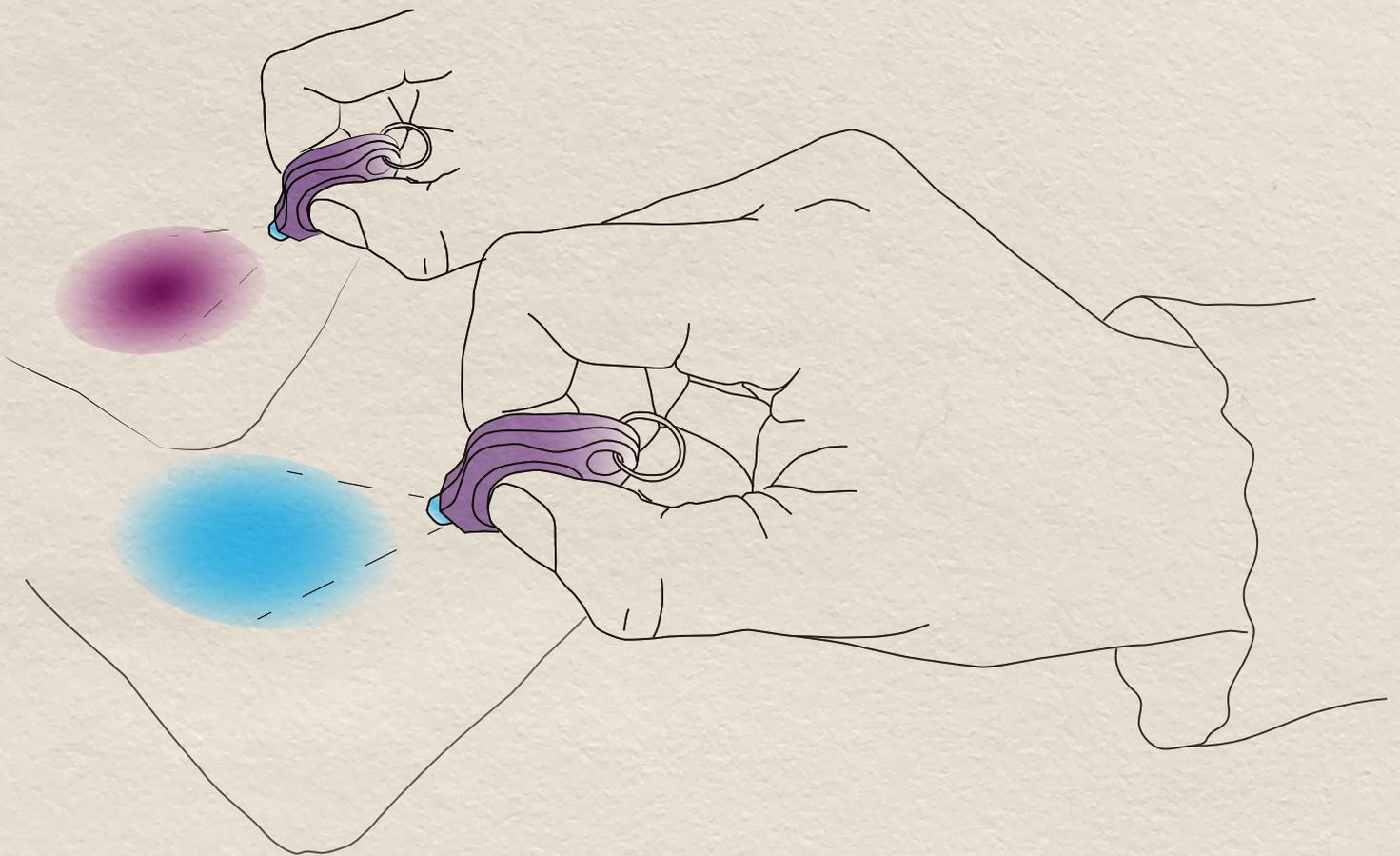


# DETECTING & AVOIDING OPTICAL BRIGHTENERS

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**Donald Farnsworth  
& Nick Stone  
2019**

# Optical Brightening Agents (OBAs)

are commonly found in everyday items including:

