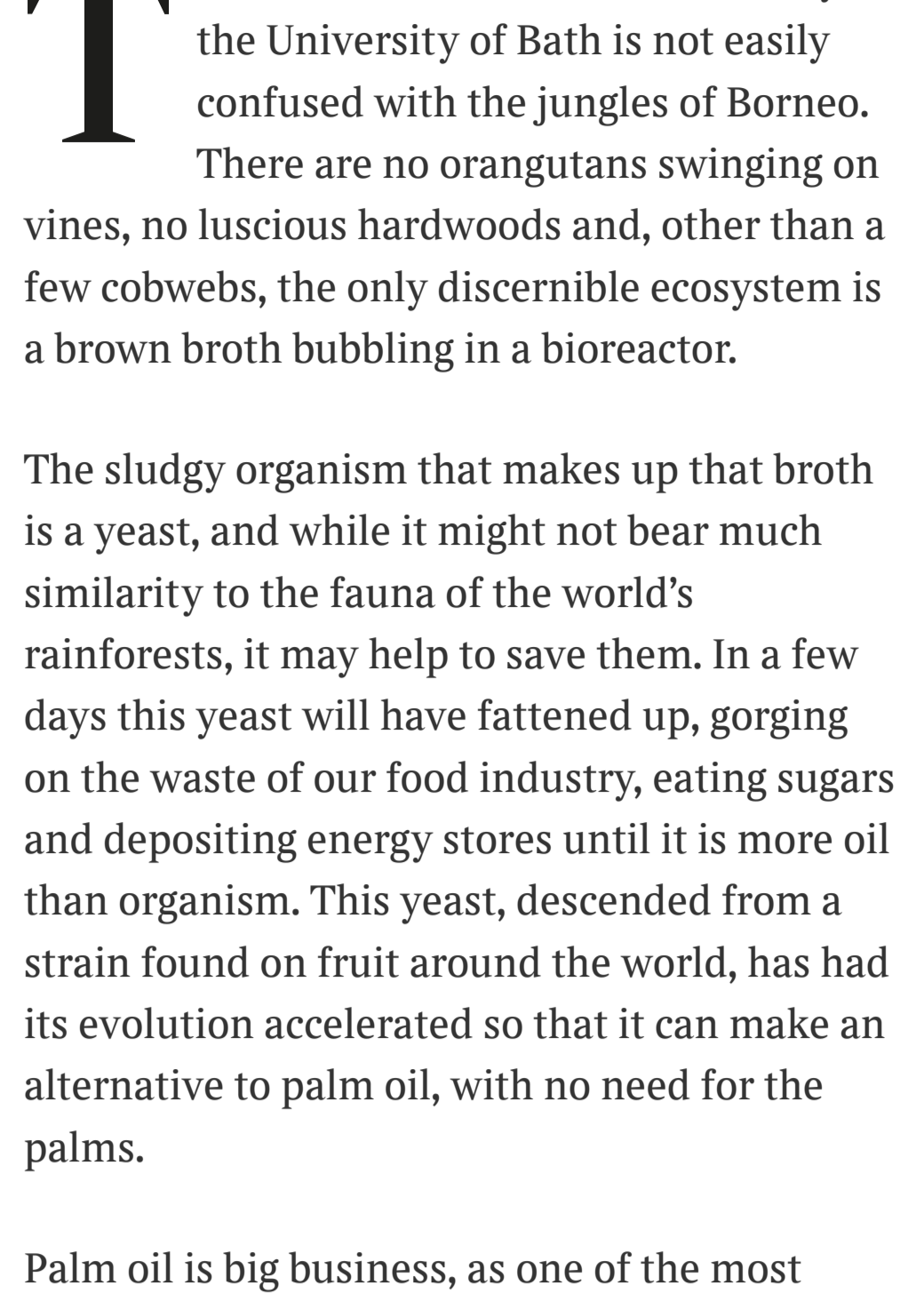


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Palm oil alternatives: is the cure for our addiction bubbling in a vat?

It's tasty, versatile and cheap — but it lays waste to the tropics and kills orangutans. Scientists are cooking up a solution, finds Tom Whipple



Deforestation driven by palm oil plantations has destroyed habitats for orangutans GETTY IMAGES

Tom Whipple, Science Editor
Thursday September 22, 2022, 12.01am, The Times

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The downstairs room of a laboratory in the University of Bath is not easily confused with the jungles of Borneo. There are no orangutans swinging on vines, no luscious hardwoods and, other than a few cobwebs, the only discernible ecosystem is a brown broth bubbling in a bioreactor.

The sludgy organism that makes up that broth is a yeast, and while it might not bear much similarity to the fauna of the world's rainforests, it may help to save them. In a few days this yeast will have fattened up, gorging on the waste of our food industry, eating sugars and depositing energy stores until it is more oil than organism. This yeast, descended from a strain found on fruit around the world, has had its evolution accelerated so that it can make an alternative to palm oil, with no need for the palms.

