Green Cleaning

Guiding Question

Many people want to use fewer paper towels to help the environment. Microfiber cleaning cloths are a popular alternative. But they can shed microplastics into our water supply. I wanted to know if there was a non-plastic alternative that was as good or better at cleaning wet kitchen messes. I will test three kinds of cotton fabric and one kind of plastic microfiber.

Which will absorb water best?

My Hypothesis

My fabrics are cotton terrycloth, cotton t-shirt, microfiber, and cotton bar mop.

My hypothesis is that the material with medium density in fibers (cotton terrycloth or bar mop) will collect water the best, due to the fact that capillary action works because water clings to the fibers, and also that the water needs room.

Materials

- Water
- 1 Cotton bar mop
- 1 Microfiber cloth
- 1Old cotton t-shirt
- 1Cotton terry washcloth
- 1 scale
- Scissors
- Bowl
- A graduated cylinder
- A plate
- A ruler
- Cardboard to make a template (optional)
- Marker for fabric
- Pencil
- Notebook

Procedure – Swipe Test

1. Cut four 10 cm squares of each fabric (you can use a cardboard template to make this easier).
2. Weigh all pieces of each individual fabric type to insure they weigh the same. If the pieces of a fabric type don't weigh the same, redo step one. (Samples between types will not weigh the same due to differences in weaving, but all samples of one type should be the same).
3. Pour 10 ml of water onto plate and wipe once with a sample of fabric. Wait 3 seconds (to allow drips to fall), then weigh the fabric.
4. Subtract the weight of the fabric from the total weight, and you'll have the weight of the water. Repeat until all pieces have been used in this step, recording as you go.

Procedure – Saturation Test

1. After swipe tests, fill a bowl with water.
2. Dip a piece of fabric into the water until fully saturated. Wait until the fabric stops dripping, then weigh.
3. Subtract the weight of the fabric from the total weight, and you'll have the weight of the water. Repeat until all pieces have been used in this step.

