

Materia Nova

by Silvia Bombardini



Precious Plastic

The word *plastic*, from the Ancient Greek *πλαστικός* – ‘to form, mould’ – was reportedly coined by Leo Baekeland, a chemist in New York in the early 1900s. Also known as ‘The Father of the Plastics Industry’, Baekeland is to be held responsible for the invention of polyoxybenzylmethyleneglycolanhydride, or bakelite: the world’s first commercially viable plastic, made fully from synthetic components in 1907. Bakelite came to be used in place of ivory for billard balls, telephones, and jewellery. Diana Vreeland is said to have loved it, and in his book *Form and Re-form*, published in 1930, Paul Frankl counted Bakelite, among other synthetics, as the ‘Materia Nova’ of his time. *“These new materials are expressive of our own age.”* he wrote, *“They speak in the vernacular of the twentieth century. Theirs is the language of invention, of synthesis. Industrial chemistry today rivals alchemy! Base materials are transmuted into marvels of new beauty”*. But Bakelite soon made way for newer alternatives, and though it is still favoured in some fields for its fine polish – for dominoes and chess pieces, for example – commonplace plastic as we know it today retains little of its charm. High-density

polyethylene, that of plastic bottles and plastic bags, was first introduced in the mid 1950s, and the world from then onwards just couldn't seem to get enough of it.

According to the United Nations, plastic production has increased globally from 1.5 million tons in 1950, to 15 million tons in 1964, to 300 million tons of plastic in 2016, with the figure expected to double by 2025. Humanity has grown more and more enamoured with it, yet paradoxically, we've grown all the more careless with it at the same time too. Scientists at the University of California in Santa Barbara had estimated that of all the plastic ever produced, some 8300 million tons in 2015, 6300 million tons had gone on to become waste. Most plastic is used just once, then thrown away – we use this most precious material, made from the world's black gold, petroleum, and virtually indestructible, for such things as nappies and cotton buds, to be used but for the shortest time and yet whose lifespan is destined to exceed our own. Nearly all the plastic that ever was still is, in some form or other.

A lot of it, is in the seas. 150 million tons to date, and the World Economic Forum counts that over 8 million more tons of plastic enter the oceans every year. A recent article in *The Economist* reports that the Yangtze river alone carries 1.5 million tons. Ocean plastics are decimating the world's marine fauna: from the dangerous 'ghost nets' abandoned by fishermen, to the plastic bags turtles can't tell from jellyfish, and eat. In February a young sperm whale – an endangered species – washed up on a beach in southern Spain, with 29kg of plastic in its stomach. Marine waste floats and swirls in gyres, and gets fragmented in tiny plastic particles often too small to see but omnipresent. We call these, 'plastic soup'. There are five major gyres around the globe, and the biggest of them is the Great Pacific garbage patch, or Pacific trash vortex: estimates around its size are difficult, but it is believed that it could almost be as big as an eight continent.

How did this new material, which in the 1930s spoke *the language of invention*, come to be the cause of an environmental crisis as serious and urgent as climate change? It all comes down to how little we've valued it, how much plastic has had to bend to the needs and whims of the disposable culture of our time. But plastic will long outlast us – and a new generation of makers are pioneering a different way to think about it, to care for it and love it, as much perhaps as Paul Frankl did. Post-consumer plastic waste itself can metamorphose into *marvels of new beauty*, that will speak in the vernacular of the future, over and over again, for the years and decades to come. In the following pages I speak to some of them, in the hope to reinstate some of the great expectations we had for plastic, back in the days when it was new and wondrous. Plastic can still be a pleasure today: just like all pleasures, still, it is best taken in limited doses.

Precious Plastic

From the Netherlands and around the world, the Precious Plastic project aims to demystify the recycling process. Rather than sending our plastic waste away, to places where we suppose they would know what to do with it, they want us instead to hold on to it, and hold on if possible to our neighbours' waste too. With a quartet of tried and tested machines – the *shredder*, *extrusion*, *injection* and *compression* machine – and step by step video tutorials on how to build them, Precious Plastic's goal is for every village and city block on the planet to run its own local economy around plastic products recycled at home. And in the five years since the first one was built, Precious Plastic's machines already are multiplying: from Mexico to Indonesia and everywhere in between. They spawn stools and bowls, flower pots, coasters and tiles. Mattia Bernini, in-house strategist at Precious Plastic, tells me more about their journey, and journeys, and why we would all do well to think more of trash – to think of it, indeed, as treasure.