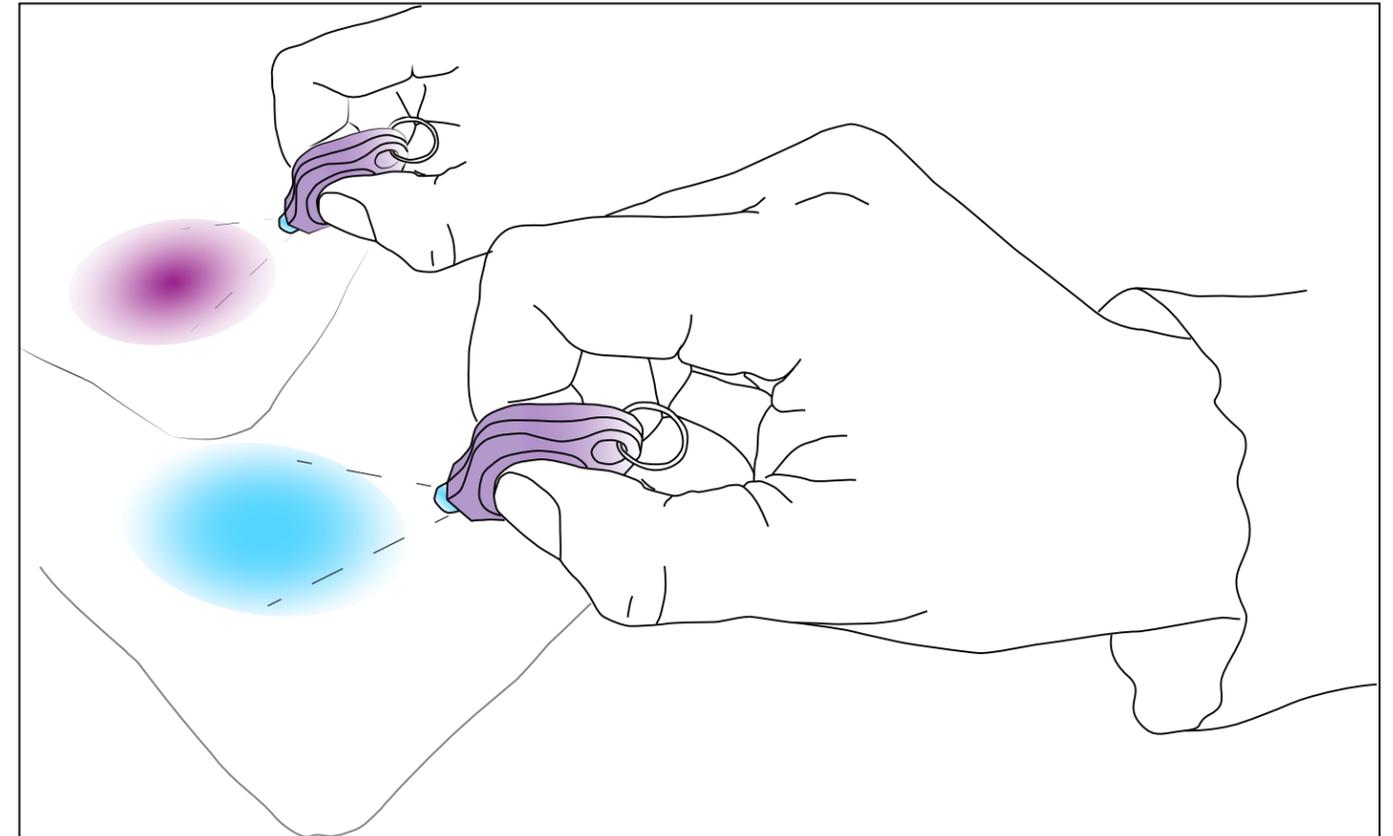
- Laundry Detergent
- Hand Soap
- Cosmetics
- Cotton Balls
- Toothpaste
- Textiles
- Toilet Paper
- Plastics
- Printer Paper
- Paint
- Food Packaging

*“Optical brighteners add chemicals to your clothes, rather than removing stains from your clothes. You could call it an optical illusion.”*

*-Vanessa Layton*

**Synonyms:** Optical Brighteners, Optical Whiteners, Fluorescent Brightening Agents, Fluorescent Brighteners, Fluorescent Optical Brighteners, Fluorescent Whitening Agents (FWAs), Fluorescent White Dyes, and Organic Fluorescent Dyes

**Trade Names:** Blankophor, Dikaphor, DMS, Intrawite (textile use), Kolocron, Optiblanc, Tinopal, Tuboblanc (textile use mostly), Uvitex.



