

Heather Kaye of FINCH explains sustainable fibres *Is recycled polyester the answer?*



One of the biggest challenges facing designers who want to incorporate sustainable fabrics into their collections is sifting through fact and fiction about which fibers are actually eco-friendly. It's safe to say there are environmental pros and cons to every fiber, whether natural (cotton, silk, wool), manufactured (derived from naturally occurring cellulose or protein like rayon, bamboo, hemp, soy) or synthetic (made from chemicals).

对于设计师来说，如果想将环保面料用于他们的设计，如何在事实与谣言中分辨出什么是真正的环保面料是一个极大的挑战。任何一种面料都有环保上的利弊，无论是纯天然的（棉，丝绸，羊毛），人造的（源自天然纤维素和蛋白质，如人造纤维、竹、麻、酱油），还是合成物（化学制造的）。

Currently, natural fibers account for 35% of world fiber production, while 65% are manufactured or synthetic. Of the latter category, 70% is polyester fiber (technically polyethylene terephthalate or PET). To put our options in perspective, organic cotton counts for less than 1% of global cotton production.

目前，天然纤维占了世界纤维生产的 35%，另外 65% 都是人造或合成的。在后者中，70% 是聚酯纤维（聚乙烯或 PET）。从我们选择的角度来看，有机棉产量还不到全球棉花产量的 1%。

Organic cotton is grown from non-genetically modified seeds without pesticides or synthetic fertilizers, using crop rotation farming practices, and is usually cultivated by hand. While designers and consumers love cotton for its natural, soothing handfeel, the water, energy and chemical inputs – even with organically grown cotton – are still environmentally impactful.


有机棉是由转基因种子生长出来，没有使用杀虫剂或化肥，而是用轮作耕种出来的，通常是手工制作。虽然设计师和消费者都因为棉织品的天然、顺滑的手感而喜爱棉织品，但使用这种原料消耗的水，能源和化学品——即使是生产有机棉——依然对环境是有害的。

Hemp, soy and bamboo start off from renewable sources, are naturally pest-resistant and require little water to grow. However, all require using the viscose process (pioneered with rayon in the 1880's), involving a significant amount of energy, water and chemicals (sodium hydroxide and carbon disulfide) to process into yarn.

麻，大豆和竹子开始成为可再生能源，他们天然抗虫害并且只需要一点水就能成活然而，所有的粘胶工艺（人造丝发明于 19 世纪年代）都需要使用大量的能源 19 80 水和化学(氢氧化钠和二硫化碳法等)将它们处理成纱。

When consumers look for garments labelled as organic or sustainable, it is important to know which step of your garment's lifecycle is being rated. Although potentially damaging chemicals such as carbon disulfide and sulfuric acid are used to treat even organic cotton and bamboo, both fibers are approved by GOTS (Global Organic Textile Standard) and certified by Oeko-Tex because the finished fiber no longer contains chemicals that may be harmful to a person's health. Knowing what chemical processes (especially how the chemicals were disposed) are involved from the raw fiber stage to a finished knitted or woven fabric ready for dyeing is often the most frustrating and least transparent step of garment creation.

当消费者寻找衣服上的标签来判断衣服是否是有机环保材料时，重点是知道你的服装在环保循环的哪一步。虽然潜在的破坏性化学药剂（如二硫化碳和硫酸）会被用来处理哪怕是有机棉花、竹等原料，但他们都是经 GOTS(全球有机纺织品标准)认证的，最后成品中不再含有可能会伤害人体健康的化学成分的纤维。了解从原料阶段到编织阶段，以及到染色阶段的化学反应过程（尤其是化学物质是如何处理的）往往是最直接的衣服制造部分。

On the synthetic side, the process is at least more transparent. **Annual PET production requires an astonishing 104 million barrels of oil!** About 60% of that, or 70 million barrels, is used to make polyester fiber for textiles. The rest is mainly used to make bottles. When you recycle a PET bottle (marked with ) , most people don't know that it cannot be recycled into another bottle. The melted resin contains contaminants that prevent it from being 'food grade' again, so it is now 'downgraded' into a secondary product, such as yarn. This is how recycled polyester (rPET) has come on the market, familiar to us in the form of Patagonia 'fleece' jackets made from recycled bottles. (This is a great time to remind you to avoid consuming plastic bottles - buy a reusable thermos!)

