

The Effects of Hand Sanitizer on Worms

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Introduction

Our research efforts went mostly into the origin and ingredients of hand sanitizer. The purpose of our experiment was to see the effects it has on worms, and how well hand sanitizer works. Our testable question was: 'What are the effects of scented hand sanitizers on leaf worms? Our prediction was that the worms would choose the scented hand sanitizer in the choice test, it would make them burrow quicker, and they would have a severe reaction in the reaction test. Our experiment is important in knowing more about a key part of the ecosystem. We completed reaction, burrowing, choice and effectiveness tests. Key materials included hand sanitizer, agar dishes, and worms. We had some surprising results, some of which was the opposite of our predictions.

Materials and Methods

(Osmon 2018)

Circle Testing:

You Will Need

1. 5 scented Hand sanitizers
2. 1 unscented hand sanitizer (control)

Procedure

1. On a raceway put 10 drops of the hand sanitizer you are testing in a circle
2. Place the worm in the middle
3. Wait for the worm to touch a drop
4. Once the worm touches the drop record it's reaction
5. Repeat steps 1-4 with each hand sanitizer and the control

Burrow Testing:

- 1) Fill the four cups with dirt
- 2) Lay a paper towel out flat on a clean flat surface, such as a table.
- 3) Put 10 drops of your chosen hand sanitizer on the paper towel.
- 4) put the paper towel in the tupperware, UNFOLDED.
- 5) Put your four worms on the paper towel, and fold the towel over.
- 6) Start the timer.
- 7) As three minutes is passing, clean your table/flat surface and flat object, and set up three more stopwatches, one for each worm.
- 8) When three minutes is up, switch your timer to a stopwatch.
- 9) Put each worm in your cup of dirt. And start the timer
- 10) Watch each worm. When they have burrowed all the way into the dirt, stop the timer and record the number of seconds.
- 11) Cut off the timer at twenty minutes. If your worms are not completely burrowed at twenty minutes, stop the timer and record twenty minutes.
- 12) Repeat this process for each hand sanitizer.

