

# How Does Milk Affect Worms Burrowing Behavior?

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## Abstract

Milk is a very common household drink and a survey in 2017 proves this by showing that 58% of Americans used milk as a vital part of their diet. Milk starts out with having a lot of fat, like whole milk, and must be put through a certain process to reduce the amount of fat in it. Milk does actually add some nutrients to the soil if it is absorbed, but will ultimately ruin the soil and kill plants. We used three types of milk, skim, whole, and 1% to test the worms. We put the worms on towels soaked with the milks and then timed how long it took for the worms to burrow after being covered in milk. The results of this experiment is that skim milk helped the worm burrow faster than the whole milk. This relates to the world because worms are similar to humans. We test worms to assume the effects on humans. The milk did not significantly change the worms speed which is a good thing because there is milk in most foods we eat.

## Introduction

How do different types of milk affect burrowing time? Milk is a very common drink for humans and holds many nutrients and proteins as well as fat. It is important to study milk because of how vital it is to daily life for humans. The chemical we are using for our experiment is milk. Milk does not have a chemical formula because it is simply a mixture of fat, protein, salts, lactose, enzymes, and vitamins (Metha, 1970). The differences between the substances we are testing is the amount of fat in each type. Milk doesn't really have an effect on humans except quenching their thirst. Earthworms and humans have similar bodily nervous systems and both have brains. Worms aren't exactly the same as humans, therefore, we don't know if milk will affect them differently (Gallessich, 2001). Milk can get into the soil from pollution or spillage. Milk does add nutrients to soil but it can cause problems in the soil for plants. It causes harmful bacteria to grow in the soil which causes the plants to wilt and die (Science Fair Projects, N/Y).

Our hypothesis is that Skim Milk will take the longest for the worm to burrow, 2% will take the second longest, and then whole milk will take the shortest. We think our hypothesis is correct because, Skim Milk has zero grams of fat, two percent milk only has about five grams of fat, and whole milk has eight grams (Get the Facts, N/Y).



## Methods and Materials

1. We gathered our materials, which were 1% Deans milk, A stopwatch, Sassy Cow Whole milk, Deans Skim milk, 4 worms, Bounty Paper towels, Water, Tweezers, A disposable styrofoam cup, and Dirt.
2. We soaked paper towels in the three types of milk and water.
3. We filled a disposable cup with dirt.
4. We placed the worm on one of the soaked paper towels for 1 minute.
5. We transferred the worm into a cup of dirt and timed how long it took to burrow.
6. We repeated 4 & 5 with each type of milk and different worms.
7. We made a data table and graph data.
8. Finally, we analyzed the data using an unpaired T-test. We put the data from our table into a graph to show the data.

## Results

There was no significant change as we compared the milks and water. For the statistical test we used an unpaired t-test. That test is used for comparing times and other things, just not choices. We compared many of the results one on one, but none of them showed a huge change. The two that showed the most change were the skim and the water, which were the fastest and slowest times. Their p-values were 0.13, which is not that big of a change, but was the greatest change out of all of them. The least amount of change was the whole and 1% milk. Their p-value was 0.92.

