

## Results of Bleach Test on Silk Yarns

April 8, 2010

The “bleach test” is sometimes used to help determine the fiber content of an unknown yarn: If a snippet of yarn is placed in bleach and dissolves completely, it *was* wool. More specifically, the fiber was keratin, a protein that makes up most familiar animal fibers: wool, alpaca, angora, mohair, and the fuzzy coats of other four-legged critters (including humans). The question then arose: Does the “bleach test” work on silk? Silk is made of the protein fibroin, which is similar to keratin, but is not exactly the same thing.

A preliminary experiment with a variety of yarn samples (acrylic, wool, wool/nylon, handspun cotton, handspun bombyx silk), suggested that bleach dissolves silk, though not as quickly as it does wool. Other experiments suggest that kind of bleach being used for the tests matters—one experimenter found that her silk samples withstood sitting in bleach overnight. Examination of Material Data Safety Sheets revealed that the concentration of sodium hypochlorite varies greatly among laundry bleaches, from 1% to 10%.

The following photographs show the results of a bleach test using Clorox Regular, which claims a sodium hypochlorite concentration of 5-10%.

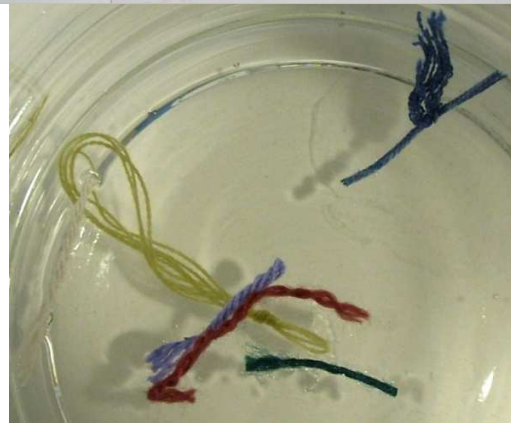
The yarns used in the test were:

- Artfibers “Tantra” (100% silk)
- Tess Yarns “Raw Silk” (100% silk)
- silk embroidery floss, indigo dyed (100% silk)
- Fiddlesticks “Silk Sensation” (100% silk)
- Fiddlesticks “Exquisite” (50% silk, 50% wool)
- 20/2 Rayon (100% rayon, a cellulose fiber that should not dissolve in the bleach test)

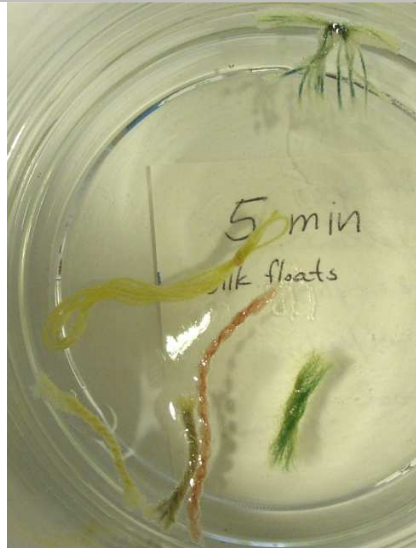
The samples were quite small—the rayon “control” microskein was about 2” long.



When dropped into the bleach, the silk samples floated, and the rayon sank. The silk samples floated on the surface of the bleach for the entire duration of the experiment.



After 5 minutes, the color had faded on all samples, and the wool/silk blend was already showing signs of disintegration.



After 10 minutes, the wool/silk yarn had complete disappeared, and the "Tantra," a loosely spun single, had been reduced to the whitish smudge of goo at about 7 o'clock in the photo, counterclockwise from the "Raw Silk" sample. The embroidery thread was also quickly dissolving. The finer the fibers and the softer the twist, the faster the yarn dissolves.



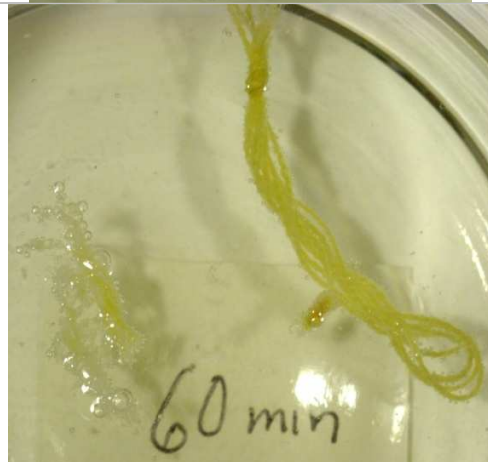
After 15 minutes, little remains of the embroidery floss except the knot in the middle.



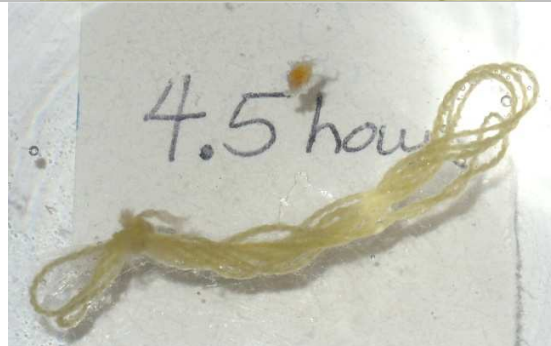
After 30 minutes, the rayon is still mostly intact, but the silk yarns are mostly dissolved



After an hour, a gentle shaking of the container caused what remained of the "Silk Sensation" and "Raw Silk" samples to disappear. The little knot of embroidery floss remained however; in the photo it's to the left of the rayon, about two-thirds of the way from the top.



After 4.5 hours, the remains of the knot were still present. The rayon was starting to look a little worse for wear.



### **Conclusions**

- The bleach test works on silk, given sufficiently strong bleach.
- Because keratin dissolves much faster than fibroin, the bleach test might be used to differentiate between the two types of protein fibers.
- It is useful to compare the results from samples of known fiber content when trying to interpret the results of any fiber identification test. This is particularly true for the bleach test, in which the brand of bleach is itself a variable. In checking the whether a yarn that burns like protein (self-extinguishes, smells like burning hair) is keratin or fibroin, one might add a snippet of wool yarn to the bleach test to see if the unknown yarn is indeed behaving like (or very unlike) wool).