*A hand-held UV light can be used to quickly reveal the presence of OBAs. If the reflected light appears blue, the item in question contains OBAs; if the light is purple, no optical brighteners are present.*

**O**ptical Brightening Agents (OBAs) are chemical compounds that absorb light in the ultraviolet (UV) region of the electromagnetic spectrum and re-emit light in the blue region by fluorescence, thereby making things appear brighter, bluer, and less yellow. Often found in detergents, they are the modern day equivalent of the centuries-old practice of “bluing” (adding a small amount of blue dye to laundry rinse water to make fabrics appear whiter).

There are numerous reasons that OBAs are problematic and should be avoided whenever possible:

## **OBAs Are Not Biodegradable**

Since bacteria cannot break down optical brighteners in the environment, they are persistent and ubiquitous. A 1975 study by the Environmental Protection Agency (EPA) found that 29,000,000 lbs of U.S.-produced OBAs went into laundry detergents in 1969; it is hard to imagine the enormous quantity of these chemicals present in our environment and water supplies today. We do know that optical brighteners are commonly found in wastewater to such a great extent that scientists use them to detect whether bacteria is contaminating community water supplies.

## OBA's Are Potentially Harmful and Largely Unregulated

According to the article “Key Characteristics of Laundry Detergents” by Design for the Environment (DFE), an EPA partnership program, optical brighteners may be potentially toxic to humans and “Aminotriazine- or stilbene-based whiteners may cause developmental and reproductive effects.” Unfortunately, this lack of certainty characterizes most studies of the effects of optical brighteners: though at least one study showed that brighteners could cause contact dermatitis (red, irritated skin) and photosensitivity, their degree of harmfulness has not been precisely identified. In the U.S., this ambiguity suggests enough of a potential risk that the FDA has placed limits on the amount of brighteners allowed in food packaging products – yet the use of optical brighteners in detergents and other nonfood products continues with little oversight or accountability on the part of the EPA.

There is very little transparency on the part of companies like Procter & Gamble, manufacturer of many popular cleaning products, with regard to the health and safety risks posed by optical brighteners. A 2011 report by the European Ecolabel Commission on criteria for laundry detergents found that as optical brighteners un-

dergo photodegradation, numerous metabolites may be produced that are not yet identified. In other words, we may not be able to truly gauge their potential future impact upon the environment.

In 2015, Procter & Gamble received a failing grade from the organization Women’s Voices for the Earth based on the disclosure of their product ingredients and processes for assessing chemical safety. Amanda Starbuck of the Center for Effective Government writes:

*Alarminglly, our nation’s primary chemical safety law does not require companies or agencies to screen chemicals before they enter the marketplace. The Toxic Substances Control Act of 1976 gave a free pass to over 60,000 chemicals that were already in wide use when the law was enacted. Today, over 84,000 chemicals are in commercial use yet the U.S. Environmental Protection Agency has required testing for fewer than 300 chemicals and banned or restricted only nine.*

Starbuck notes that since women still do more than 70% of housework in the average household, they face a greater risk of exposure to harmful chemicals in cleaning products than men do — chemicals which may then be passed on to children during pregnancy or breastfeeding. Meanwhile, a