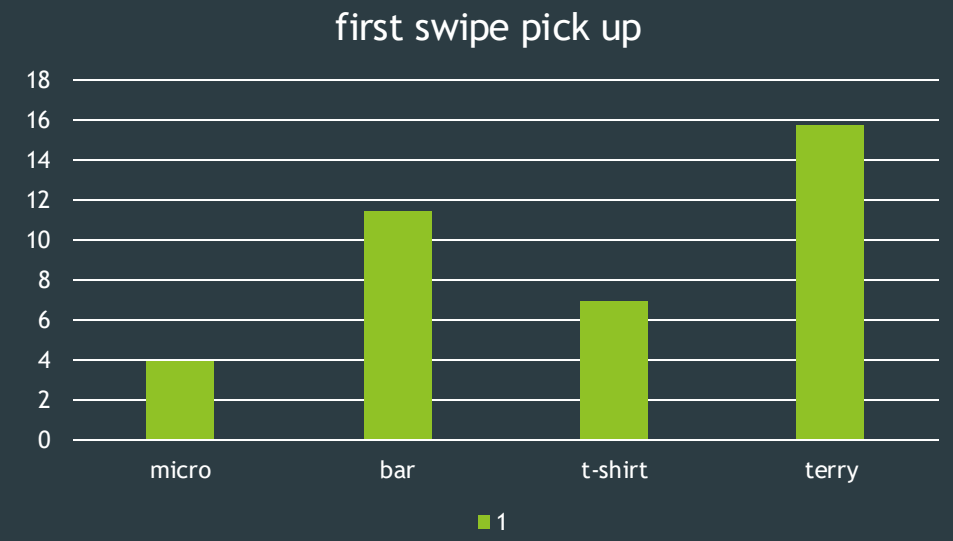
Research

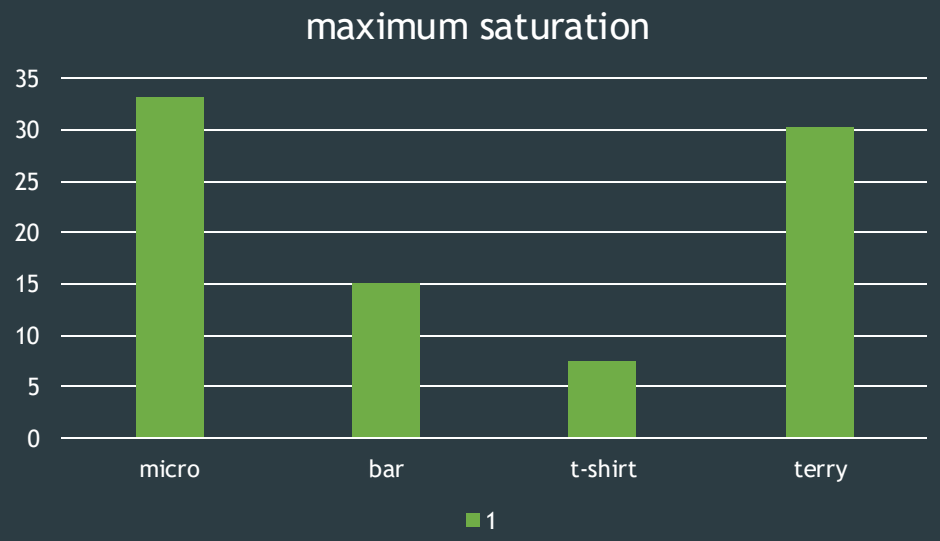
Fabric picks up water with capillary action. Capillary action works by water sticking to strings, then more water sticking to strings and pushing water up

Microfiber cloths shed microplastics, so they aren't the most environmentally safe alternative to paper towels.

It takes a lot of water to produce cotton. The water needed for one t-shirt is enough for one person to have water for 900 days.

Results





These graphs show how much water (by weight in grams) each type of fabric picked up on the swipe test and in saturation, averaged. I also took some subjective notes during my swipe tests, which I have transcribed below:

	notes
micro	Bad at initial swipe.
bar	Holds on to water well.
T-shirt	Very little water capacity.
terry	Best all around, although it drips a lot.

Conclusion

In conclusion, I found that terry wash cloth is the best for liquid messes. Sadly, I couldn't test solid messes, or micro-fiber cloth might seem better. I think the micro-fiber cloth was only good because it was thick.

Therefore, there is no reason to use microfiber cloth over cotton for wet kitchen messes, but it might be better for things I didn't test. T-shirt rags were the worst, but are probably the most environmentally friendly option because they are recycled. There is no perfect answer.