Palm oil is big business, as one of the most important ingredients in food and cosmetics. It is also destructive business. Where there is a palm oil plantation, more often than not, there was once a rainforest. Across the tropics, palm oil agriculture is estimated to account for 5 per cent of all deforestation. When it isn't grown on virgin forest, it is often grown on land that could be returned to forest, were it not valuable in palm oil production. In a wealthier and more populous world, demand for this oil is only going to grow.

“There's only one way to go to meet that demand: by going further and further into the rainforests. Palm oil is only grown in the tropics,” says Chris Chuck, a professor of chemical engineering at Bath. For your palm oil needs, in other words, more orangutans will die. “There has to be another way of producing it.”

If we think of palm oil at all, it is, perhaps, as the thing that makes Nutella so guilt-inducingly tasty. It is one of those mysterious ingredients, like MSG (monosodium glutamate, an umami flavouring), that is used in mysterious food processes and which along the way, we realise, harms [the planet](#).

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People think the problem with palm oil is that it kills orangutans. That is true, but it isn't why it's such a big a problem. The real problem with palm oil is that it's fantastic. It is odourless and pale, meaning it can be used unobtrusively as a food additive. It is solid at room temperature, meaning it can find its way into a wider range of confectionary. It is naturally saturated, and can be reacted with other chemicals to form more than a 100 different byproducts that are then used in cosmetics.

And, of course, Chuck says, “it has that mouthfeel that we want”. It is the biscuitiness in the biscuit, the smoothness in the chocolate spread. This oil, thanks to its unique properties, and the uniquely high productivity of the plant it comes from, is everywhere.

Walk into a supermarket and pull something off the shelves. It could be food, it could be cosmetics, it could be a cleaning product. There is, roughly, an even chance that what you have in your hand contains palm oil. In the UK each person consumes 7kg of palm oil a year, almost entirely without knowing it.

It's not just that the oil is better than the alternatives. It's also that the alternatives aren't necessarily a win for the environment either. Even if you manage to reproduce the same taste with, say, rapeseed oil, the amount of land needed to do so will greatly exceed that used for a comparable amount of palm oil.

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Some companies have, nevertheless, tried to replace it. The supermarket Iceland made an advert featuring sad orangutans and pledged to remove palm oil from its own-brand products. It succeeded, but then the Ukraine war happened and it couldn't get enough sunflower oil. Other companies have tried to make it ethical. In 2004 the industry set up the Roundtable on Sustainable Palm Oil (RSPO), aiming to ensure that oil on sale did not cause damage. Certification from this group, similar to a Fairtrade stamp for palm oil, is far from perfect. If it works as intended, and many environmentalists dispute that it does, it means the palm oil you are consuming did not itself directly result in a tree being chopped down. It does not, however, guarantee that the land it was produced on was not previously forest.

It's nevertheless true that some companies are going to great lengths to buy palm oil with a halo, and this is a good thing. About 20 per cent of palm oil is RSPO-certified, but what of the rest of the industry? Do image-conscious companies cornering the least harmful palm oil market do anything to prevent the actual harm, rather than ensuring the most harmful palm oil is simply bought by those companies that don't care? “The annual growth of the sector is still about 7 per cent,” says Chuck. “You can figure where that comes from.”

What if you could make palm oil without needing to plant any palms at all? This is the question that Chuck and the Clean Food Group, the company founded on his research, wanted to answer.

Making palm oils from other organisms is not new. Scientists have, for instance, experimented with genetically engineering crops that don't only grow in the tropics, such as tobacco, to produce oils. For almost a decade, various groups have been trying to trick algae into making it. Many have succeeded, but the difficulty has been scaling the process up to make a dent in a business worth tens of billions.

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Synthesising palm oil starts as biology and chemistry, and rapidly becomes animal husbandry. How do you make your organism happy when you're growing it at bulk? Or, perhaps, how do you make it unhappy enough that it lays down fat in anticipation of lean times, but not so unhappy that in the process it dies? The advantage of yeast is that many of these problems are solved. In the reactor in the basement of the University of Bath, researchers are making kilograms of yeast a week. There are plans under way to upgrade this figure to tonnes, and they have signed a collaboration agreement with a big, undisclosed British retailer.

One reason they are confident that it will keep on scaling is that none of this is that new. We know that making hundreds of tonnes of yeast a week is feasible, because that is what is already done in plants serving the brewing industry.

There is, nevertheless, much to be solved. There is the price: thanks to the great oil-making efficiency of the palms, palm oil is dirt cheap. Another is the inputs. Do we have enough food byproducts that we can feed this yeast solely on waste? If not, feeding the yeast will require growing crops here.

And yet, something needs to be done. In the basement, the yeast is getting fatter. In so doing it is making something bland, pale, apparently uninteresting — but oh so yummy. In a distant jungle, oblivious, an orangutan swings through the trees.

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