S.B.: Recycling at home, for many of us, still consists in sorting our plastic in a separate bin and hope for the best – to later purchase again, perhaps the very same products recycled out of it. Precious Plastic aims to change that, and give back to recycling craftsmen, in a sense, the fruit of their own labour. How did the project begin, and what sort of challenges did you encounter in making it happen? How much has it evolved since then?

M.B.: Precious Plastic began in 2013 with Dave Hakkens' graduation project at the Design Academy in Eindhoven. Since then there have been endless challenges that we've had to face, and overcome over time. We work on versions, so with each new version we've worked on a new design brief, depending on what was needed. With version 2.0 the main challenge was to build these four machines, and to create the opensource materials that would make it as easy as possible for people to replicate them worldwide. This included making them as cheap as possible, as well as making them in such a way that they can be built using very basic tools, so that not only people in the more affluent and developed countries can reproduce them. Then for version 3.0, another big challenge was to make sure that all the machines that had been built around the world by then were being used as best as they could be. We did a whole year of experiments and tests, to basically create a series of techniques that can be implemented with the machines. So that people around the world who already have them can really start producing more and more products for their local markets.

The project has evolved immensely: with version 1.0 there were only three machines, and maybe three people replicated them in Europe. Then with version 2.0 there were four machines, and about 400 people who reproduced them. We launched version 3.0 in November, so it's very early still to draw conclusions, but there are ever more people creating amazing products all around the world that are surprising us on a daily basis. So it's changed immensely and I suspect that over the next few years there'll be a lot more changes still.

S.B.: We live in times when good ideas are swiftly marketized – but as you mention, the blueprints and tutorials for building Precious Plastic’s machines are now freely accessible to everyone online. Why was this so important for you? Could you talk me through the steps, once I’ve built them, to turn say, a crate of old milk bottles into spinning tops?

M.B.: To have the machines’ blueprints freely available online, for us that was the bottom line really. It’s really what the project is built upon. We’re not in this business to make a profit, we’re here to solve a problem. We don’t care about money, all we care about is the gigantic problem of plastic waste that humanity is facing, and we believe that to put a price on this kind of knowledge would only slow the process, and minimize its impact. Working with an opensource philosophy for us is crucial. It allows us to share our knowledge with people all over the world and learn from them too, for instance learn how to improve the machines, how to make them more efficient. We get inspired by our community, by how they work with the machines and what kind of products they’re able to make, what creative new ways of working with plastic they find. It’s incredible how much this enriches the project. So even though we don’t get any financial benefits, we get a huge amount of benefits in the wider sense of the word. We will always keep all of our knowledge, know-how, and documentation free for everyone, so that we can all work together toward finding solutions for this problem, that we’re all responsible for.

The process, to turn plastic from waste to product, is pretty simple. Although we don’t like the term waste, because we don’t believe waste is a thing in its own, it’s only waste in our brains. We just call it plastic then. So you just have to collect the milk bottles, the plastic, sort it based on its type, and after that you use the shredder machine to crush it into smaller chunks. Once you have the shredded plastic you can choose the colour that you want to work with, a bit like you would do with paint. To make a spinning top you would put the shreds into the injection machine, set it on the right temperature, and wait about 10-15 minutes for them to melt. Next, you would inject the melted plastic into a mould, to give it the final shape. You’ll have to wait another 10-15 minutes for it to cool down, and once it’s cold you can open the mould and you’ll have your product!

S.B.: You say that waste exists only in our minds, and your logo in fact is a plastic bag repurposed as a white flag – an international sign of rescue and peace. The name of the project itself, Precious Plastic, calls for the redemption of this much maligned material from the reputation its improper use has gained it, as a disposable alternative to more expensive choices. Why is plastic precious to you, and how do you go about changing how it’s perceived by the world at large?

M.B.: Plastic to us is precious because it’s a scarce resource. It comes from oil, which is a finite resource on this planet, and whether we like it or not within a few decades it will be scarce. We’re just anticipating the time when there won’t be any more plastic around, and we believe that only by changing the way that we as a society look at plastic, we can prevent it from being seen as waste and being used as disposable. We consider the

current plastic crisis as a design fault, in the way products are designed currently to be used for five minutes, and then last forever. Through our research over the past years we came to realise how precious this material can be if only some care, love, knowledge and patience are put into it. It can become just like any other material, like wood, like marble, metal, bronze. It can become precious over and over and over again, just by changing the way we look at it. So we don't see waste when we look at plastic, we see opportunities.

