

BUSINESS DAY | NYT NOW

Companies Quietly Apply Biofuel Tools to Household Products

By STEPHANIE STROM MAY 30, 2014

Consumer products containing ingredients made using an advanced form of engineering known as synthetic biology are beginning to show up more often on grocery and department store shelves.

A liquid laundry detergent made by Ecover, a Belgian company that makes “green” household products including the Method line, contains an oil produced by algae whose genetic code was altered using synthetic biology. The algae’s DNA sequence was changed in a lab, according to Tom Domen, the company’s manager for long-term innovation.

Ecover calls the algae-produced oil a “natural” replacement for palm kernel oil, which is in such high demand that environmentalists are concerned that tropical rain forests are being felled to grow palm trees, disturbing ecosystems and threatening endangered animals.

“Finding a sustainable source of palm oil is, of course, difficult,” Mr. Domen said. “This new oil is a more sustainable alternative from a new technology.”

That technology is synthetic biology, which involves the creation of biological systems intended for specific purposes. Synthetic biology, originally aimed at producing biofuels, has been around for about 20 years, but applications have only recently begun to emerge across several industries including cosmetics, flavorings and scents.

Unilever recently announced that it was using algae oil made by a company called Solazyme in Lux, a popular soap. The two companies signed an agreement in 2009 to explore use of Solazyme’s products in the consumer giant’s goods.

But in an illustration of how reluctant companies may be to disclose the use of synthetic biology, it is unclear whether the oil in Lux was generated

through the same synthetic process. Unilever declined to comment.

These announcements have prompted some environmental groups and consumer activists to call for labeling that would disclose whether synthetic biology was used to make product ingredients.

“We support Ecover’s determination to move away from using unsustainable palm oil, but would ask your company to reconsider the false solution of using ingredients derived from the new genetic engineering — synthetically modified organisms,” the groups wrote in a letter to the company.

An ingredient crucial to malaria drugs, artemisinin, is already being produced from a yeast altered through synthetic biology. Specific brands have not been disclosed.

Solazyme points to substances like rennet, a key processing aid in cheese-making that requires an enzyme called chymosin to promote clotting. Traditionally, calves’ stomachs were used to provide that enzyme to curdle milk for cheese. But since the late 1990s, rennet has been generated by a microbe whose genetic code was altered with the insertion of a single bovine gene, and that process is the one most widely in use now in the United States.

The processes using synthetic biology involve techniques that more extensively alter genetic code. Those include “artificial gene synthesis,” in which DNA is created on computers and inserted into organisms, and other methods for changing DNA sequences and genes within organisms to alter their function.

Such techniques are used to coax bacteria, fungi and other organisms into producing substances they do not naturally produce. The algae now churning out the oil Ecover is using in its laundry detergent, for instance, would not generate such oil without genetic tinkering.

“It is not possible to harvest algae in the sea and get this oil,” Mr. Domen said.

According to the ETC Group, a Canadian organization that tracks emerging technologies, Ecover is so far the only company that has publicly confirmed the use of synthetic biology to create an ingredient found in a specific product, its Ecover Natural Laundry Liquid.

Ecover buys the ingredient, algal oil from Solazyme, which used to describe itself as a synthetic biology company but has taken the term off its website.

“We use both natural strains, classic breeding, and strain selection, along with the tools of modern biotechnology, to produce a wide variety of oils and

ingredients,” Genet Garamendi, a spokeswoman for Solazyme, wrote in an email.

Solazyme describes the organism that produces the oil as “an optimized strain” of single-cell algae “that have been in existence longer than we have.”

The company already sells its own line of cosmetics made from a different algal oil, Algenist, that are carried in stores like Sephora and Nordstrom.

Solazyme pointed to the environmental benefits of its processes and noted that the World Wildlife Fund, Rainforest Alliance and other environmental groups support its work. “We use molecular biology and standard industrial fermentation to produce renewable, sustainable algal oils that help alleviate pressures on the fragile ecosystems around the Equator that are frequently subject to deforestation and habitat destruction,” Jill Kauffman Johnson, the company’s director of sustainability, wrote in an email answering questions posed to Ms. Garamendi.

