

# Waterproofing Products: Do They Really Work?

Nikos Filipos

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SJVRS

# Introduction

The experiment I performed had to do with testing 3 waterproofing agents to find out which is the best. I got interested in this topic because my friend was using “Kiwi Camp Dry” to preserve his shoes. He insisted that it was the best product on the market. So I put his theory to the test, choosing two other products to test against “Kiwi Camp Dry.”

# Question

Which waterproofing product will work best to keep water from permeating fabric?

# Hypothesis

If I spray three pieces of fabric with three different waterproofing products, then I think that “Kiwi Camp Dry” waterproofing spray will work the best because it has two film forming ingredients.

# Variables

## Independent Variable:

The different waterproofing products I am using.

## Dependent Variable:

The amount of water that soaks through.

## Control:

Temperature, Amount of spray, and the size/mass of the fabric.

## Control Group:

Water permeation through fabric with no waterproofing product

# Abstract

My experiment involves testing 3 different waterproofing sprays to see which one will keep the least amount of water from permeating the fabric. After spraying 3 identical pieces of fabric with 3 different waterproofing sprays I poured 20 ml of water onto the fabric. Once I gave the water enough time to fully permeate I measured the amount of water that had soaked through into the graduated cylinder. Additionally, I measured the mass of the fabric both before and after they water was applied to determine if water was absorbed into the fabric. The results of my experiment proved that Rustoleum NeverWet outperformed both other products by having no water permeate the fabric. Kiwi Camp Dry had significant water permeation while Scotchgard had a significant amount of water absorption into the fabric.

# Research

How does it work?

Fabrics and other materials have pores through which water permeates, waterproofing sprays fill these pores up with some type of wax, oil, rubber, or glue making whatever it is put on waterproof to some extent. Many, if not all, waterproofing agents use silicone polymer as a sealant or bonding tool. Silicone polymers are very resistant to UV light and heat which is useful for many outdoor products.

# Research

What's inside it?

Dimethicone, a main ingredient in many waterproofing sprays, is a silicone oil that can also be used in cosmetics, particularly waterproof mascara and lotions. It forms a smooth, protective coat over what it is applied on just seconds after being applied. Dimethicone is often referred to as “silicone oil.”

# Materials

- Gram Scale
- Pencil
- Paper
- 9 Fabric squares (6.81g each)
- Square template/stencil
- Sharpie marker
- Scissors
- Funnel
- Graduated Cylinder
- Kiwi Camp Dry spray
- Rustoleum NeverWet spray
- Scotchgard Water & Sun Shield
- 20 ml water x 9



# Procedure

1. Gather all materials
2. Cut fabric into identical squares and measure mass to make sure they are all the same
3. Put on safety goggles and gloves and work in a well ventilated or outside area
4. Spray waterproofing agent onto one side of each piece of fabric for 4 seconds
5. Repeat step 3 on each piece of fabric with each waterproofing agent, leave 3 fabric samples untouched for control group.

# Procedure Continued

6. Allow fabric to dry for at least 24 hours
7. Measure the mass of each fabric piece again, find the average mass and record in data table
8. Place funnel on top of graduated cylinder
9. Affix fabric over top of funnel
10. Pour 20 ml of water onto fabric
11. Wait 2 minutes for water to fully permeate



# Procedure Continued

12. Observe the amount of water that has seeped through the fabric into the graduated cylinder
13. Record results in data table
14. Measure the mass of the fabric again, find the average and record in data table
15. Repeat steps 7-14 with all other fabric samples
16. Repeat entire process for a total of 3 trials for each fabric group

