

Ocean plastic: Today's solution becomes tomorrow's problem

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Sometimes plastic recycling is so much worse than just letting trash be trash.

But first, let's thank European supermarket chain Lidl for trying. We all must. Plastic pollution is an enormous challenge. Unfortunately they, like many, are ignoring the toxic dimension of plastic recycling. Until efforts to solve the plastic crisis fully understand plastic toxicity, they risk making today's solutions into tomorrow's problems. And not just tomorrow's minor problems—we're talking societal-disruption and extinction-scale problems.

Our research team this week found a story in *The Daily Mail* about Lidl's plan to wrap fish in plastic recycled from "ocean-bound plastic" collected off beaches in Southeast Asia.

Sorry. It may be well-intentioned, but for someone who understands plastic toxicity, it's a horrifying idea.

Here's why: Plastic contains many toxic substances. Scientists think about four sources:

1. The plastic itself

Some toxics come from the plastic itself: The basic building block that is the core of a plastic molecule is sometimes demonstrably toxic. Bad for babies. Bad for adults. Bad for libido. Bad for fertility, brain function and a lot of other adverse effects people care about. For example, BPA is widely used as the "monomer" that is connected in a chemical chain to make a polymer, the very definition of plastic. So are BPS and many other "BPA-free" alternatives. The monomer BPA (and BPS etc.) is a notorious endocrine disrupting chemical.

2. The additives

Some of the sources are additives (like phthalates that chemical engineers ooze into the plastic to force the plastic to attain specific characteristics, like softness or resistance to UV light or microbes). These additives aren't bound to the polymer so they ooze out of phthalate-softened PVC based Rubber Duckies. Just right for infants to suck on if your goal is to suppress sperm count once they become adults.

3. The unintended ingredients

Then there is a complicated morass called "nonintentionally added substances (NIAS)." Some of these have been identified. Others we know are there but we don't know what they are. These usually are byproducts of reactions that take place as plastic is made. One problem is that to make plastic out of a feedstock that is absolutely 100% pure would be wildly expensive. So in the real world there are impurities. And these impurities react during the making of plastic to form NIAS. But other chemical processes produce NIAS even with pure feedstock. We know some NIAS are toxic, like formaldehyde and acetaldehyde in PET plastic. But for most we are ignorant. They could be safe, or they could be toxic.

4. The environment

Lastly, plastic materials absorb toxic substances from the environment, for example from ocean water. Some of these are notorious, like PCBs, DDT (still), dioxins, and others.

Ignorance about toxicity

Brian Yurasits/Unsplash

The result is that virtually all plastics are likely to contain toxic ingredients, especially those taken from the ocean. Some may not, but they are never fully tested. A remarkable scientific study last year made clear how ignorant we are. After the basic finding that most plastic materials tested were toxic in one way or another, the most surprising finding in their work was that a widely acclaimed bio-based plastic was among the most toxic. Oops. In that case, it was probably due to the additives.

While chemical engineers try to make food-grade plastic packaging material out of a jumble of old plastic picked off the beach, their products will unquestionably contain toxic chemicals. It's not something you want wrapped around your fish. Or finding its way into your fetus via food packaging. Very bad idea.

An epidemic of hormonally related diseases

Lidl

What are some of these toxic substances? They are a litany of what doctors have identified as endocrine disrupting compounds, including bisphenols, phthalates and perfluorinated (or "forever") chemicals, PCBs, DDT (banned in the 1970s but, still, found everywhere). This nasty stuff is now associated with today's epidemic of hormonally related diseases, like type 2 diabetes, heart disease, obesity, infertility, ADHD and autism. And there are other types of toxicity imbedded in these plastics, as well: Carcinogenicity, oxidative stress, etc.

Some of those beach plastics in Lidl's recycled packaging may be safe, although literally none (really, none) have been fully tested for safety. But some of them are definitely toxic.

When you mix safe plastics with toxic plastics the recycled result is always toxic. And forget hiding behind the old adage that "the dose makes the poison." Endocrine science has established that exceedingly small doses can have big effects.

Not safe for food?

That means programs like Lidl's bring you food packaging that is unavoidably toxic.

Unless they have tested each batch. In which case, Lidl, show us the data.

Many of the plans to gather plastic from the ocean and make something out of it fall victim to this basic truth. Recycling possibly safe and toxic plastics together winds up with unquestionably toxic materials. We don't want that in our food supply because stuff in packaging migrates into the food we eat. Plastic recycling solutions that don't address the toxicity of the recycled product are part of future problems. Any entrepreneur or reporter who pretends otherwise is creating a serious problem for tomorrow.

A serious problem

And this is why it's such a serious problem. The toxics in plastics are associated with declines in sperm counts so precipitous that the developed world may wind up with 4 out of 5 men infertile by 2040 or 1 out of 2 boys autistic by 2042.

This is a problem we have to take seriously, despite the feel-good sense we get from short-term solutions. Lidl investors should beware of the financial exposure this creates for the company. As we begin to understand the long-term consequences of plastic exposures, Lidl on its current path will not be on the right side of science, or history.

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