

# The Case Against Yoga Pants and Other Technical Athletic Wear

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February 07, 2024

## STORY AT-A-GLANCE

- › Nonorganic cotton is a chemical-dependent crop. While making up only 2.4% of global cropland, it receives 10% of all agricultural chemicals and 25% of all insecticides
- › Athletic wear such as yoga pants and fleece jackets shed copious amounts of microscopic plastic fibers each time they're washed; 1.7 million tons of microfibers enter the ocean each and every year
- › To reduce pollution, opt for organic fabrics colored with natural dyes; avoid screen printed items and trademarked technical fabrics; install a microfiber filter on your washing machine; be mindful of how you wash synthetic clothing and look for Bluesign System Certification

***Editor's Note: This article is a reprint. It was originally published March 29, 2017.***

Water pollution has many sources. Agriculture is a significant one, but clothing is another that has not received as much attention.

Nonorganic cotton contributes to environmental problems due to the fact that most of it is genetically engineered (GE) and sprayed with copious amounts of Roundup, the active ingredient in which is glyphosate, a likely human carcinogen.

In fact, nonorganic cotton is one of the most chemical-dependent crops out there. While making up only 2.4% of global cropland, it receives 10% of agricultural chemicals in total, and 25% of all insecticides.<sup>1</sup>

But synthetic fibers like polyester and nylon are equally destructive.<sup>2</sup> In 2014, polyester – a plastic material made from crude oil – made up 60% of all fabrics produced by the textile industry.<sup>3</sup>

Unfortunately, stretchy fabrics like yoga pants and comfy, cozy fleece items have become a true bane, shedding copious amounts of microscopic plastic fibers each time they're washed. Due to their tiny size, these microfibers<sup>4</sup> flow straight through the wastewater treatment plant without being caught.

## **Microfibers Account for Majority of Plastic Pollution**

Testing shows synthetic microfibers make up 85% of shoreline debris worldwide,<sup>5</sup> and are particularly concentrated in beach sediment near waste water treatment plants.<sup>6</sup> According to estimates by the International Union for Conservation of Nature, up to 1.7 million tons of microfibers enter the ocean each and every year.<sup>7</sup>

Once in the water column, this plastic micro-debris blocks sunlight required for plankton and algae to thrive, and the ramifications of this reverberates throughout the entire food chain. To get an idea of just how severe the problem has become, consider this: In some ocean waters, plastic exceeds plankton by a factor of 6-to-1!<sup>8</sup>

Toxic dyes, fabric treatments such as flame retardants and stain resistant chemicals and laundry detergents further add to the growing environmental problems posed by clothing.

## **Microplastics Are a Major Issue in the Gulf**

University of Florida researcher Maia McGuire, Ph.D., studies plastics in Florida waterways. At the outset, she expected to find primarily microbeads – the small plastic beads found in face and body scrubs – but she quickly realized microfibers are a far more serious concern. McGuire told the Akron Beacon Journal:<sup>9</sup>

*"I totally thought we were going to be finding microbeads and [bigger] fragments. What do we do about it is the multimillion dollar question. The consensus seems to be that we need improvement in technology in washing machines and wastewater treatment plants in combination in order to try and filter out these fibers. There's just so much we don't know."*

Between September 2015 and August 2016, McGuire's Florida Microplastic Awareness Project collected and analyzed water samples from 256 sites in Florida. Eighty-nine percent contained plastic, 82% of which was in the form of microfibers. Only 7% were microbeads.

As of July this year, personal care products are no longer allowed to contain microbeads.<sup>10</sup> Beginning July 2018, microbeads will also be banned from cosmetics, and as of July 2019, they must be eliminated from over-the-counter drugs sold in the U.S. as well.<sup>11</sup>

While banning microbeads is a step in the right direction, water testing reveals they're not nearly as prevalent in the environment as microfibers are, so banning microbeads while doing nothing about microfibers is not going to have a really significant impact.

## **Microfibers Threaten Wildlife and End Up in Human Food Supply**

It stands to reason that once these fibers are in lakes, rivers and oceans, they will be consumed by wildlife, migrating further and further up the food chain, and that is precisely what researchers have found. The fibers have been found in both table salt<sup>12</sup> and various seafood sold for human consumption.<sup>13</sup>

Microfibers have been shown to raise mortality among water fleas<sup>14</sup> and reduce overall food intake of **crabs**, worms and langoustines (aka Norway lobster),<sup>15,16</sup> thereby threatening survival rates. Testing of both freshwater and saltwater fish show 90% have microfiber debris in their bodies.<sup>17,18</sup>

Not only do the actual fibers pose a health hazard to the sea life that consume them, since they bioaccumulate, these fibers also act like sponges, soaking up and

concentrating toxins like PCBs, pesticides and oil, making the animal – which could end up on your plate – even more toxic than it normally would be.