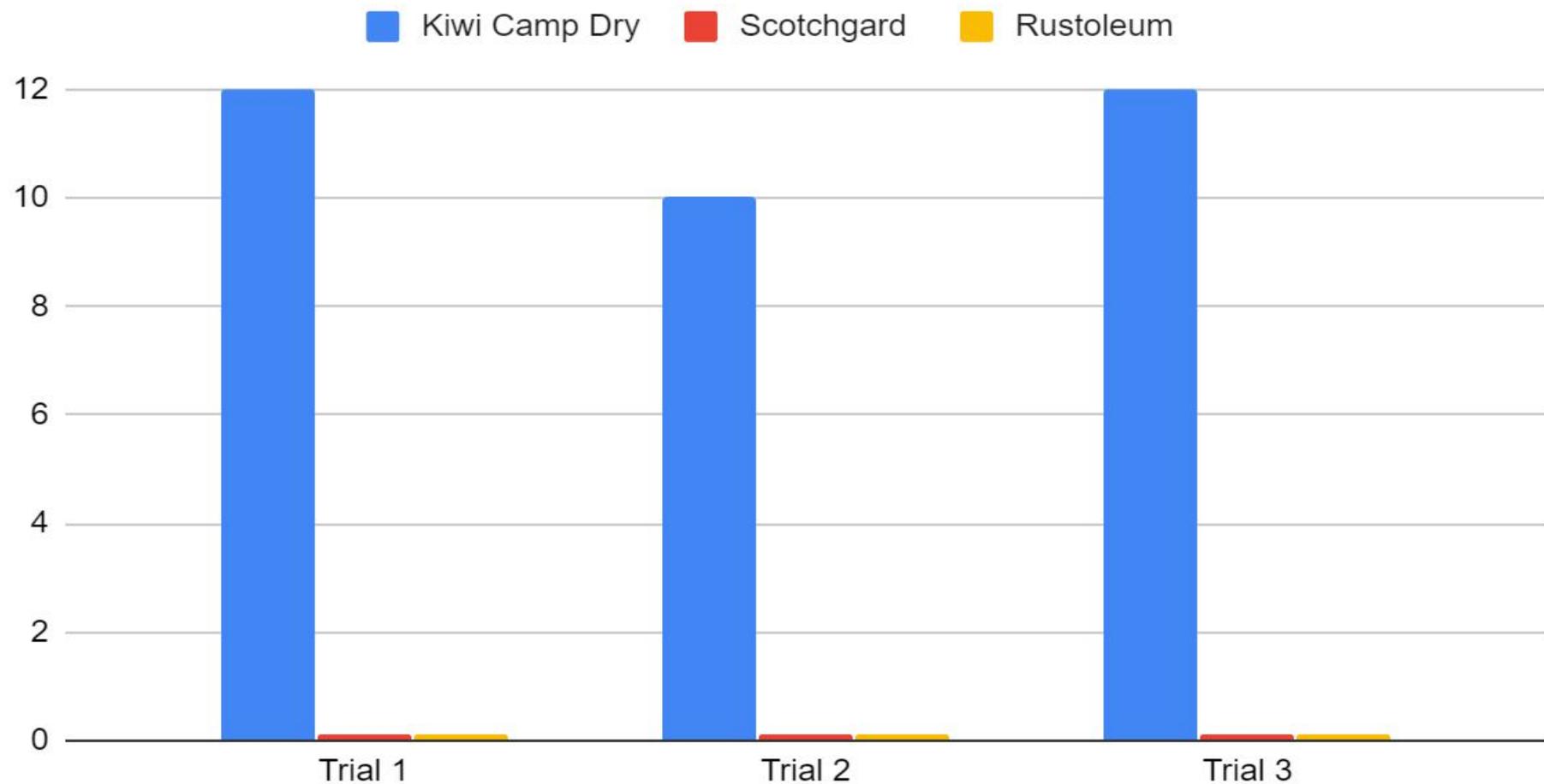


# Results

Water Permeation in milliliters

	Kiwi Camp Dry	Scotchgard Water and Sun Shield	Rustoleum NeverWet	Untreated Fabric Control group
Trial 1	12	0	0	
Trial 2	10	0	0	
Trial 3	12	0	0	
Total Average water permeation in milliliters	11.33	0	0	

