



A new generation of eco-friendly plastic film alternatives are being introduced to eliminate the environmental damage brought on by traditional plastic films. Image Source: Pexels user Scott Webb

Last month, a series of incredible photographs taken off the Honduran island of Roatan began making its way around the Internet. The images didn't depict the turquoise waters and white sand beaches we typically associate with this small sliver of Caribbean paradise. Instead, they captured a different kind of island, one made of "cutlery, bags, bottles, and wrapping floating among the seaweed."¹ In one image, taken from underneath the rubbish pile, the garbage is shown from the sun's rays penetrating the water, a stark reminder of how ocean-bound refuse can compromise underwater ecosystems.

What's remarkable about the photographs from Roatan isn't simply the vastness of this particular plastic island, but the fact that it is just one of many. More than eight million tons of plastic end up in the oceans each year. As Ian Johnston, environmental correspondent for *The Independent*, writes, "There will be more plastic than fish by 2050 and 99 percent of all seabirds on the planet will consume some."² But while Roatan's plastic island may only be a drop in the ocean, many hope the images will raise awareness about the problem and spur change. "Think about your daily lives," writes Caroline Power, a resident of Roatan, in a Facebook post. "Do you still use plastic bags? Ziplock bags? Plastic wrap on your food?" She believes that by examining our habits, we can make smarter choices to diminish our destructive impact on the environment.

For some, however, preventing plastic pollution isn't simply a matter of making different choices with currently available materials, but creating products that replicate the appearance and functionality of their traditional plastic counterparts without the negative environmental consequences. One of the most important areas of interest is the development of eco-friendly plastic film alternatives. While these innovative products open up exciting possibilities for reducing reliance on traditional plastic films, their success depends on close monitoring of color and haze using spectrophotometric instrumentation.



Traditional plastic films often end up in landfills or the ocean, where they present significant environmental dangers. Image Source: Pexels user Emmett

Why Plastic Film Matters

Plastic film is used in a wide variety of applications, from food packaging to grocery bags, landscaping to agricultural uses, electrical fabrication to art conservation. Part of its appeal lies in the fact that it is possible to manufacture plastic film in a broad range of colors and haze levels, making it extremely versatile both functionally and aesthetically. However, its broad appeal also translates into significant amounts of waste, particularly as most plastic film is employed for temporary, disposable usage rather than as enduring goods. According to Chaz Miller, state programs director for the National Solid Wastes Management Association, “Plastic film provides 17.5% of all plastic in the waste stream.”³

One of the challenges traditional plastic films present is lack of biodegradability and recyclability. Although some plastic films can be recycled, suitability for recycling and remanufacture depends on resin type and color as well as individual film characteristics, thus disqualifying many films. Even certain types of plastic films that are technically recyclable present practical problems for many non-specialized recycling facilities, as they can “snag conveyor belts and wheels in the sorting machines, bringing the whole process to a grinding halt.”⁴

When this plastic film isn’t recycled it has to go somewhere, and that means the landfill, incinerator, or natural environments. All of these can have significant environmental consequences, including contributing to the physical destruction of natural lands, releasing persistent chemicals into the atmosphere, harming wildlife, and disrupting ecosystems.

The Possibilities of Eco-Friendly Films and Plastic Film Alternatives

As awareness of the dangers traditional plastic films present grows, a number of organizations have begun investigating the possibilities of eco-friendly plastic film alternatives, particularly in applications related to food packaging. Last year, the US Department of Agriculture (USDA) unveiled a biodegradable film made with milk protein casein, which could replace plastic film wraps. “It feels like plastic wrap when you look at it and hold it, but it does not stretch as much,” says Laetitia Bonnaillie, a research chemical engineer at the USDA. “Applications we are thinking of now are those single-serve packages that use so much plastic. The purpose is to make a packaging that has that has zero waste.”⁵ While Bonnaillie envisions that the film may initially be used for cheese, snacks, and meats, but could expand into broader usability. Because it is 250 times more efficient as an oxygen barrier than traditional plastic film and can potentially provide enhanced UV protection, the film can also prolong the shelf life of foods.

But the casein film isn’t just biodegradable; it is also [edible and can be flavored](#). Tatsiana Savitskaya, a chemist and professor of physical chemistry at the Belarusian State University, is also experimenting with edible films, which she believes present exciting possibilities for creating truly zero-waste packaging. “As an example of edible film, there is packaging for candy. We pack the candy into the edible film and can eat the candy with this primary packaging,” she says, “We have also wrapped our edible film around fish or meat. You can pack it and fry it without oil, because we can add oil into the film—and also the spices.”⁶

Other organizations are [experimenting with eco-friendly films](#) made materials such as potato peels and culls, chitosan, and dehydrated fruits. In the future, additives such as probiotics, vitamins, and dietary boosters could be incorporated into these films, giving them additional benefits and broadening their appeal. “The consumer is more and more interested in saving the environment while also optimizing nutrition,” Bonnaillie explains. “There is definitely interest in this.”⁷



Spectrophotometric color and haze measurement is essential to creating high-performing plastic film alternatives. Image Source: Unsplash user Caroline Attwood

Using Color and Haze Measurement to Perfect Films

Widespread use of eco-friendly plastic film alternatives may still be some time off, but the development of these materials requires paying close attention to not just environmental impact, but appearance. After all, [plastic products are useful](#) and without high-performing alternatives, making meaningful changes on a broad scale is an uphill battle. Many consumers will want products that look as similar to traditional plastic films as possible, particularly clear films that allow packaging contents to be plainly visible. However, there are also infinite possibilities for creating new looks via unique color and haze combinations.

Establishing color and haze standards for eco-friendly plastic film alternatives will rely heavily on [the use of spectrophotometric instrumentation](#). Spectrophotometers allow you to analyze color and haze with extraordinary accuracy and precision, giving you the information you need to evaluate new products and determine your own tolerance for aesthetic variation. Ingredient and process variables can be correlated with color and [haze data](#) to give you greater insight into how each variable affects the appearance of your product, allowing you to fine-tune your formulation and manufacturing process until you achieve your desired result. This includes analyzing the impact of nutritional and flavor additives, allowing you to integrate these novel components while maintaining your desired appearance. If your product needs to look similar to existing products, you can easily compare your product to that which you are simulating on an objective, numerical basis. You can also use spectrophotometric data to create a signature look for your products, making them stand out from the pack.

However, spectrophotometers aren't just useful during product development. Rather, they can be used throughout the manufacturing process to ensure that your high aesthetic standards are maintained. By instantly alerting you to undesirable variation, you can rapidly identify formula or process faults and prevent a faulty product from being released for public consumption. While this is critical for companies manufacturing already well-loved products, it is also essential for new products to establish themselves in the marketplace and develop a reputation for quality. As such, spectrophotometers play a vital role at every stage of product creation.

HunterLab Innovation

HunterLab has been a leader in the field of spectrophotometry for over 60 years. Today, we offer a comprehensive line-up of [portable, benchtop, and in-line instruments](#) designed to meet the exacting needs of our customers. Our spectrophotometers are renowned in both the plastics and food industries due to their remarkable accuracy, precision, and ease of use, bolstering your ability to innovate and continuously create products of the highest quality. [Contact us](#) to learn more about our spectrophotometers, customizable software packages, and world-class customer support services and let us help you select the right tools for your needs.

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