We try to change how it's perceived by society in a number of ways, first of all through our communities, by sharing with them the knowledge that we've developed. At the same time we work on exhibitions, expositions, we do design talks, to reach an ever-greater number of people. We were at the Dutch Design Week, and now we're going to go to the Salone del Mobile in Milan – we try to really change the context in which plastic is presented, because we believe that the context influences a lot people's perception of whatever they're looking at. So if you see plastic thrown away on a beach you'll get a feeling about it, but if you see it in a museum environment, and if you see other people that really give it a lot of attention, you'll change the way you think about plastic too.

S.B.: Over the past few months you've been busy building Precious Plastic machines in Kisii, Kenya, and Puerto Varas, Chile. What differences have you noticed, if any, in their use and outcomes from time zone to time zone?

M.B.: We're doing a lot of these projects right now around the world, building workspaces primarily in developing countries. We call these projects Precious Plastic Pilots. We do them to learn, first of all, because by going there we understand the problem with plastic locally, and understand how to tackle it in a more efficient way with respect to different cultural backgrounds. We also do it to really try and push projects to the next level, to offer our expertise and support so that they can become successful, in various ways but also financially. There are a lot of differences from country to country, plastic is very different in Kenya than it is in Chile for instance, and cultures are very different too. But it is a very good learning experience for us, and there'll be more of these being announced soon!

The Summer House

The perpetually rushed lifestyle and disposable culture of big metropolises never did sit well with Shivangini Parihar, who grew up attuned to the rhythms of nature on her family's farm in western India. So much so, that she launched The Summer House *"to endorse a way of life that allows for the time to stand and stare"*. With her business partner Rekha Datla, they make slow-paced clothing and homeware – handcrafted locally and in Madhya Pradesh, West Bengal and Andhra Pradesh, long-lasting, and comparatively cheap. The Summer

House works with undyed fabrics, organic cotton, and Tencel, a new age fibre made from sustainably harvested trees. But it's their swimwear line made of recycled marine plastic that really caught our eye. Because fishing gear is usually made with some of the strongest nylon on the planet, it makes these some of the strongest bikinis too, and infinitely recyclable. Below, Shivangini speaks of sustainability in India and elsewhere, and of all the various ways in which The Summer House keeps its environmental footprint as low as it gets.

S.B.: We're here to talk about swimsuits, but your sustainability credentials reach further than that. Slow living is nowadays something of a buzzword for conscious city folks, but for those of us who hail from the country, it's got more to do with memory and the past: will you tell me about your journey to The Summer House? When did you decide it was important to work with local families of craftsmen and handweavers in Gujarat?

S.P.: The Summer House is born from nostalgia. For the celebration of the everyday that we found lacking in big-city lives. From missing the purity in our food, and the comfort in our clothes, and the sturdiness in the wares we bought. That's when we started noticing that there are more people like us who crave these little joys of simplicity and functionality.

The choice to work with local craftsmen and weavers was an obvious one. To us, there is nothing more luxurious than the feel of the handmade, and the use of a technique that has been passed down for generations. Working with these artisans provides continuous work for their communities and helps to keep the craft alive.

S.B.: To a generation who's grown up used to fast fashion's discounts, products with a low environmental footprint and fair production processes can oftentimes seem too expensive. But the same generation is also the one who's becoming more and more aware of the ills of our planet and the urgency to behave more kindly towards it. By saving on middlemen you keep your prices low, without compromising on your ethos: what aspect are your customers drawn mostly to, nationally and internationally?

S.P.: The brand was never built around the idea of sustainability, it is simply how we are as people. Sustainability is often understood as limited to fabric or product, when really it is about making the least damaging choice every step of the way. We insist on a few measures... for example, our buying trips are planned annually to minimize our carbon footprint. Most of our fixtures and the tailoring machinery at our studio are upcycled. Our fabric scrap is donated to NGOs who reuse it for smaller products. Most importantly, our clothes and wares can be cared for easily and do not require a dry clean cycle like most luxury labels.

Our customers come back for one single aspect: quality, which has been our primary focus since the inception of the brand. Internationally, customers love our transparent operations, the use of earth-friendly fabrics, and chemical free dyes. They also come back and say that the product is well priced, thereby making it easier to purchase, which is great since it's true that sustainable clothing is often associated with expensive options. The international customer is more aware of the damage of fast fashion, but usually has fewer options to choose from otherwise. Nationally, this has become a really competitive market. As awareness around ethical clothing and sustainable lifestyles grows, more Indian consumers are questioning their purchases. We believe that the Indian consumer will choose a garment or homeware born from ethical and sustainable processes over other merchandise of the same price as long as the design and quality are matched or better.