就合成物来说，过程是最透明的。每年生产 PET 需要惊人的 1.04 亿桶油！其中 60%，或者说，7000 万桶油被用作制造聚酯纤维纺织品。剩下的主要用于制作瓶子。当你

回收一个 PET 瓶子时，它被溶解成无法重新被用作食品用塑料的受污染的树脂，因此它被降级到二次产品，如纱线。这就是回收聚酯（“rPET”）如何以我们熟悉的巴塔哥尼亚羊毛衫的形式“”出现在市场里。（这时我们要提醒你，不要使用一次性塑料瓶—买一个可重复使用的热水瓶！）

Here's how recycled polyester works:

after you toss a PET #1 bottle into a recycling bin, these bottles are sorted at a recycling center and then brought to a PET reclaiming facility. The bottles are cleaned, tops and labels removed and the bottles are sorted by color. The sorted bottles are put into a grinder, ground up into small flakes, then tossed in hot air to give them a hard coating. It's at this stage that a carcinogenic chemical present in all PET, antimony, is released into the air. The flakes are then melted into a thick liquid and filtered through a plate with 68 tiny holes than form filaments five times finer than human hair. The filaments harden and are spooled on hot rollers to stretch and realign the polyester molecules. The yarn is now ready to be woven or knitted into polyester garments.



以下是回收如何进行的： 当一个 PET1 号瓶被扔进可回收垃圾桶后，瓶子被运送到回收中心并且被放到 PET 回收设施里。这些瓶子已经被清洗干净，也移除了瓶盖和底部，并且被按颜色分类。瓶子们被放

进研磨机磨成小薄片，然后被扔进热空气里涂上硬涂层。这一步将会使目前 PET 里的一种致癌化学成分，锑，被释放到空气中。这些小薄片融化成浆，然后通过一个有 68 个小孔的筛子五次过滤，变成比人类头发还细的纤维。这些纤维变硬后被缠在高温的滚筒上，被重组为聚酯分子。这些纱线现在已经可以用于制作新衣服了。



Despite all of that, what makes rPET qualify as a sustainable fiber is that this process uses 2/3 less energy, no new petroleum, and close to 90% less water than the original PET. A rPET shirt uses up about 5 bottles that would otherwise go to landfill, but it's important to note that at the end of its use the shirt is not recyclable. A few highly innovative mills have figured out how to create rPET without releasing any carcinogens, AND how to create fabric that can be recycled again – but it will be a year or two before truly recyclable rPET enters the market.

除了这些，使 rPET 成为环保材料的原因还有这一工艺减少了三分之二的能源用量，没有新的石油，比原本的 PET 材料减少了 90% 的耗水量。而且一件 rPET 制成的衣服用了 5 个原本会被丢去掩埋场的塑料瓶，不过值得注意的是它最终制成的衬衣无法再被回收了。一些极具创新能力的企业正在试图制作出不释放任何致癌物质的 rPET，以及如何制造出可以再次被回收的纤维——但等到真正可回收的 rPET 进入市场已经是 1 年或 2 年后的事情了。

There's also a huge opportunity for growth in recycled fibers, as the recycling rates in high consumption areas like Europe and the US are still low – only 46% and 27% respectively of all PET bottles are currently recycled.

生产可回收纤维同样具有很大的市场机遇，因为像在欧洲和美国这样的高消费的地方，目前 PET 瓶回收率只有 46% 和 27%。

For now, the downside to rPET is that the carcinogen antimony is released during the process and that there is almost no way to know for sure that the original inputs were actually post-consumer use bottles. That's right, once the bottles enter the incineration phase, there is no way to prove the end result is really recycled polyester. Agencies that monitor fiber supply chains are starting to figure out ways to certify recycled polyester, but for now those of us working with Asian mills still have to keep our eyes wide open and the questions coming. Stay tuned!

目前，rPET 的缺点在于生产过程中会释放致癌物，以及几乎没有确切的办法可以知道投入的原料实际上是上一个消费者用过的瓶子。的确，一旦瓶子进入燃烧阶段，没有方法能证明最后真的是回收聚酯。检测纤维供应链的机构已经开始找出办法证明回收聚酯，但目前为止我们的亚洲工厂还需要扩大眼界以便发现问题。敬请待！