These chemicals have been shown to cause liver damage, liver tumors and signs of endocrine disruption in fish and other seafood, including lowered fertility and immune function. Last year, citing a report<sup>19</sup> by the British Department for Environment, Food and Rural Affairs [DEFRA], the Daily Mail wrote:<sup>20</sup>

*"Microplastics have been found in a wide variety of species including zooplankton, mussels, oysters, shrimp, marine worms, fish, seals and whales. Chemicals on microplastics ingested by an organism can dissociate from plastic particles and enter body tissues ...*

*[DEFRA] said there is evidence from animal studies that small plastic particles can cross membranes into cells, causing damage and inflammation.*

*Looking at the implications for humans, [DEFRA] said: 'Several studies show that microplastics are present in seafood sold for human consumption, including mussels in North Sea mussel farms and oysters from the Atlantic. The presence of marine microplastics in seafood could pose a threat to food safety.'*

According to the DEFRA report, eating six oysters could introduce about 50 plastic microbeads into your body. One-third of the fish caught in the English Channel also contain microbeads, as do 83% of scampi sold in the U.K.<sup>21</sup>

## **Factors That Worsen Microfiber Release**

Tests show each washing of a synthetic fleece jacket releases 1.7 to 2.7 grams of microfiber.<sup>22,23,24</sup> For perspective, a paperclip weighs about 1.5 grams.

Estimates suggest a city of 100,000 inhabitants deposit up to 240 pounds of microfibers into local waterways EACH DAY – an amount that equates to 15,000 plastic bags entering waterways on a daily basis. A number of different factors contribute to the amount of fibers shed, including:

- **Age of the item** – The older the fleece jacket, the more microfibers are released<sup>25</sup>
- **Quality of fabric** – Lower quality generic brand fleece can shed 170% more over its lifespan than higher quality fleece
- **Type of fabric** – In a comparison of acrylic, polyester and a polyester-cotton blend, acrylic was the worst, shedding microfibers up to four times faster than the polyester-cotton blend<sup>26,27</sup>
- **Type of washing machine** – While tests just a few years ago showed that top loading machines released many times more microfibers than front loading models,<sup>28</sup> more recent high-efficiency top-loading machines now release far fewer microfibers than front loaders<sup>29</sup>
- **Water temperature, length and agitation strength of the wash cycle and the type of detergent used** – Heat, agitation and harsh detergents all promote the breakdown and shedding of microfibers

## Potential Solutions

One of the fastest and easiest remedies is to add a filter to your washing machine that catches microfibers.<sup>30</sup> In 2017 at one point, Wexco was the exclusive distributor of the Filtrol 160 filter,<sup>31</sup> designed to capture nonbiodegradable fibers from your washing machine discharge.

Unfortunately, this solution only partially addresses the problem, since the microfibers will still end up in a landfill when you empty the filter into your trash can. From there, they may still enter the biological chain.

Another novel potential solution – a waterless washing machine – was developed by TERSUS Solutions in Colorado, with funding from Patagonia. It washes clothing using pressurized carbon dioxide instead of water.<sup>32</sup> Patagonia is also looking for mitigating solutions, including product redesign to prevent the shedding of microfibers.

Perhaps the simplest way to circumvent all of these problems is also the most biologically elegant, and that is to avoid buying synthetic fiber clothing in the first place,

and opt for organic cotton, hemp, silk, wool or bamboo fabrics instead.

## **Polyester Downfalls Beyond Microfiber Pollution**

Beyond microfiber pollution, polyester and other man-made fabrics have many other environmental drawbacks, including the following:<sup>33</sup>

- Polyester is not only made from petroleum; the manufacturing process of polyester and other synthetic fabrics is also very energy-intensive, releasing large amounts of toxic air emissions, including volatile organic compounds, particulate matter and acid gases.
- Byproducts of polyester production also include water pollutants such as volatile monomers and solvents.
- Toxic chemicals are also used during the production of many fabrics, including perfluorochemicals (PFCs), phthalates, azo dyes, dimethylformamide (DMF), nonylphenol ethoxylates (NPEs), nonylphenols (NPs) and triclosan. Swedish research estimates 10% of all textile-related chemicals are potentially hazardous to human health.<sup>34</sup>

According to a Greenpeace report,<sup>35</sup> sportswear tends to contain the highest levels of toxic chemicals, including endocrine disruptors, which may have acute toxic effects if you're susceptible. Chemicals are applied to most synthetic fabrics to improve wicking performance, provide water and/or stain resistance and decrease odors.