# Water Permeation in Milliliters

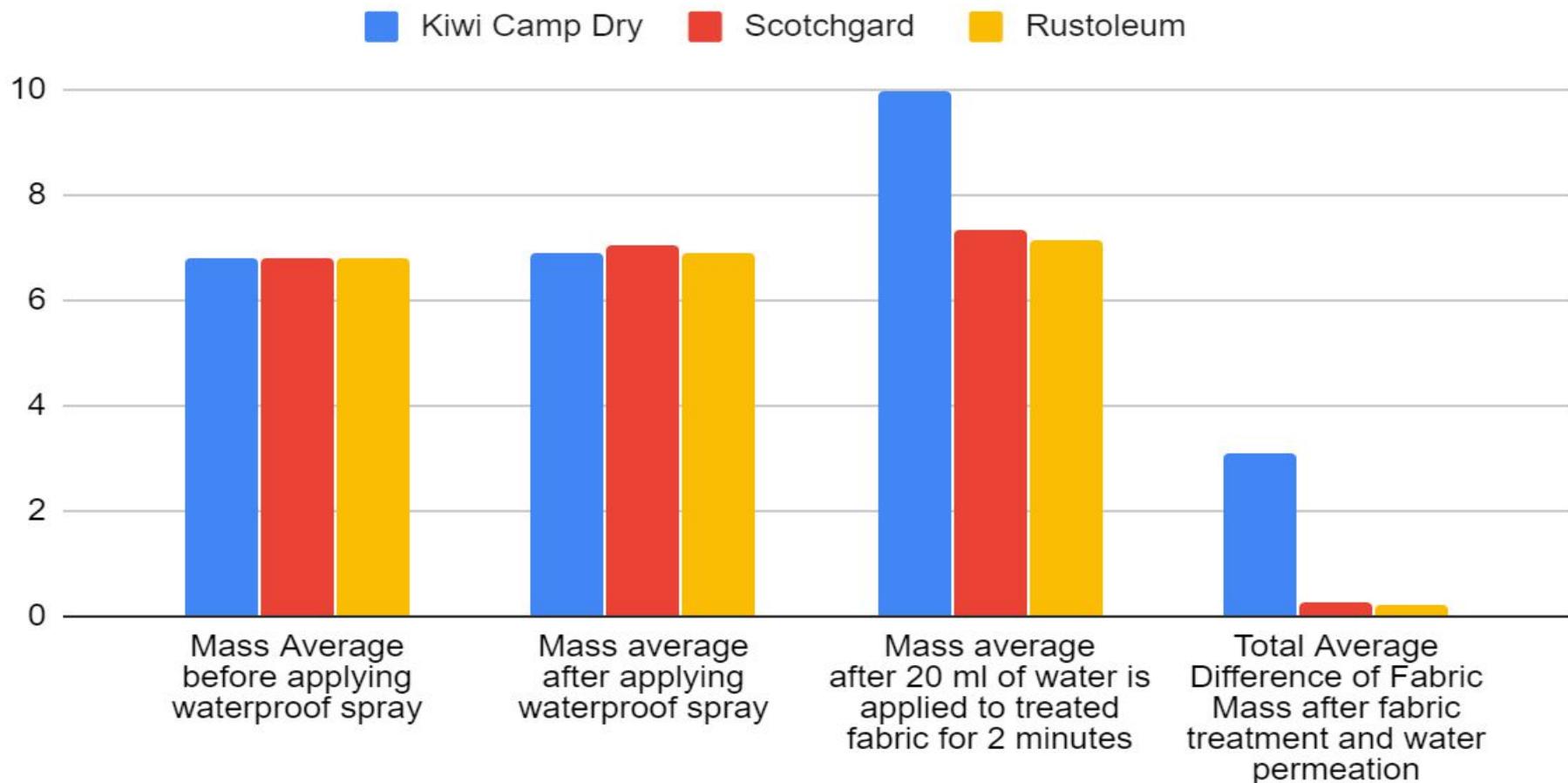


# Results

## Fabric mass in grams

	Kiwi Camp Dry	Scotchgard Water and Sun Shield	Rustoleum NeverWet	Untreated fabric Control Group
Mass Average (3 samples) before applying waterproof spray	6.81	6.81	6.81	
Mass average (3 samples) after applying waterproof spray	6.88	7.06	6.90	
Mass average (3 samples) after 20 ml of water is applied to treated fabric for 2 minutes	9.97	7.31	7.12	
Total Average Difference of Fabric Mass after fabric treatment and water permeation	3.09	0.25	0.22	

# Fabric Mass Throughout Experiment



# Potential Errors

I did several spray tests before spraying the actual fabric pieces to try to ensure that I had even spraying methods.

The Rustoleum product was not an aerosol spray, it was a pump spray which could have changed the amount of product that was dispensed.

There could have also been a slight difference in the amount of water poured onto the fabric.

I allowed an absorption time of 2 minutes to elapse. This was how long it took the Kiwi CampDry to completely soak through. The other products may have soaked through if more time had elapsed.

# Conclusion

After experimentation I found that Rustoleum Neverwet worked the best because it allowed no water to soak through, and very little water to be absorbed by the fabric. My hypothesis was incorrect, it turned out that the Kiwi Camp Dry was the most easily permeated by the water. This was odd due to the fact it was the only waterproofing product that had multiple film filling agents.

# Further Experimentation

If I were to further experiment I would use more waterproofing products that are on the market to truly see which is the best.

I could also use different kinds of fabric to see which fabric is the best for keeping water away. I used cotton for this project because I wanted to use a product that easily absorbed water. Canvas material used for tents, shoes and backpacks would be my next experiment.

I could allow the time for the water to absorb into and through the fabric be a longer time period, 30 minutes.