Other environmental and consumer groups, however, want Ecover to note the use of synthetic biology in the new oil it is using so that consumers know what they are buying.

The groups acknowledge that the Solazyme oil itself — in the Ecover detergent — does not contain genetically engineered ingredients in the conventional meaning of the term. Rather, the organism producing the oil has been genetically altered.

But they contend that calling products that contain such ingredients “natural,” an obvious selling point for companies, gives a false impression. “This is not what consumers think of when they see the word natural on a label,” said Michael Hansen, senior scientist at Consumers Union.

At this point, the field is largely unregulated. A scientific committee of the United Nations Convention on Biological Diversity is expected to discuss the budding science and the potential regulatory implications at a meeting next month.

“For us, what’s significant is that there is no government oversight specifically aimed at this new technology, and there has been no regulation or even discussion about how to frame regulation – and yet these products are already moving onto the market,” said Jim Thomas, a researcher with the ETC Group.

Synthetic biology companies note that some of the microorganisms they create to make ingredients like orange and grapefruit flavorings have passed

the muster of the Environmental Protection Agency, and that the Food and Drug Administration has declared the ingredients they produce as “generally recognized as safe.”

A new paper on the regulation of synthetic biology from the J. Craig Venter Institute, a nonprofit research group, noted that the techniques of synthetic biology creating genetically engineered organisms will fall outside some existing regulatory authority and that the number of such organisms coming to market may overwhelm regulators. “As engineered microbes become increasingly complex, risk assessments will pose a greater challenge,” according to the report by the institute, which was founded in part by Dr. Venter, a pioneer in genomics.

The industry is preparing to address questions about the impact of using such technology. This month, SynBioBeta, which bills itself as “an organization dedicated to nurturing stable growth of the fledgling synthetic biology industry,” hosted a forum where companies like Amyris, Evolva, Monsanto and DuPont Industrial Biosciences discussed how best to shape public perception and prevent regulatory scrutiny.

Some of the same companies are now busily churning out vanillin, resveratrol and citrus flavorings from yeast and other microorganisms that are a product of synthetic biology for use in foods.

At the offices of Amyris in Emeryville, Calif., company officials last year showed two products to a reporter for The New York Times. Those products, Peter Thomas Roth Oilless Oil and Elizabeth Arden Visible Difference moisture cream, use squalane, an oil typically derived from olives and in some cases from shark’s liver. But Amyris said these products contained squalane that Amyris produced from yeast altered by synthetic biology. Amyris now has about 300 products that contain its squalane.

Through their public relations firms, Elizabeth Arden and Peter Thomas Roth declined to be interviewed or confirm their use of Amyris’s oil.

On its website, Peter Thomas Roth says that the squalane in Oilless Oil is derived from a fermentation process involving sugar cane. It does not say the sugar cane is first consumed by a microorganism whose genetic code was altered in a lab.

Elizabeth Arden simply lists squalane as an ingredient in its cream.

Mr. Domen of Ecover said there had been a big internal debate about use of the algal oil but that the environmental benefits ultimately outweighed

concerns over any negative consumer reaction.

The oil is produced by altered algae grown in a bioreactor, Mr. Domen said, and fed with sugar cane. The algae is then harvested and pressed to release the oil, he said.

Mr. Domen said that Method, a popular line of household products that Ecover bought in 2012, also is considering using ingredients generated through synthetic biology processes.

He referred questions about how Solazyme disposes of the remains of the algae once the oil is extracted to Solazyme. The company responded: "Resulting biomass is completely inert and can be used in a number of applications that are beneficial to reducing greenhouse gases."

Ecover said it was working with Friends of the Earth, ETC and other groups to address their concerns about labeling its detergent. "We're currently still looking into that, specifically, on the labeling, how we can best communicate this," Mr. Domen said. "We definitely want to provide all the information necessary."

Andrew Pollack contributed reporting.

A version of this article appears in print on May 31, 2014, on page B1 of the New York edition with the headline: Changing the Science of Soap.