

Spatter Patterns

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Introduction

Forensic science has been around for ages. One specific area of this branch in science works with blood spatter. Using certain scientific applications such as physics, analyzing the pattern left from blood can reveal information about a crime and what took place. Experts have already tried to learn and examine blood spatter in a controlled environment, but this project took an extra step in creating an accurate blood substitute while trying to create a mechanism that would create a controlled spatter by a swinging motion. The mechanism was a part of an engineering project.

- It is important to note that the engineering portion of the project was incomplete, and thus could be used for a continuation.

Problem/Question

What effect does a controlled motor have on a blood substitute when “creating” blood spatter?

How will the fake blood substitute affect the spatter of blood compared to actual blood?

Hypothesis/Proposed Solution

Out of three fake blood solutions, the researcher hypothesized the fake blood recipe that uses flour, water, food coloring, and cornstarch (Recipe #1) would be the most accurate.

Methodology & Procedures

Step 1: A pipette was used to collect a small amount of fake blood and two drops were placed on whiteboard, as it was a smooth and portable surface.

Step 2: The whiteboard was propped up at an angle, and the “blood” was left to drip down the board.

Step 3: Once the blood ran down the whiteboard $\frac{3}{4}$ ths of the way (or the substance did not move), the viscosity was recorded.

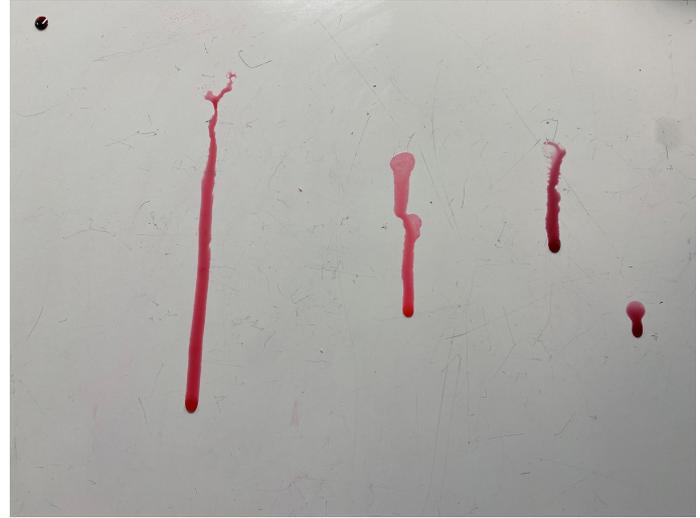
Step 4: The results from the fake blood test were compared to water and milk. Water is much less viscous than blood, whereas milk is slightly more viscous than water.

Methodology & Procedures continued

- When observing data, two factors were taken into consideration:
 - The distance at which the fake blood ran.
 - The rate at which the fake blood ran.
- As stated, the fake blood was compared to water and milk. Viscosity is measured in centipoise (cP). Water is only around 1 cP and milk is 3 cP. Blood is usually around 3 to 4 cP.

Results

Out of the three recipes, the recipe made from corn syrup, corn starch, water, and food coloring (recipe #2) resembled blood accurately. The recipe containing corn starch, corn syrup, water, and food coloring did not resemble blood. This is because the substance was slightly too viscous. The last fake blood, which was costume makeup, did not drip at all.



A picture of a drip test, the far left dot is the makeup, the next one to the right is from recipe #2 (as well as the far right), the one second to the right is from recipe #1.

Interpretation of Results & Discussion

The results show that the most accurate substitute for fake blood, when not taking into consideration temperature, color, etc., is a recipe including corn syrup, corn starch, water, and food coloring. These results were unexpected, as the hypothesis assumed the other recipe would be more accurate. The fake blood was not expected to work well, as it was most likely produced for appearance rather than substance.

There were a few unexpected things that did come up in the experiment. The method of measuring data could have been more thorough. How was the data going to be compared and tested? The experiment could have been more complex had more time been spent on these questions.

Conclusion

There is plenty of advances that forensics continues to make today. A big part of blood spatter has already been studied, but developing new and inventive ways to continue studying this area in forensics is significant. While the results from the experiments do not support the hypothesis, knowing what substitute best resembles blood could be a step into studying the physics of blood even more. In addition, despite the engineering goal for the project not being finished, the mechanism could also be used in current research and applications. Overall, the results do answer part of the research question. Part of the question was the engineering goal, which was not achieved. The other part of the research question was answered.

Applications & Implications

- Knowing what blood substitute is the most accurate could help those who are unable to gain access and/or do not want to undergo the complex process of obtaining blood in educational settings.
- The blood substitute does not have the same risks as handling real blood (when doing research or analyzing spatter in educational settings), but is still similar in terms of viscosity. This provides a safer alternative that is accurate.

References

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