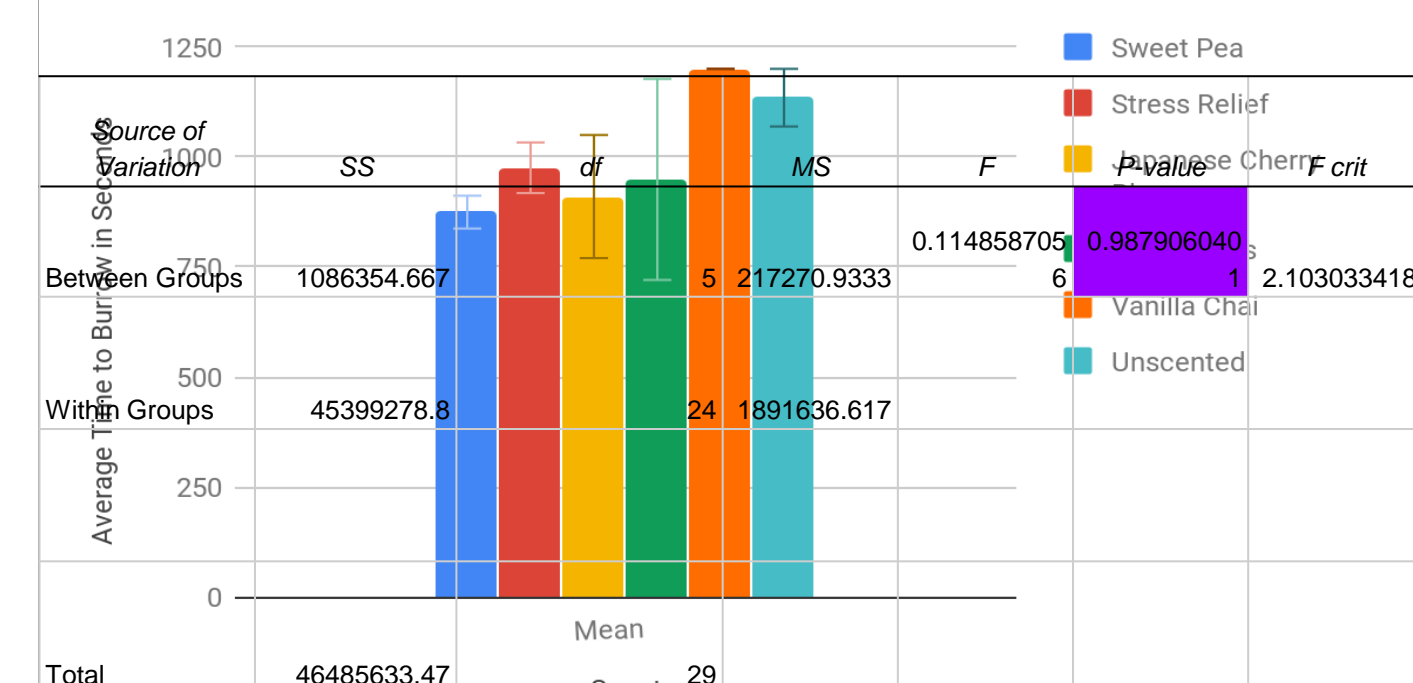
Abstract

toxicology is, "a science that deals with poisons and their effect and with the problems involved." We investigated acidic, alcohol-based scented and unscented hand sanitizers. For the five scented hand sanitizers, we used Bath and Body Works scents; Sweet Pea, Japanese Cherry Blossom, Stress Relief, Vanilla Chai, and Hey, Thanks. The model organism we used is leaf worms, because of their sensitive skin, and the fact that they are invertebrates, and not as protected as regular vertebrates. Because if worms are being hurt then the substances are not safe for humans

Data Presentation

Statistic	Sweet Pea	Stress Relief	Japanese Cherry Blossom	Hey Thanks	Vanilla Chai	Unscented
Mean	874.5	975.25	910	948.75	1200	1134.5
Median	894.5	954.5	954.5	1164.5	1200	1200
Standard Deviation	74.44237145	115.0431079	279.3337311	456.3955704	0	131
Standard Error	37.22118572	57.52155393	139.6668656	228.1977852	0	65.5
p-value for t-test	0.692888521	0.7980987804	0.8747924885	0.8660771365	0.9460892343	

The Burrow Times of Worms Soaked in Hand Sanitizer



Scents trial #	Circle/Reaction Test			Total
	No Reaction	Mild Reaction	Strong Reaction	
Sweet Pea			4	4
Stress Relief			4	4
Japanese Cherry Blossom			4	4
Hey Thanks			4	4
Vanilla Chai		1	3	4
Unscented		1	3	4

Data Analysis

We have noticed that there is largely no difference among the data in part saying that these worms do not care about scent in hand sanitizer this is probably due to the alcohol content still being extremely high and it is still very acidic and as we found out in a bacteria test is still quite effective of cleaning.



Discussion

There are two types of hand sanitizers alcohol based and alcohol-free hand sanitizers. We use the alcohol-based sanitizers so I will describe them more in depth. First alcohol-free hand sanitizers, alcohol-free hand sanitizers use natural bacteria-fighting substances to fight off bacteria which tend to not work as well but still do the job well enough to disinfect your hands enough for most scenarios. alcohol-based hand sanitizers, on the other hand, alcohol-based hand sanitizer uses ethanol alcohol to kill all bacteria on the substance, but is that much alcohol safe to put on your hands? Our testable question should help answer that, what are the effects of scented hand sanitizer on leaf worms. And our hypothesis was if we test worms reactions to differently scented hand sanitizer then the worms will prefer the control over the scented and will not have a preference on scent because the chemicals change are not that big and they might not taste it.

For this experiment, we dilute the concentration to 11% because full concentration killed one of the worms and still yielded medium - strong reactions for the circles so this stuff obviously is bad for you even at 11% dilution. If this your skin absorbs this stuff it might also kill all the good bacteria in your body. Not to mention when the water evaporates it will leave an alcohol residue on your hands.

Overall hand sanitizer works it just isn't good for you at all, one in a while can't hurt but if you use that stuff a lot, you might want to consider using soap and water or switching to an alcohol-free hand sanitizer.

Works Cited

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