

# Study documents cigarette environmental hazards

September 6 2013, by Susan Zakin

---



The most common kind of trash on beaches are cigarette butts, according to the Ocean Conservancy.

Back in the bad old days when teenagers smoked cigarettes to be cool, it wasn't unusual for a teenage girl to surreptitiously pocket a cigarette butt left behind by a boy she had a crush on.

The soundtrack for that scene could well be "Tainted Love" as recent research shows that cigarette butts contain [toxic chemicals](#), including arsenic, cadmium and toluene.

The pollution caused by cigarette butts, along with massive deforestation from cutting down trees for wood to dry and fire cure tobacco, means smoking is seen more and more as an [environmental problem](#).

It's a problem that's on the rise, with an estimated 5.6 trillion cigarettes smoked annually, and more smokers in the developing world every day.

"Cigarette smoking is a full service health hazard," said Dr. Thomas Novotny, a scientist formerly at UCSF and UC Berkeley who is now a professor at San Diego State's Graduate School of Public Health. "It's also a full-service environmental hazard."

Novotny, an [epidemiologist](#), leads research funded by UC's Tobacco-Related Disease Research Program to look at the lesser-known hazards associated with smoking.

## **Double dose of trouble**

Cigarette butts turn out to be a double-barreled problem: the 4,800 chemical compounds in cigarettes, at least 69 of which are carcinogenic, plus plastic filters that contain dangerous compounds, too, and aren't biodegradable.

It's fairly well known that cultivated tobacco is one of the toxic members of the nightshade family, and that nicotine in tobacco is highly addictive, raises blood pressure, affects the [central nervous system](#) and constricts blood vessels.

What may be surprising is the level of toxicity found in a single cigarette butt. Using standard tests adopted by the U.S. Environmental Protection Agency, Novotny and other researchers discovered that a cigarette butt soaked in a liter of water for four days will kill both the topsmelt and the freshwater fathead minnow [fish species](#).

The level of toxicity was lower in smoked cigarette filters without tobacco and lower still in unsmoked cigarette filters minus tobacco. But both were also found to be toxic.

Most of the toxicity comes from the nicotine, but the plastic filters, which are treated with titanium dioxide and other chemicals, add to the mix. The result is a concentrated brew of environmental toxins.

The Ocean Conservancy reported that the most common kind of trash that they find on beaches is cigarette butts. That's because the vast majority of cigarette filters are made of cellulose acetate, a kind of plastic that isn't biodegradable.

Sunlight breaks down the 12,000 tiny, Y-shaped strands in the filters, but that can take two to 10 years. Even then, the filters merely break into smaller pieces of plastic.

These toxic shards make their way through storm sewers into oceans and rivers, where they can be ingested by wildlife or become part of the gyre of plastic in the ocean that grows larger every year.

Novotny and his colleagues want to determine if specific [chemical compounds](#) from cigarette butts are accumulating in freshwater trout and saltwater mussels—and in humans.

## **Moving through the food chain**

The ultimate goal is to determine whether cigarette butt litter exposed people to toxins or to endocrine-disrupting chemicals that mimic estrogen, either through eating fish or interacting with soil, sand or water in shoreline and marine environments.

"As a result of the lab work we've done, there's a suggestion that there is a persistent contaminant effect that gets into the food chain," said Novotny. "In addition to the chemicals in cigarette butts, tobacco is grown with pesticides that aren't regulated. So there is a whole range of contaminants that haven't been studied yet."

The irony is that cigarette filters serve no purpose, other than making smokers feel better about the health hazards associated with cigarettes.

In fact, filters may even create additional health problems, including inflammation from inhaling tiny strands of cellulose acetate, Novotny said.

If filters don't have any health benefit, why do people use them? It may all go back to what Baby Boomers remember as the Micronite filter. After a Reader's Digest article suggested that smoking might be linked to cancer in the 1950s, R.J. Reynolds ran advertisements claiming the filter made Kent cigarettes healthier than other brands.

As it turned out, the snappy-sounding Micronite filter contained the deadliest form of asbestos—crocidolite.

The manufacturer, Lorillard, had evidence of this as early as 1954 but continued to use crocidolite in its filters until 1956. The "healthy" image of filtered cigarettes persists despite lawsuits by people who smoked Kents or worked in the Lorillard tobacco factory and developed mesothelioma, a rare and deadly cancer of the lung and abdomen caused almost exclusively by asbestos..

## **Smokers are litterbugs**

The cultural mythology of cigarette smoking includes the devil-may-care gesture of tossing away a cigarette butt after dosing on nicotine. Novotny and fellow TRDRP-funded researcher Elizabeth Smith, a historian who is an associate adjunct professor at UCSF's School of Nursing, conducted a comprehensive survey of the tobacco industry's own research on cigarette butt litter.

Their conclusion was that palliative measures, including making ashtrays

available on city streets, simply don't work.

Novotny and Smith's wittily titled 2011 research paper, "Whose Butt Is It? Tobacco Industry Research About Smokers and Cigarette Butt Waste" drew on the country's largest repository of tobacco industry documents, The Legacy Tobacco Documents Library at UCSF. The library contains more than 14 million documents comprising more than 80 million pages released by tobacco companies after a series of lawsuits that forced the industry to release their internal files in the 1990s.

As they surveyed the documents, Smith and Novotny found that cigarette manufacturers had been concerned about the problems posed by cigarette butts for decades. Industry studies revealed that while most smokers realized that cigarette butts were not biodegradable, they were largely unaware that they were toxic. Some members of focus groups even suggested a tidy solution to the litter problem: filters made of candy or crackers so they could be eaten.

But smokers were sensitive to the litter problem. A Philip Morris study found that many smokers considered litter a sign of laziness and insensitivity. But 45 to 75 percent threw cigarette butts on the ground anyway, partly because they found cigarette butts "disgusting" and didn't want to see them in their ashtrays. Smokers seemed to feel shame or guilt and simply wanted to dispose of their cigarette butts as quickly as possible.

Companies were concerned that promoting a biodegradable filter would encourage more litter. Instead, the industry mounted anti-littering campaigns. These campaigns might work for people within 10 feet of an ashtray.

Smokers between 21 and 25 were particularly oblivious: 92 percent threw their [cigarette butts](#) on the ground. The studies found that tossing

away a cigarette butt was a "natural extension of the defiant-rebellious smoking ritual."

Apparently, the leather-jacketed James Dean-type smoker hasn't changed much.

Cigarette butts make up 30 to 38 percent of waste along shorelines and waterways, and with the number of smokers rising in places like China, it's looking more and more like the problem is overflowing the ashtray and harming the environment.

Provided by University of California - San Diego

Citation: Study documents cigarette environmental hazards (2013, September 6) retrieved 27 April 2024 from <https://phys.org/news/2013-09-documents-cigarette-environmental-hazards.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.