started his career in biochemistry

IF PERSONAL hygiene seemed important a few years ago, there's nothing like an ongoing global pandemic to remind us of the importance of cleanliness. Research has found that people now wash their hands almost twice as much as before Covid and the number of people who admit to sneezing into their hands without washing has been halved.

But while many of us have a new attention to cleanliness - a bonus for those who have endured a packed Tube in summertime - what we use to wash our homes and our hands and bodies still gets flushed away out of sight.

Biosurfactants are a key ingredient in the manufacture of detergents and personal care products, but current mainstream goods primarily use hydrocarbon, petrochemical and tropical oil-based surfactants, which can cause significant harm to the environment and are based on unsustainable fossil fuels.

While environmentally friendly products do exist in this sector, they use a costly yeast-based batch fermentation process, which results in high-priced products that only a limited market can afford. And if there's another thing the global pandemic has taught us it's we can't throw money down the drain, either.

Richard Lock is a scientist who worked in biochemistry almost his whole career, starting with developing polymers for diesel fuels to nuclear science. His company Holiform has developed a way to mass-produce environmentally friendly yeast-based biosurfactants - basically the product that cuts through oil and grease and helps us clean our bodies or a work surface - to create cleaning products that are the same price or cheaper than their petrochemical alternatives.

Richard left a well-paid job to become MD of Holiform, spurred partly by the birth of his daughter but also by an increasing frustration with industry-wide greenwashing. He explains: 'I got to an age where I was getting fed up with hearing about pseudo green.

'Marketing is powerful but they have gone off-piste in my mind - saying stuff is green but

it's not. How can you expect a consumer to understand what they are really buying? I gave up a very secure job to join a start-up and the reason I left is I wanted to be part of the solution and not the problem.'

For Richard, the realisation of the scale of the challenge to save the planet came from when he was working in places like Mumbai, where he was formulating laundry detergents.

'I got to see the world and how it was going. The sheer number of people and the sheer usages of everything. In the Western world we think we are busy and packed but when we go to other countries and see what the population

is and how people are fighting to survive, we have to make it easier for everyone to make greener choices both in the UK and also around the world.'

Holiform is an award-winning University of Manchester biotech spin-off based at Sci-Tech Daresbury in the Liverpool City Region.

Using a system similar to brewing beer, it uses a yeast called *starmerella bombicola*. By using rapeseed oil and sugar they force a fermentation that creates crude sophorolipid solution that can be bled off.

The clever bit, which makes it a much cheaper process and more sustainable, is that the yeast is not killed off during each process, but fed back live into the fermentor.

The by-product becomes animal feed and the only significant CO2 emissions come from the stirrer. No nasty chemicals or solvents are involved. Richard explains that carbon

used from fossil fuels to create petrochemical surfactants takes more than 350million years to be replaced into the ground using natural processes, while fermentation using raw materials from annual crops recaptures the carbon used within a 24 to 48-month period.

The rapeseed oil and sugar being used is non-GMO and the crops are those that are already used for crop rotation by farmers - so no need right now to find more land for crops just for cosmetics.

But what if the system really takes off; does this cause another problem as a by-product?

'I welcome that question,' he says. 'The reason we have been successful, I believe, is that we have begun with a solution and want to constantly improve it.

'I think big companies like to make things more complicated than they need to because they feel important

when they make something complicated. I believe that you start with the journey and get something you know you can improve on.'

The plan for Holiform is to use oil by-products as the basis. It is estimated that UK caterers produce between 50 to 90million litres of waste cooking oil each year for a start.

'We are looking for companies where we can use that. We want people to give us their rubbish oil, we can deal with it and use it to clean your clothes. This is not about finding the magic bullet at the beginning but rather developing new ways to replace fossil fuels.

'If we use the same brain power that we used when we first got oil out the ground and used it for fuel and cleaning then that is absolutely possible. If we did it before we will do it again.'

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