

# The Battle of the Soxx

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## Introduction

-Sediment is the number one pollutant in the nation. It is picked up in rain, snowmelt or stream erosion<sup>1</sup>.

-As more land is being urbanized, there are fewer pervious surfaces that allow for infiltration of stormwater<sup>2</sup>.

-As storm water flows over ground surfaces and soil, it transports sediments, such as soil particles, fertilizer, sticks, and construction waste downstream where it accumulates<sup>3</sup>.

- The company Filtrexx created Envirosoxx to filter pollutants from storm water and runoff.

-Our experiment consisted of designing a “soxx” to attempt to mimic the Filtrexx filtration capabilities at a much smaller cost using household materials.

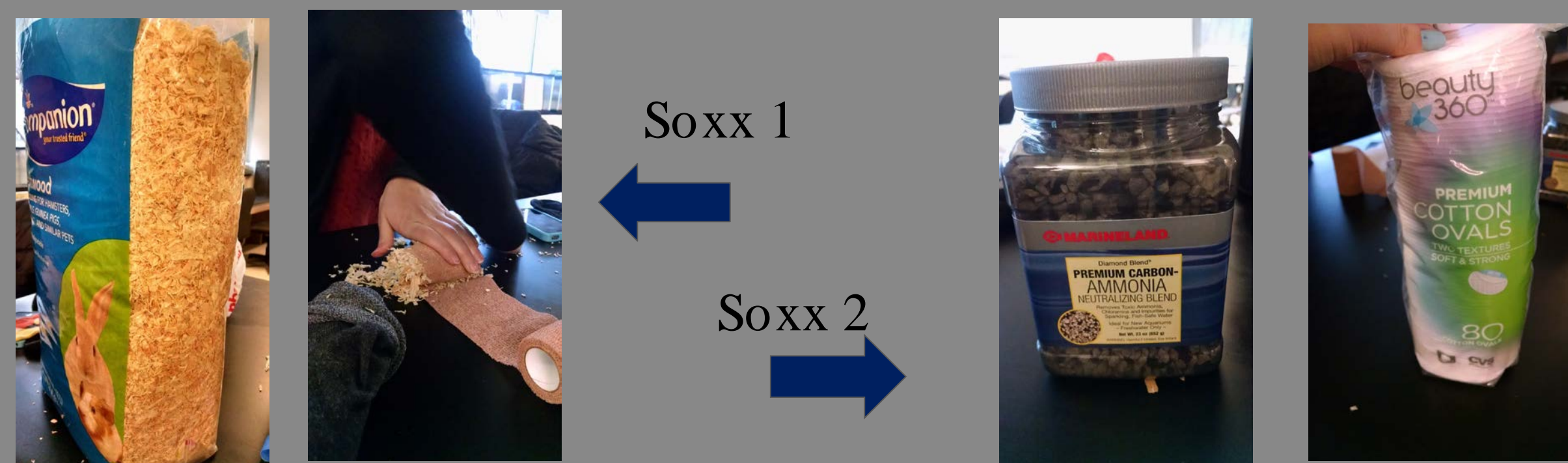


Fig. 3. Materials used in making the six Soxx

## Methods

-Storm water collection: Standing water in rain gardens in two locations on Villanova University’s campus were collected

-Soxx creation: Two types of soxx were created. The first was filled with activated carbon and cotton and the second had gauze and wood shavings

Experimentation:

1. Collected first rainwater sample from location 1
2. Created two different soxx
3. Used a sink to mimic a storm drain, wrapped soxx around the sink drain
4. Rainwater was poured so it would filter through the soxx, down the drain, and into a bottle to collect samples
5. Collected rainwater from location 2
6. Repeated steps above. We used the same soxx.
7. Used a Buscher vacuum to collect sediment on filter paper for all samples
8. Dried and weighed the filter paper and recorded the mass of the sediments for each sample