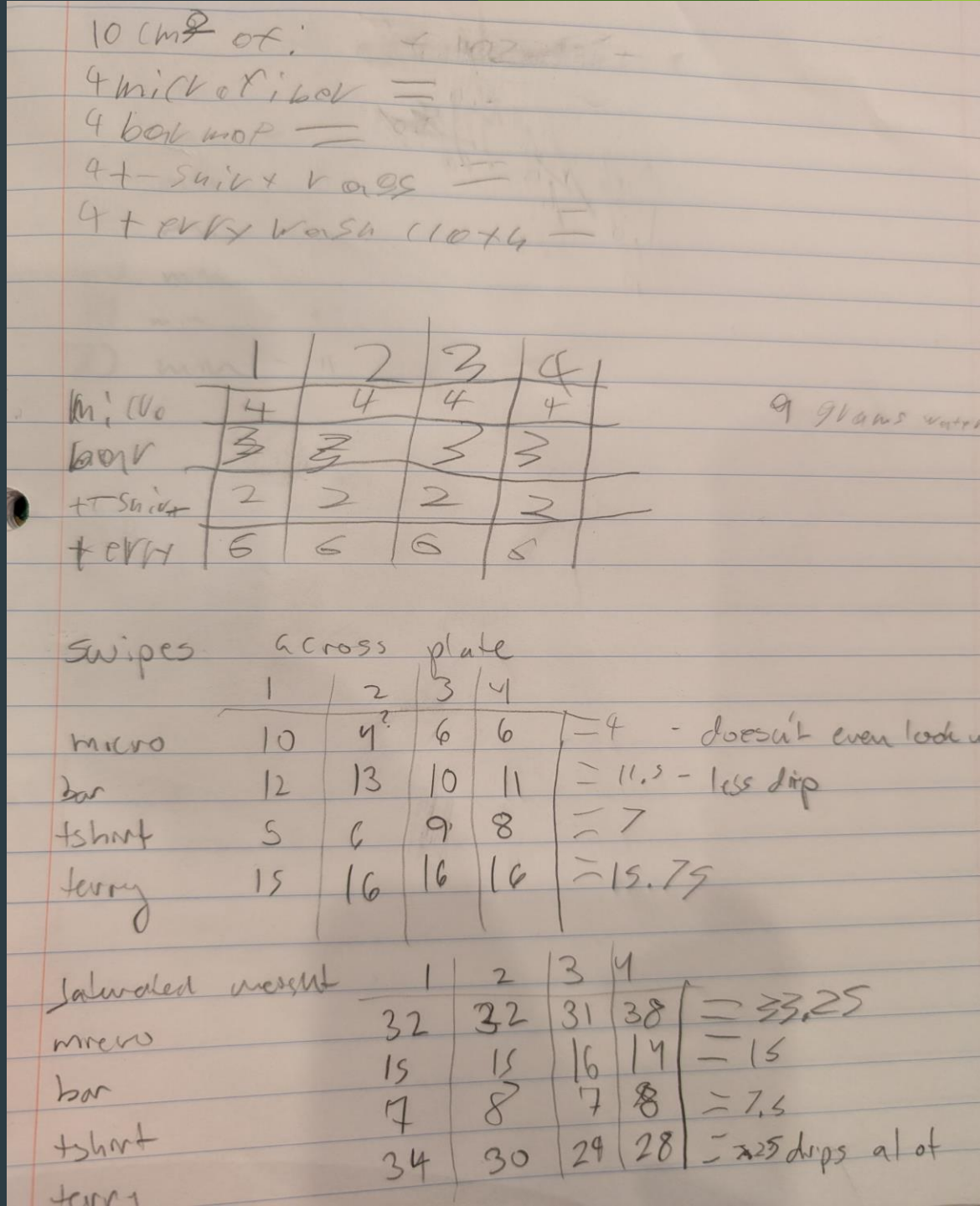
References

Hirsch, A. (2018). Science Comics: Trees. First Second.

Mogavero, T. (2020, April 16). Clothed in Conservation: Fashion & Water | Sustainable Campus. Sustainablecampus.fsu.edu; Florida State University. https://sustainablecampus.fsu.edu/blog/clothed-conservation-fashion-water

Spalding, D. K. (2025, September 12). Microfiber Cloths Explained: How They Work, Their Benefits, And Their One Big Downside. IFLScience. https://www.iflscience.com/what-are-microfiber-cloths-and-how-do-they-clean-so-well-80792

Science journal



10 cm² of:
4 microfibre =
4 bar mop =
4 t-shirt rags =
4 terry wash cloths =

	1	2	3	4
Micro	4	4	4	4
bar	3	3	3	3
t-shirt	2	2	2	2
terry	6	6	6	6

9 grams water

Swipes across plate

	1	2	3	4	
micro	10	4?	6	6	= 4 - doesn't even look
bar	12	13	10	11	= 11.5 - less drip
tshirt	5	6	9	8	= 7
terry	15	16	16	16	= 15.75

Saturated weight	1	2	3	4	
micro	32	32	31	38	= 33.25
bar	15	15	16	14	= 15
tshirt	7	8	7	8	= 7.5
terry	34	30	29	28	= 30.25 drips a lot