Some clothing manufacturers are now starting to take these issues more seriously. For example, Patagonia is working on developing textile treatments using raw, natural materials and, along with Adidas, has promised to phase out PFCs. Adidas has vowed to be 99% PFC-free as of this year. Others, such as Ibex, Alternative Apparel, SilkAthlete and Evolve Fit Wear are using organic cotton, silk blends and merino wool for their sportswear lines.<sup>36</sup>

## Toxic Garment Dyes Wreak Environmental Havoc

Textile dyeing is another major environmental destroyer. Many of these facilities are located in developing countries where regulations are lax and labor costs are low.

Untreated or minimally treated wastewater is typically discharged into nearby rivers, from where it spreads into seas and oceans, traveling across the globe with the currents. An estimated 40% of textile chemicals are discharged by China.<sup>37</sup> Indonesia is also struggling with the chemical fallout of the garment industry.

The Citarum River is now one of the most heavily polluted rivers in the world, thanks to the congregation of hundreds of textile factories along its shorelines.

Tests by Greenpeace reveal the river water contains alarming amounts of lead, [mercury](#), arsenic, nonylphenol (an endocrine disrupting chemical) and many other toxic chemicals – all of which are dumped by textile manufacturers straight into the river without even the most basic of chemical filtration or treatments.

The final clothing items also contain nonylphenol, and it can take several washes before it's all washed out. This means the chemical is also entering your local sewer system. Nonylphenol is considered so hazardous that many European Union (EU) members have banned its use in the garment industry. It's not even allowed in imported textile goods. Notably, the U.S. has no such restrictions.

## Become Part of the Solution by Cleaning Up Your Wardrobe

While some companies are actively investigating ways to produce more environmentally-friendly clothing, each and every one of us can contribute to the solution by curbing your consumption and giving more thought to what you buy and how you care for your items.

As described in my previous article on "fast fashion," the entire life cycle of a piece of clothing would ideally be taken into account before buying, as most of your [discarded](#)

**clothes** actually end up in landfills, or are resold to developing countries where local clothing industries then suffer instead.

Most Americans have enough clothes to outfit entire villages in some other countries. There's little doubt that many would do well to absorb some of the life-affirming suggestions offered by the **minimalism movement**. As the director of environmental strategy for Patagonia told CBS in 2015:<sup>38</sup>

*"People need to learn how to buy less and companies need to learn how to be profitable in selling less ... Something has to fundamentally shift in the consumption world that reduces the pressure on the raw materials, which reduces pressure on the planet ..."*

To avoid toxic chemicals and reduce environmental pollution associated with the washing and wearing of clothes, consider the following recommendations:

**Opt for organic cotton, hemp, silk, wool and bamboo fabrics** – While such items typically cost more than nonorganic cotton and synthetics, buying fewer items will allow you to spend more on each item. On the upside, higher quality organic items tend to last far longer with proper care, so you get your money's worth in the end.

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**Opt for items colored with nontoxic, natural dyes when possible** – Businesses investing in organic farming and natural dyes include PACT (undergarments and loungewear), Boll & Branch (bed linens, blankets and towels), Jungmaven (organic hemp and cotton T-shirts), Industry of All Nations (clothing) and many others.

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**Avoid screen printed items**, as they typically contain phthalates.

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**Look for the Bluesign System Certification**,<sup>39</sup> which tells you the item has been manufactured with a minimal amount of hazardous chemicals, or none.

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**Avoid trademarked technical fabrics**, as most are coated with chemicals that will eventually wash out.

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**Be mindful of when and how you wash synthetic clothing** – Wash synthetic clothing as irregularly as possible using a mild detergent. Line dry instead of putting them in the dryer. The heat and agitation will break down fibers.

Handwashing or using the gentle cycle with cold water will also minimize the shedding of fibers, as will using a front loading washing machine. Avoid fabric softeners and dryer sheets. They leave a film on the fabric that blocks the wicking ability of the fiber.

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**Install a microfiber filter** on your washing machine.

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