S.B.: The Summer House's swimwear line is made of recycled fishing nets, one of the most harmful examples of plastic pollution in the oceans. There's something poetic though, in returning them to the seas in a much friendlier shape. How did you first come across Econyl, and how does this miracle fabric work?

S.P.: At The Summer House, we choose to endorse a way of life that allows for the time to stand and stare – and what better place to stand and stare than at the beach? The irony of looking good at the beach at the cost of the sea was apparent to us. We had been thinking about a swimwear line for two years, but wanted to be sure to use a sustainable fabric for it. Thankfully, in our research, we found something even better. Because Econyl is not only made responsibly, but it actually helps to clean up the oceans.

The Econyl fabric is fashioned by recycling and weaving the discarded nets into nylon particularly suited for sportswear, outdoor wear and lingerie. Ocean waste is fished out, polymerized and converted into this regenerated nylon yarn, that is then made into a fabric that is beautiful and strong. The fabric really has to be felt to be believed. It is smooth, and lush, and agile. Econyl is different in every way, and in terms of design, our biggest challenge was designing swimwear that looked good on every body type. In terms of production, our team had never produced swimwear before. The fabric turns differently on the machine. But we wanted the quality of stitching to be on par with the best, so the time taken to produce one swimsuit is the same amount that it would take for three to four dresses. The effort completely paid off though, when we received images of our customers from around the world wearing our sustainable swim line on their vacations.

S.B.: Fast fashion still dictates shopping rhythms and dominates wardrobes around the world, but do you believe we can expect an ever more sustainable fashion industry in the years to come? What new projects are you working on now, and what are your plans for The Summer House in the future?

S.P.: There is a growing awareness about the impact of what one wears on the environment. This is evident here in the number of new local designers using natural fabrics, brands starting eco-friendly ranges, and even in the

rise of ethical fashion influencers – all this in response to a more aware consumer. But of course, we have a very, very long way to go.

With each edit, we hope to create timeless styles that surpass trends or fads. Our new edits will continue to explore traditional techniques that may be amalgamated into modern designs, be it with clothing or homewares.

Supercyclers

Supercycling begins with the least promising, most ubiquitous plastic waste streams: single-use bags, drinking straws, that which the ocean spits out again on local beaches in Australia, where Sarah K is based. Like the best objects of design, hers and her peers' supercycled productions are often intuitive, simple enough for anyone willing to follow their instructions to try at home. Still, there's nothing crafty about them. Either sleek or textured, pellucid and lightweight, they easily steal the scene at the design fairs around the world that Sarah frequently frequents, to recruit yet more supercyclers to join the movement. To date, their new website counts twelve profiles, with among them the likes of ceramic artist Kirstie Van Noort and Italian design duo Formafantasma. In the following interview, Sarah describes how the supercyclers' project began, where it's headed, and a few of their greatest hits so far. She also issues a call, for supercyclers further afield to get in touch. If any one's reading, they wouldn't want to miss out on that.

S.B.: We're all the more aware today, of the nefarious effects on our planet of plastic pollution – yet according to some estimates still 160,000 plastic bags are being produced around the world every second, used for an average of 15 minutes each, to then take as much as 300 years to dissolve. Fortunately, projects like yours have found a much better, long-lasting use for them: could you tell me about your *Ghostware* line, and how supercyclers was born?

S.K.: In 2010 Liane Rossler and I launched the first supercyclers project, a re-imagining of single use plastic bags – indeed the most easily discarded and ugliest of waste – to turn them into delicate coloured vessels. The vessels were created by gently heating the bags over objects and the process was openly demonstrated to show others how to do it. The aim, which has become an important principle of supercyclers, was to make the discarded desirable again.

We showed the resulting works and launched supercyclers at an exhibition I curated at Milan Design Week in 2011. It was our intention to draw attention to the issue in the best way we could: by demonstration and also by beauty. Seeing waste as a resource is the first step, making it so beautiful that its provenance as waste is not apparent is the next. But we also want it to be transparent, in our presentation and marketing, so that it is clear, in fact, that the products are created from waste. Since we started, supercyclers has been used as a platform to

explore different waste streams, and to push the boundaries of what is possible with regard to sustainable design. Not just reusing waste, but affecting change towards a lifestyle that might impact quietly as opposed to negatively on our environment. We want to raise the aesthetic bar of sustainability in design, and help place it at the heart of design thinking. Designing is problem solving, and the environmental issues we are faced with today are an important problem to be solved.

