



Wax Melts and PM_{2.5}



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Question

How does the scent of a wax melt used in a warmer affect the amount of PM_{2.5}?

Background Information

PM_{2.5} is a microscopic particle that is found in the environment. It enters the body through the inhalation of air. PM_{2.5} is particulate matter that is 2.5 micrometers or less in diameter. This means that it gets into the body easier than other sizes of particulate matter. If too much PM_{2.5} is built up in the body, it can cause various health conditions ranging from asthma to heart attacks. The current safe amount of PM_{2.5} is 12 micrometers per cubic meter.

Wax melts are an alternative people use instead of burning candles. Wax melts last longer than candles and don't use a flame. This eliminates the amount of smoke that is being released into the air of peoples' homes.

I tested the amount of PM_{2.5} that was emitted from five different scents of wax melts while they melted and cooled, since warmers are becoming more popular.

Hypothesis

If I melt a stronger smelling wax, such as a very fruity or woody smell, then it should create a high amount of PM_{2.5} because there are more aromatic agents in the stronger scents.

Method

Materials:

- Wax melts (scented Butter scotch and Maple Cream, Cranberry and Mandarin Splash, Line Dried Linen, Vanilla Cookie Crumble, and Criso Fall Leaves)
- Wax warmer
- Wynd reader

Variables:

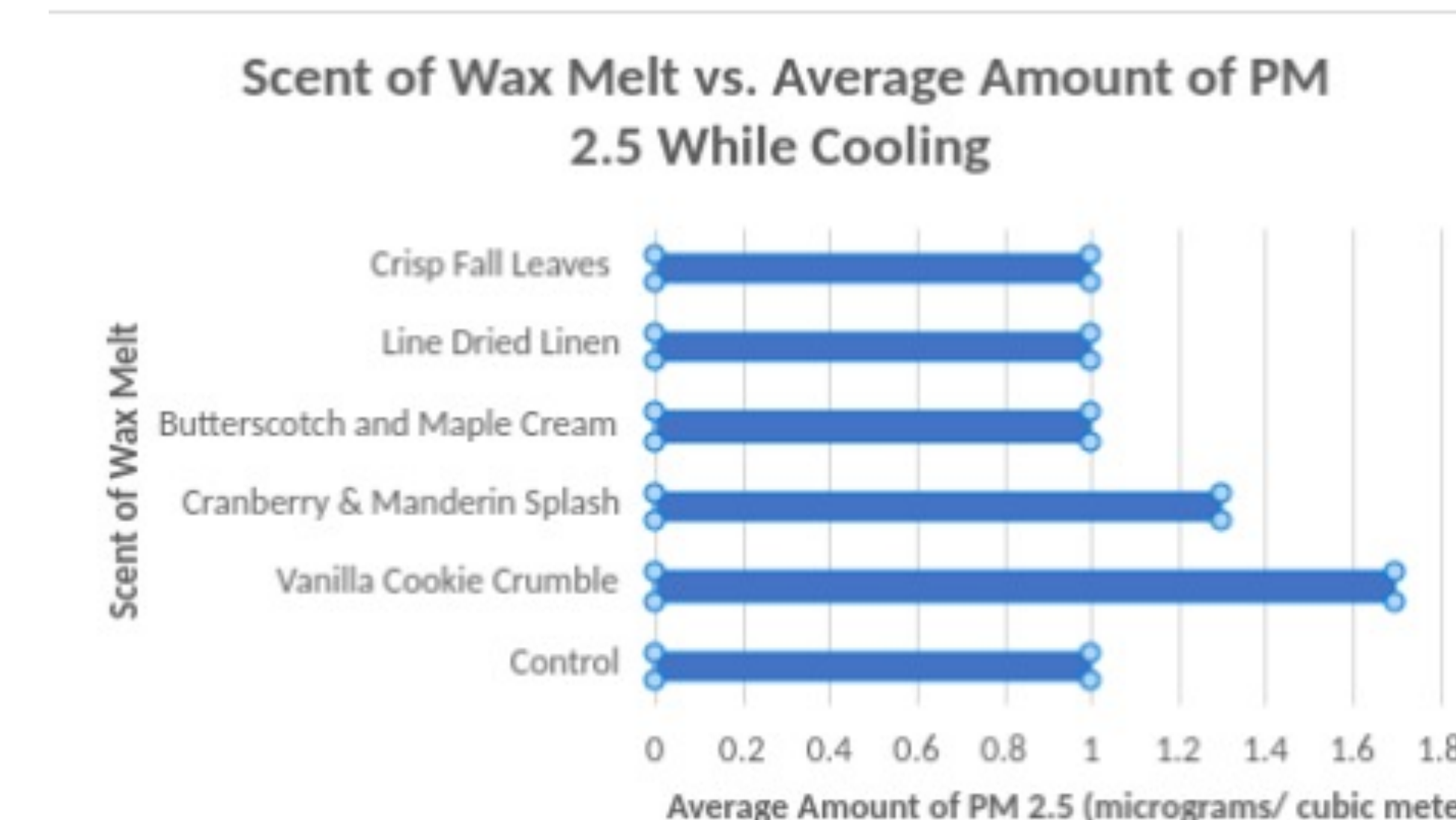
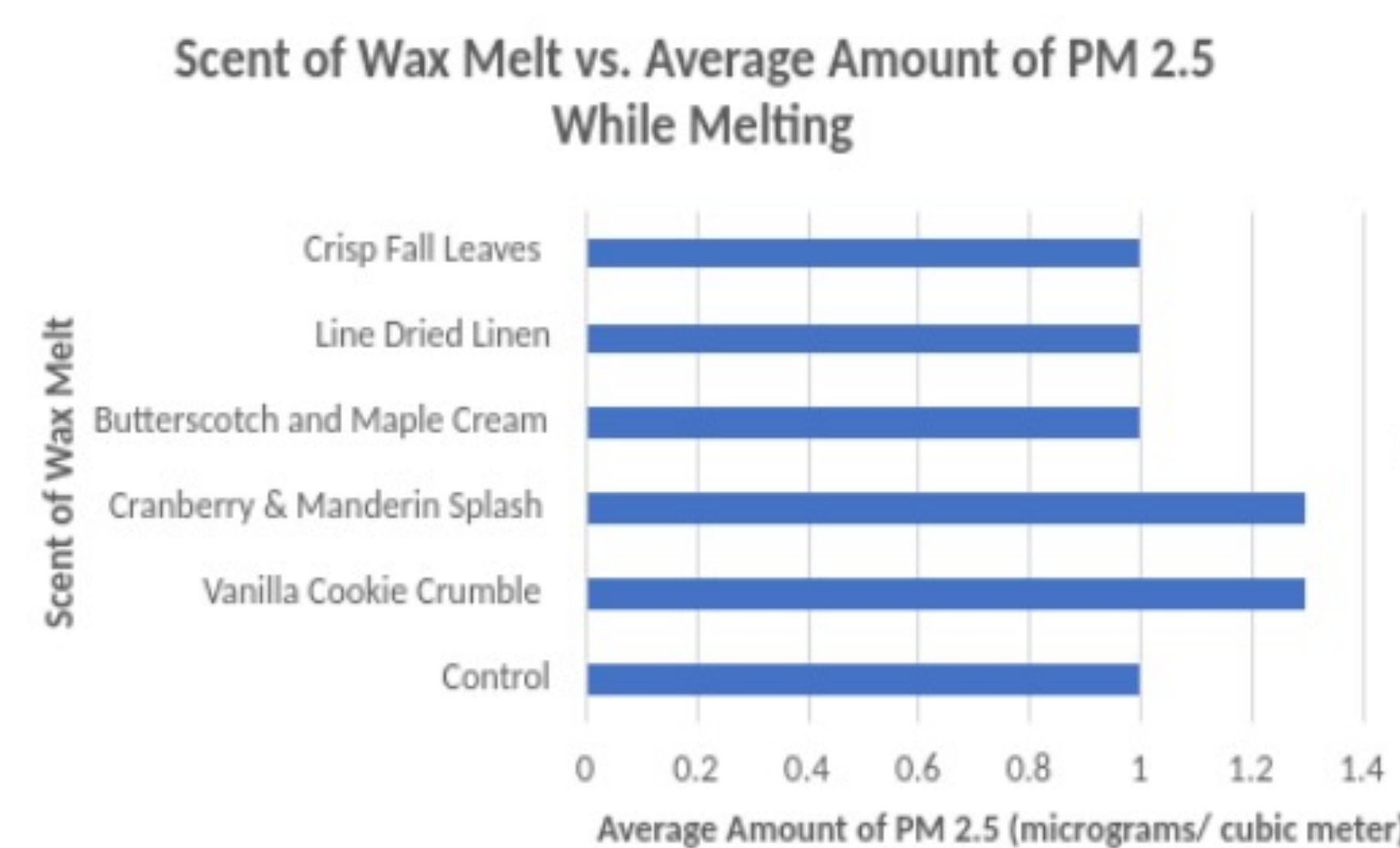
- Independent- Scent of the wax
- Dependent- Amount of PM_{2.5}
- Constants- Room used, length of tests, brand of wax melts