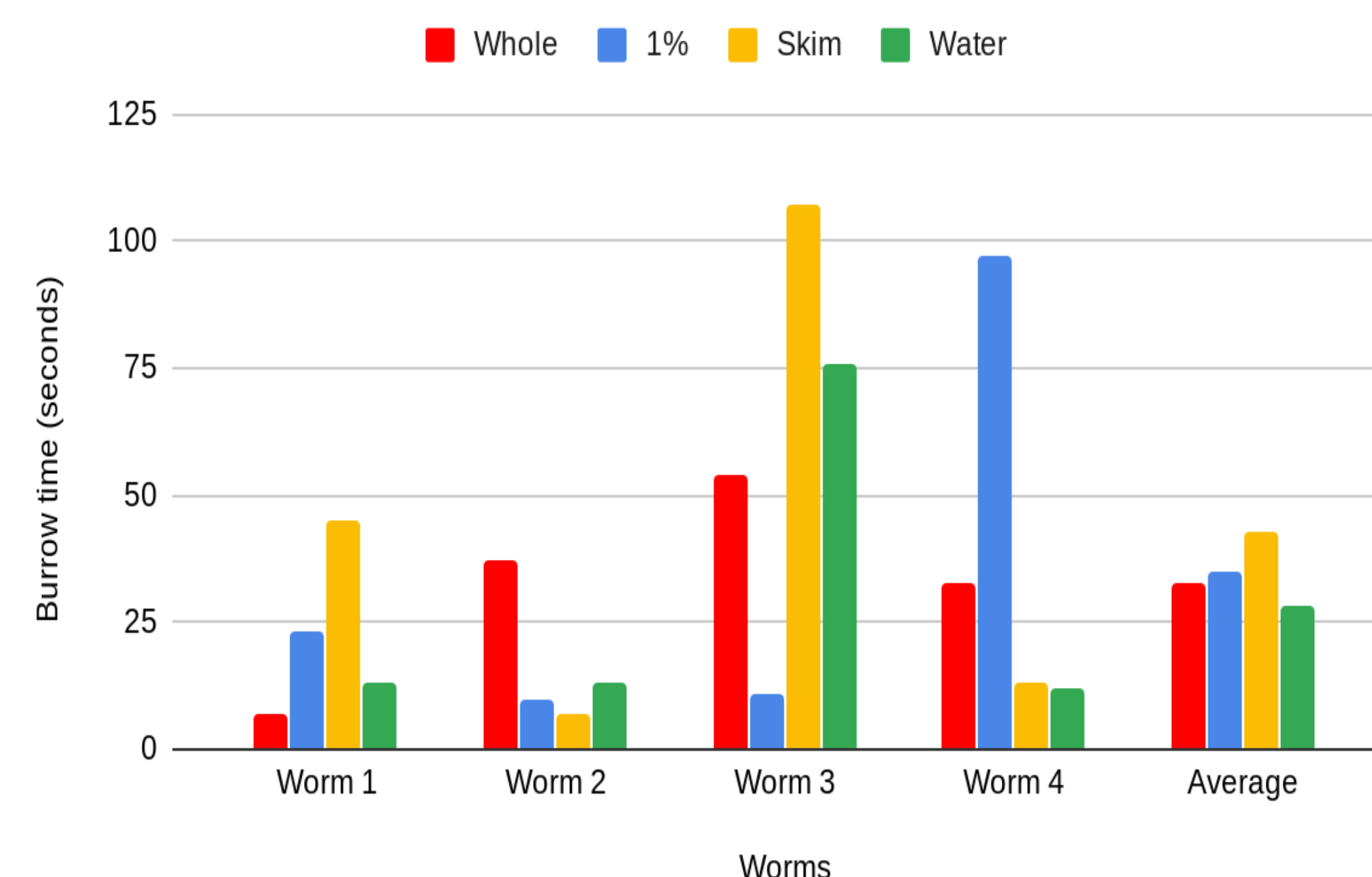
For worm 1 and worm 3, skim made them the slowest. For worm 2, whole milk made it the slowest. And finally, for worm 4, 1% made it the slowest. Water proved to work well in making the worm go faster. Water took the worms very little time, except worm 3. The averages showed that skim made them the slowest, the 1%, than whole milk, and finally water was the fastest.