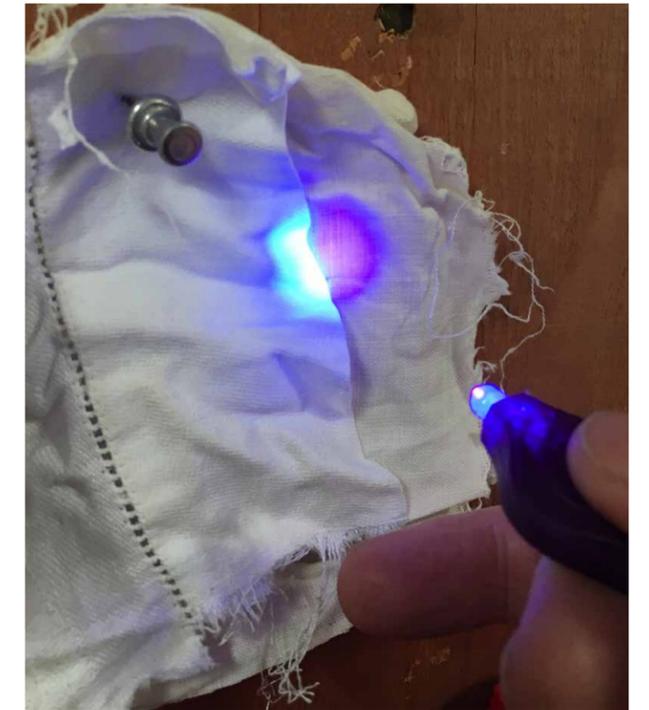
1990 study conducted by the National Institute for Occupational Safety and Health found that men working in an area of a chemical plant that manufactured an intermediate used for the production of OBA's suffered from impotence, decreased libido, and lowered testosterone levels; the study suggested that these symptoms could be due to the estrogenic activity of the chemical in question (a stilbene derivative).

## OBA's Undermine Efforts At Stealth

The U.S. military discourages the use of detergents that contain optical brighteners when washing combat uniforms. Night vision lenses can pick up the ultraviolet light on the uniforms, making optically brightened uniforms an easy target.

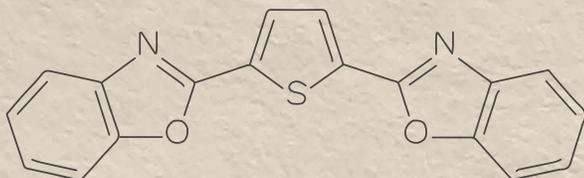
## Papermakers & Artists: OBA's Make Your Paper/Artwork A Time Bomb

Papermakers who are not careful about the source of their rags will likely end up retting textile scraps which have been laundered in optical brighteners; likewise, artists using commercial art papers are placing their work at risk. Creating paper from such rags – or creating artwork using such paper – means effectively creating a ticking time bomb. With the passage of time and exposure to the sun, the color of the paper is likely to fade or change unpredictably – not to

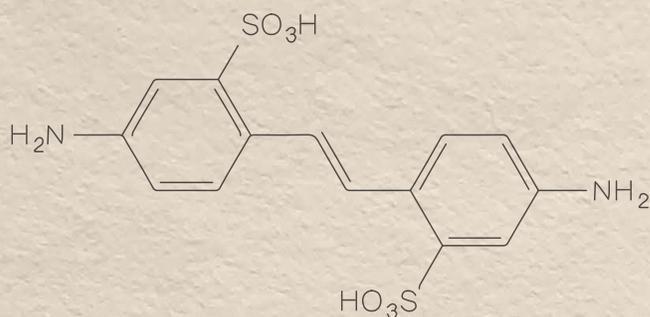


*A UV light reveals that the rag on the left was brightened with OBA's; the one on the right is safe to use for papermaking.*

mention the potential health hazards already mentioned. When sourcing my own rags for retting, I was pleased to find numerous suppliers of vintage linen scraps via eBay. However, I was soon dismayed to discover that they all contained 20th-century optical brighteners — permanently attached to the fibers and impossible to remove. Eventually, I was able to locate environmentally conscious companies on the West Coast that make products using natural linen and hemp without optical brighteners. These scraps help me to approximate the use of Old World raw material without poisonous OBA's. •



**4,4'-bis (benzoxazolyl)-cis-stilbene and 2,5-bis (benzoxazol-2-yl) thiophene**



**4,4'-diamino-2,2-stilbenedisulfonic acid**

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