## Results

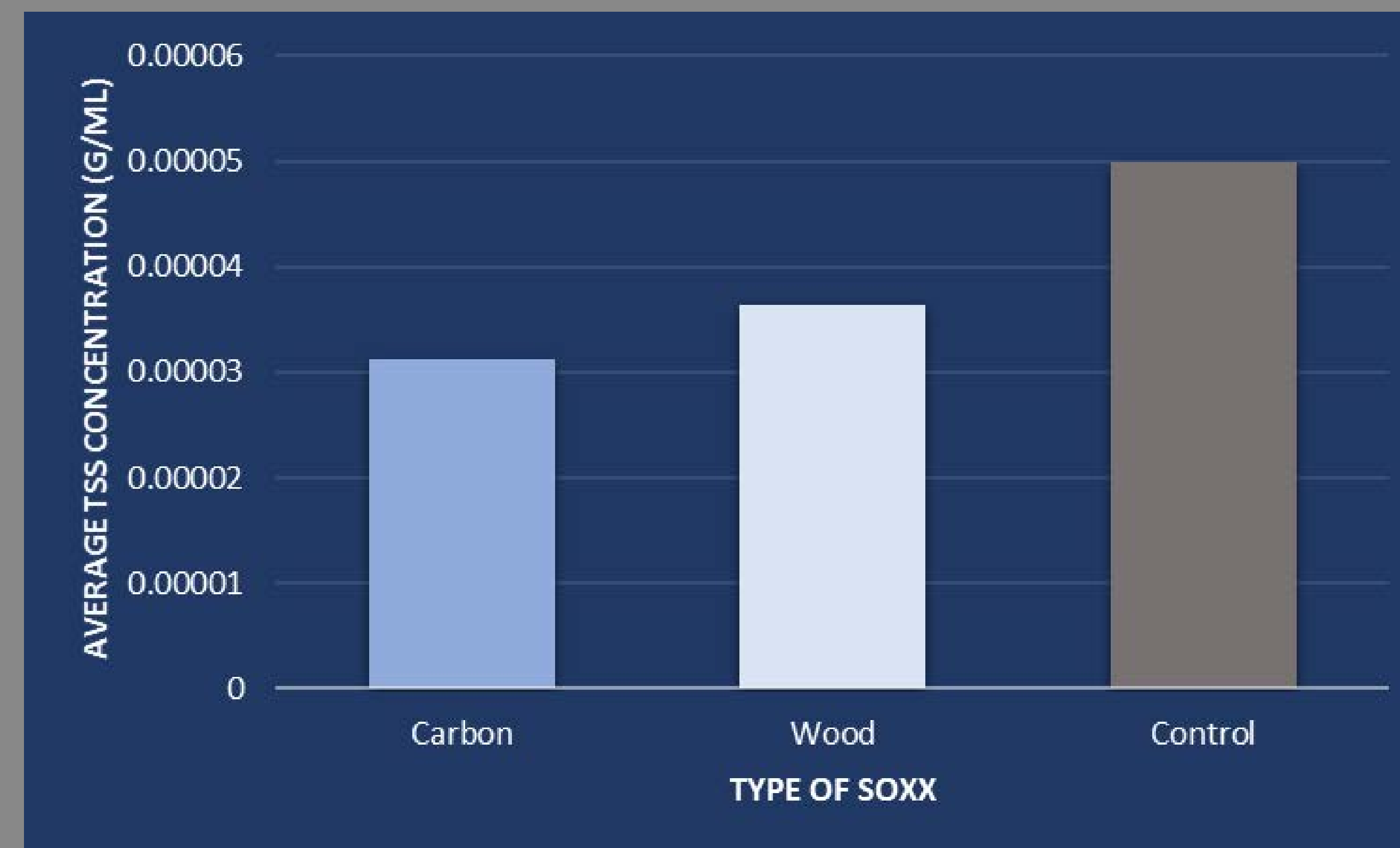


Fig. 1. Average TSS concentrations of the filtered water by Soxx from the first trial.