I feel like this is finally starting to happen. Social media has helped to spread the word and for images of the damage being done to be seen more widely. People in general are more serious right now about supporting and making change, and it feels good to be a part of that.

S.B.: Plastic, that was first invented as a substitute for ivory, is made from oil, that it took millions of years to form. We consider it disposable because it's cheap, but that doesn't have to be the case. Supercyclers' Midas touch turns old plastic, among other waste, into luxurious objects of design: what do the members of your collective have in common, and how did you find them?

S.K.: Since supercyclers' launch I always have my eyes open to designers who are addressing sustainable issues in interesting ways. In the sea of stuff that is released every year at all the design weeks around the globe, the projects and designers that might align with supercyclers have always stood out, because the sad truth has been that not every designer or design brand is thinking this way. But we'll keep working at it until sustainability is no longer relevant, until it's just a natural part of the design process to consider the past and future of an object in its making.

We've just refreshed our website and we are planning on continuing this tradition, finding more designers to profile and to be a part of this movement. We are open to receive suggestions, especially from designers in China and Asia who might want to become supercyclers.

S.B.: I'm particularly interested in your *Yours to Care For* project, turning plastic drinking straws – a seemingly innocuous item, but actually one that can't be recycled, and causes serious damage to the environment when discarded – into horizontal single stem vases. Please tell me more about them, how did you come up with the idea, and how exactly do horizontal vases work?

S.K.: In the same way as Liane and I put our heads together to think about how to transform plastic bags into something of beauty, we were also alerted to the fact that largely as a result of the McDonalds franchise, over 500 million plastic straws are being used and discarded every day worldwide. Many of these end up in the oceans where the plastic is damaging marine ecosystems and wildlife.

We workshopped and experimented with a series of ideas for the straws. Fusing them at one end so that they could be watertight was the first, simplest, and we felt most positive thing we could do, to transform something discarded and useless into something useful and in support of nature. The water held in the straw, which won't spill out even when lying down by a neat trick of osmosis, would nourish a cutting, an herb, weed, leaf or flower as a vase.

Once again, this project was about raising awareness of the issue, and doing so in a way that looked at alternative uses for the problem. But it was also joining the campaign to stamp out the ridiculous overuse of straws altogether. As Liane Rossler says, it's "*such a short trip from your mouth to the drink*". *Yours to Care For* both sums up a shift in attitude about the plastic itself, and puts emphasis on its use as an aid in caring for, watering and nurturing the single stem of greenery in it.

S.B.: On show until June as part of an exhibition at MAAS, the Museum of Applied Arts & Science in Sydney, is a Marine Debris Bento Box you made with supercycler Andrew Simpson. Though it looks like marble, it's actually made of plastic waste washed onto Australian shores from the Great Pacific Garbage Patch: can you talk me through its story, and how it reflects supercyclers' ethos?

S.K.: Again, it's just a matter of applying design thinking to the problem. A few years ago, Andrew had met an agency who were collecting plastic waste washing up on the beaches of New South Wales. Because the cost of taking it to the tip was prohibitive, they were taking the collected material inland and burning it! His response was to offer to buy everything they had and would continue to collect.

Andrew and I were inspired by Bakelite, an early form of plastic that plays to plastic's strengths and was used to make objects that were meant to last, like telephones and housing for electrical components, as well as having a marbled quality and a heavier weight that makes it feel more valuable. This highlights another important supercyclers' principle: that value should be felt physically in an object, whereas the disposable culture that we've developed places little value on things, especially packaging which we are actively encouraged to 'throw away'. But there is no away. All these behaviours are at odds with sustainability and can be altered, it's just a matter of stopping, thinking about it, and then doing it differently. So now we've evolved a template for approaching design where time is a part of the equation. We consider the energy and skill that goes into the making of something, its longevity and ability to be cared for, and its future when it is no longer needed or wanted – that it will either be passed on, reappropriated, recycled or biodegrade. But that whatever happens it will remain in the loop, and not escape to the natural environment in an uncontrolled way.

Every one of these steps can exist within an economy. This was clear to us from early on: that sustainability will only be embraced and be able to sustain itself when it is an intrinsic part of the financial economy. Putting a higher price on an object that reflects the thought, skill, labour and material value gone into it also helps us as users to care for that object and want to hold onto it for longer.