We had many variables in our experiment. Our independent variable is the types of milk. The dependent variable is how long it takes the worms to burrow. Controlled variables are the light, where the worm came from, amount of dirt, and how long they sit in the milk

## Graph

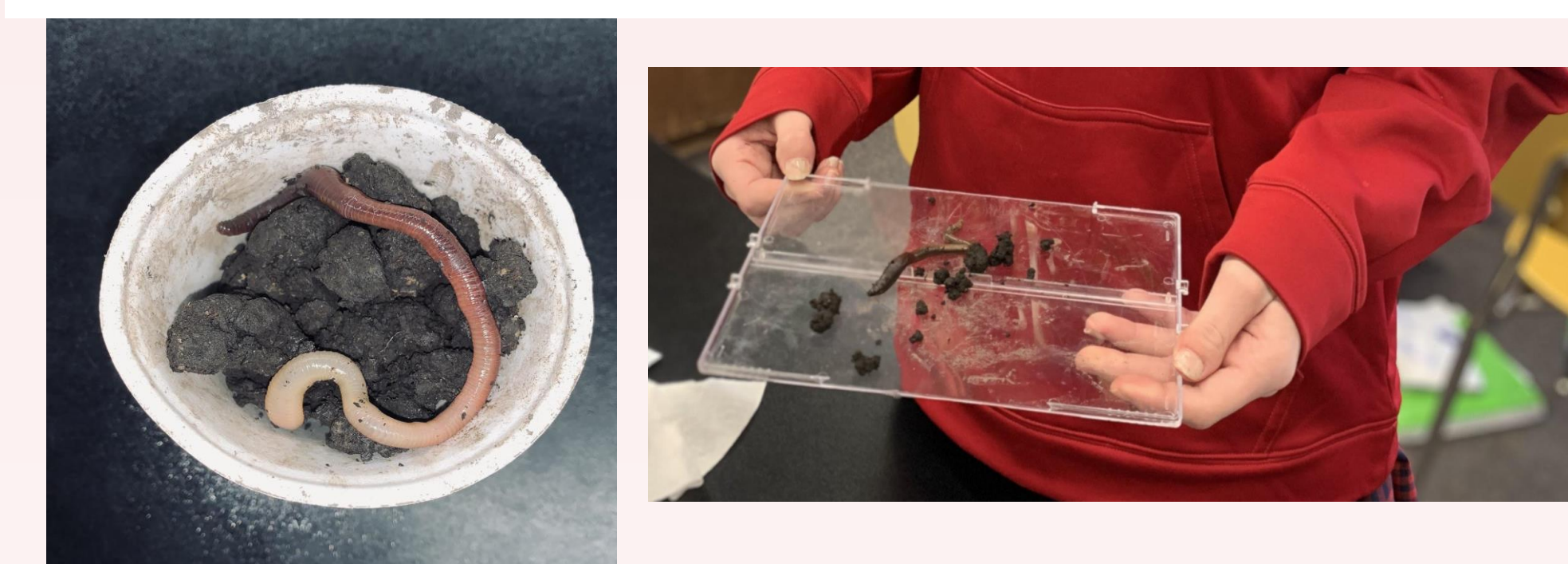
Our graph represents how the worms reacted to the chemicals. Skim gave them the slowest burrowing time. Water gave them the fastest burrowing time. 1% also made them slower. We used seconds to time them.

The affect of milk on worm's burrowing time



## Conclusion

Overall, the worms didn't show too much change between the milks and water like we hoped they would. Skim definitely made them the slowest. Water was still the fastest. There were the occasional worms who went much slower than expected which interfered with some of the data. The hypothesis that skim would take the longest was correct because it did take longer for the worm to burrow in skim milk, then 1%, after 1% then whole milk. We were wrong because we thought the whole would be the shortest, but water actually took the least amount of time. Water didn't take a lot of time for all of them. Whole milk also made the worms slightly faster. The worms were hard to get out of the bucket, and were kept using worms that the other groups already tested on. The milk didn't affect the worms that much at all compared to the water. This makes sense because milk doesn't have a huge effect on humans, and it is said worms are like humans. We test on worms to relate the results to humans. There is milk in many foods we eat, not just drink. It is a good thing that milk does not affect them that much otherwise we would have to be careful when we eat it. People care because almost everybody drinks milk and they want to know the effects on their bodies. In the future we want to test different types of milks or liquids to see how these affect earthworms' burrowing time.



## Works Cited

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