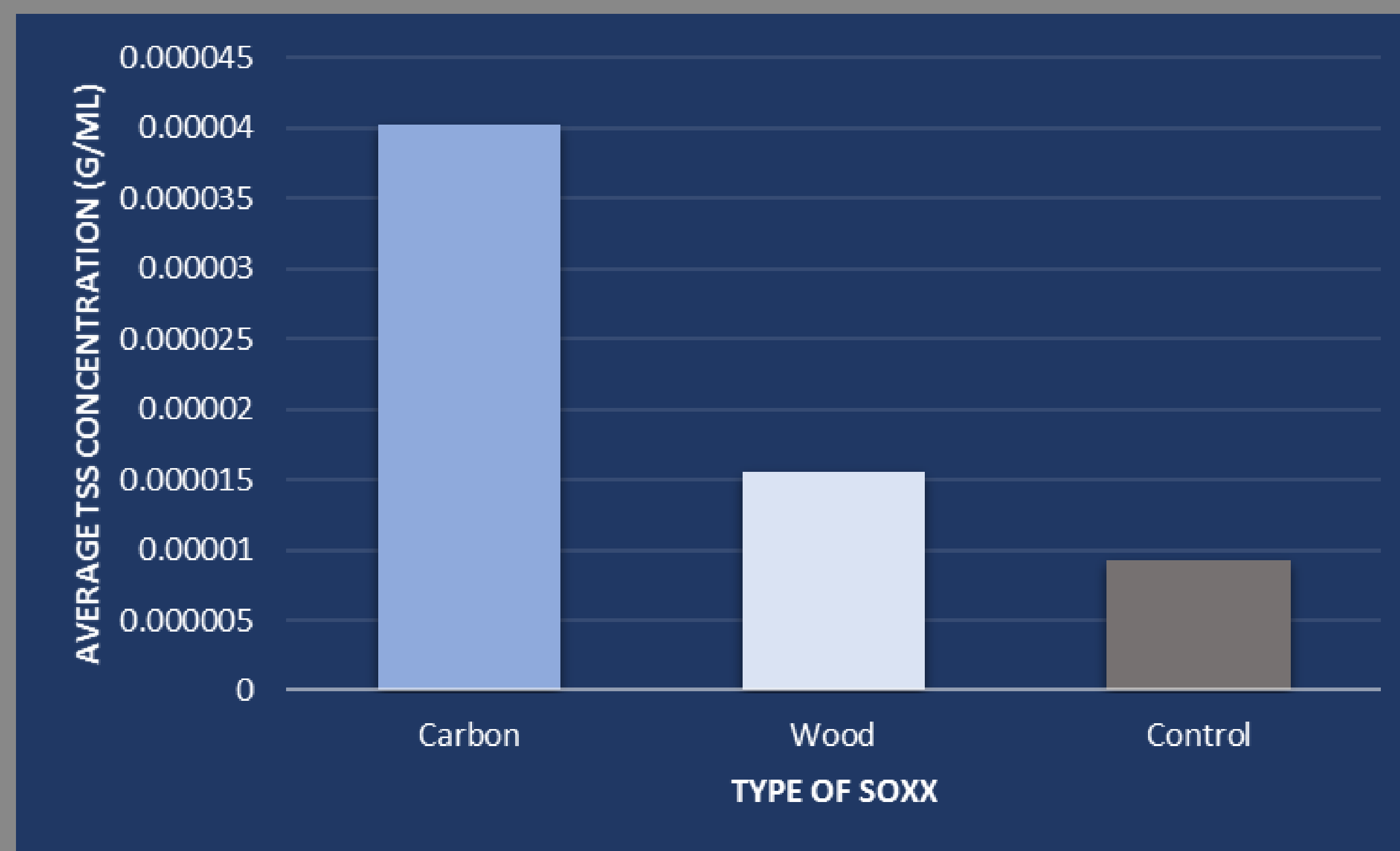


Fig. 2. Average TSS concentrations of the filtered water by Soxx from the second trial.