AMAM

To keep plastic in the loop, perhaps infinitely, is a worthy ambition indeed. But to think at the same time of alternatives to it, is just another side of the same coin. When plastic is redeemed at last, and gains back the value it lost to overuse over the past six decades or so, we still might need sometimes, though hopefully not as much as we do today, something cheap but good with which to wrap and safeguard perhaps those very newly cherished plastic objects in our future. *Agar Plasticity* is a project by Kosuke Araki, Noriaki Maetani, and Akira Muraoka, of the Tokyo-based design collective AMAM, that seeks to substitute plastic packaging with a red algae by-product commonly found in Japanese confectionery: agar. Kosuke reveals below some of the alchemy involved in the process, and the peculiar properties of this pellucid, porous material – until the day comes, when we'll all be as familiar with it as we are with plastic today.

S.B.: Bubble wrap, packing peanuts, wrapping paper and foam – we've come to associate layers of packaging with the preciousness of what's inside, as if they were a guarantee of luxury. What they are, instead, is just a step away from becoming garbage. According to recent statistics, only 14% of plastic packaging is collected for recycling, worldwide. But if agar was used, globally, in plastic's place, recycling wouldn't be an issue: how did the idea first come to you, and how many experiments did you go through to make it happen?

K.A.: Agar is traditionally consumed as food in Japan, it's used for making sweets. So it is very common among us, but only for that purpose. From 2015, our team member Muraoka had been fascinated with the beautiful materiality of agar, but was not sure what would be the best thing to make out of it.

Meanwhile, for years, I'd been feeling stressful with plastic waste issues caused by making so many disposal goods out of plastic, and I wanted to work on them in some ways. So I thought that making something which could be an alternative to current plastic products, specifically cushioning materials, out of agar would be suitable because it's light, crushable, and what's more, natural. I would like to remind everyone that although plastic is not often consumed or treated as precious, it absolutely is. Considering its raw material and the energy needed for producing and reproducing it, plastic should be utilised for more appropriate applications.

At the beginning of the project, we went through lots of failures before gaining a fine cushioning structure. Because it's a natural material, it was not easy to control the quality of the outcome. We tested it hundreds of times until we became experienced enough to estimate its quality.

S.B.: You mention that agar is usually consumed as food, and indeed the process to make it, by way of boiling seaweed, does sound a bit like cooking. Could you describe it in its various stages, from the harvested red algae to the making of, for example, a sheet of agar for wrapping flowers?

K.A.: The extraction of agar produces certain amounts of algae fibre waste, most of which are usually discarded. By utilising it, we produce wrapping sheets for flowers or cushioning sheets for pots, helping to reduce the cost of disposal. Nothing is wasted.

By combining the algae fibre waste and agar again, the sheets are made. Different concentrations of the agar solution allow for different outcomes in terms of thickness, flexibility and hardness.

S.B.: Quite a few projects in recent years have started to think about ways to extend the life of plastic, and fight against our contemporary disposable culture. But to develop a material that, even when eventually disposed of, causes no harm, remains a challenge. Agar though, from my understanding, would cause little to no pollution. What happens to agar packaging, at the end of its lifecycle?

K.A.: Because agar absorbs and retains water very well, at the end of its lifecycle agar packaging could be utilised again as a material for improving the water retention of soil. And if it contains algae fibre waste it serves as a fertiliser as well, instead of simply being thrown away. If used agar packaging were collected in quantity, they could be utilised for the benefit of large fields.

Or should they end up in the ocean or landfill, they would not be harmful to the environment, nor to other life. The agar simply biodegrades.

S.B.: In 2016, Agar Plasticity won the Lexus Design Award's Grand Prix, and nowadays it's exhibited at the Museum of Applied Arts & Science in Sydney. How has your project evolved since its inception, and what are the biggest challenges you still face? What are your hopes for the years to come?

K.A.: The project has been gaining a lot of attention and we've been in contact with many companies as well as exhibition curators, but to be honest, we have not been able to meet anyone who actually moved onto developing it with us, so its progress has been very little since its inception.

In order to turn our proposal into reality, the production process has to be industrialised, and that is what we are desperately aiming for. However, we are still making prototypes of packaging by hand. Because no one has ever conceived using agar for packaging, we know there will be still lots of unknown areas in making it an

'industrial material'. This is something which cannot be sorted out without scientific and financial support, and the project definitely needs them to be developed further.