Procedure

1. Take control data by recording the amount of PM_{2.5} in the room for 2 hours
2. Place wax warmer in a room people don't use in during daily activities.
3. Place the Wynd reader in the same room as the warmer.
4. For a five-day period, melt a different wax melt each day and collect data while the wax melts (1 hour) and while the wax cools down (1 hour), making sure to clean the dish that the wax sits in between tests.
5. Screen shot all data from tests.
6. Wait for a week and then run the five tests again.

Results



The wax melts had about the same amount of PM_{2.5} while melting. The amount of PM_{2.5} while cooling differed more.

Conclusions

My hypothesis was refuted. The scent of wax does not affect the amount of PM_{2.5} emitted when it was warming. They all had between 1 and 3 micrometers per cubic meter, which is well within the safe amount of PM_{2.5}. While cooling, the Vanilla Cookie Crumble had the highest amount of PM_{2.5}. It had 1.7 ug/m³, whereas the others were all below 1.3 ug/m³. So, the scent of a wax melt does not affect the amount of PM_{2.5} meaning that those household wax warmers everyone is using are completely safe when it comes to air quality.

An error that occurred could have been that our heater turned on and could have affected the amount of PM_{2.5}. This could have been prevented by turning off the heater while the test was running. One test that would be of interest would be testing the amount of PM_{2.5} created by the wax in a secluded room that is never used.

References

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