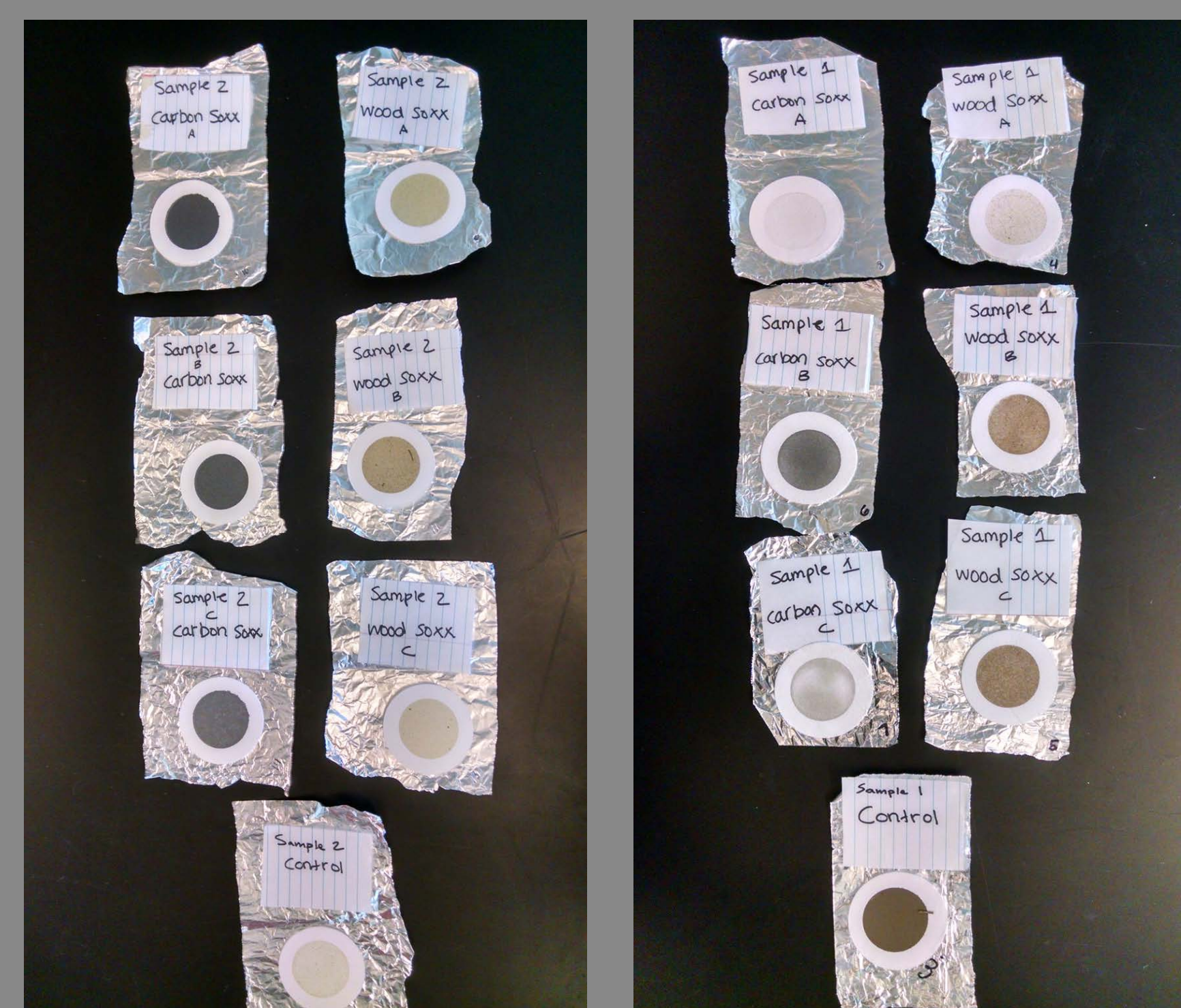


Fig. 5. Filter papers with remaining sediments after experimentation with Soxx.

## Discussion

- The results show that when the first water sample was filtered using our soxx, the sediment content was significantly reduced in most instances from our control sample

-In our second trial with the second water sample, a leaching of carbon occurred when filtering and our wood shavings soxx contained more sediment than our control sample did

-This error was likely due to the reduced amount of water available for experimentation in the second trial contributing to an increase in potential contamination of the water.

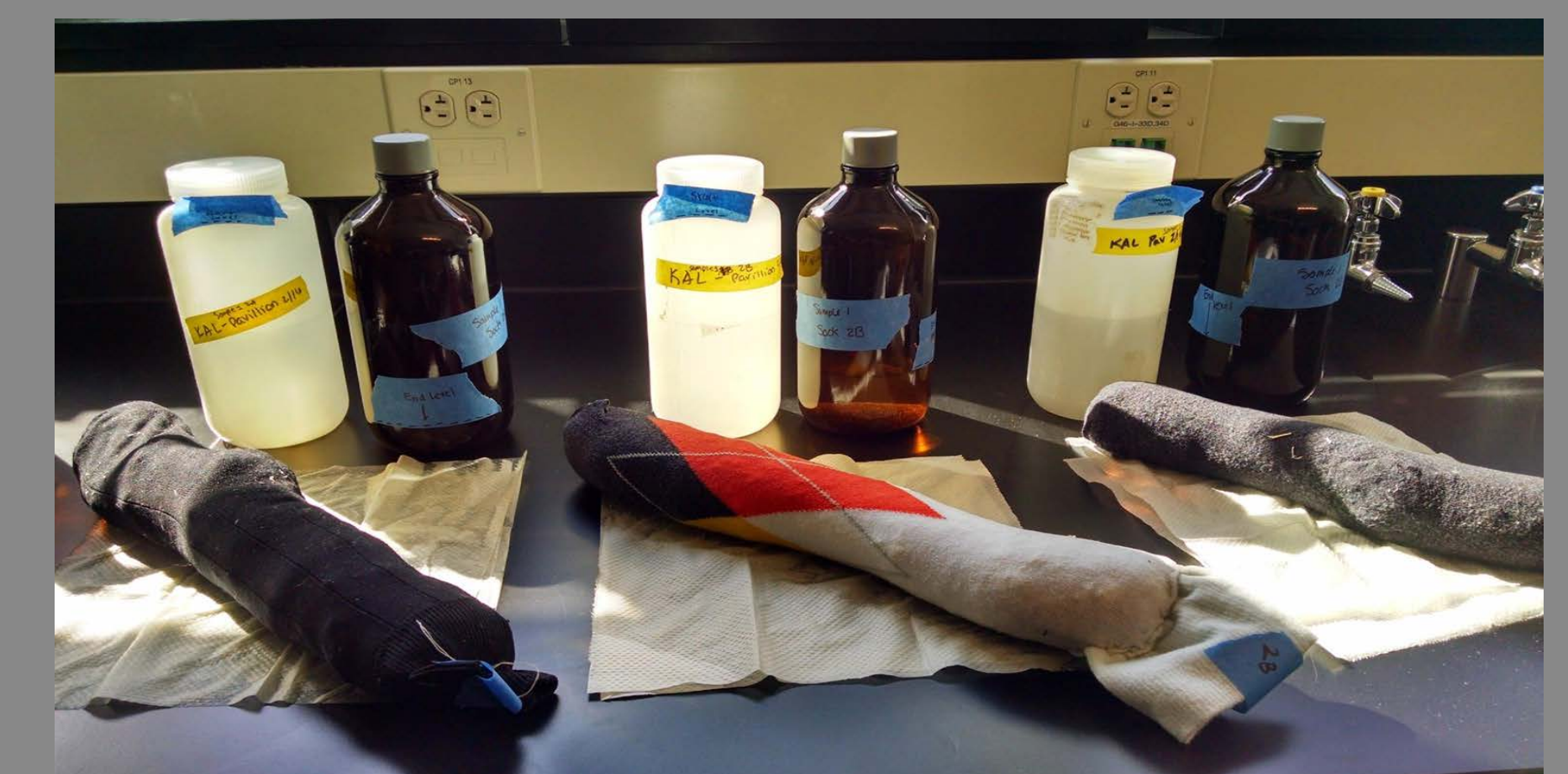


Fig. 4. An example of three Soxx, sample water before filtering and after filtration through Soxx.

## Conclusion

The Soxx were able to filter sediments somewhat effectively in the first trial. However, by the second trial the Soxx appeared to be ineffective at filtering sediments from the control sample collected. If implemented on Villanova University’s campus, our Soxx would only be effective for a short time frame and cleaning or replacement would be necessary.

## Acknowledgements

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## Citations

- 1) Perlman, H. (2015, August 7). Runoff (surface water runoff). Retrieved April 18, 2016, from <http://water.usgs.gov/>
- 2) Sediment. (2008). Retrieved April 18, 2016, from <http://www.aspenpitkin.com/>
- 3) What is a Watershed? (2016). Retrieved from <https://cfpub.epa.gov/>