




Burning Candles

The Effect of wax type of a candle's melting time.



Question

Do different types of waxes affect a candles melting rate?

Research

Paraffin wax is commonly used in candles, and burns quicker than natural waxes. It also creates more smoke than natural waxes (Kylene Jones). Wax normally used in a container candle is soy wax and wax normally used in a pillar candle is beeswax (Candleers). If you buy two different types of candles that have a different type of wax, but are still the same weight (even though not size), it is most likely the denser wax will last longer (Candleers). Different types of waxes are made up of different ingredients, including having different melting temperatures and density, so different sorts of waxes will have varied burn times (Candleers). Normally, candles that take a longer time to burn consist of beeswax because it is normally denser compared to other waxes (Candleers). Beeswax needs a higher temperature to burn than other waxes because beeswax candles last longer than paraffin candles (Sciencestruck) (Candleers). The period of time a candle burns is also affected by hardeners for the wax (Sciencestruck) .

Hypothesis

If the candles are made of a denser wax, then they will burn for a longer amount of time.

Materials

Tools needed to conduct this experiment!

- Different types of candles made of different waxes
- Room
- Lighter
- Device to time
- Additional wicks
- Scissors
- Ruler



Procedure

1. Open all of the lids of the candles
2. Cut a $\frac{1}{2}$ strip of wick for each candle that requires a wick
3. Scoop 1 teaspoon of additional candle wax of whichever candle you are working with and put into small microwave safe bowl
4. Microwave bowl on HIGH for 15-20 seconds or until candle wax fully melted
5. Take melted candle wax out of microwave carefully and dip $\frac{1}{2}$ inch wick into melted candle wax
6. Repeat step 5 for each wick, to have a total of 12 wicks dipped in each type of candle's wax
7. Attach $\frac{1}{2}$ inch wick that has melted candle wax on it to matching candle in the center of the inner top
8. Wait until melted candle wax is dry and wick is fully attached to candle
9. Place candles onto a sturdy, clean table indoors, in a sealed room with ventilation
10. Simultaneously start an 8 hour timer while lighting all 12 candle wicks with a lighter
11. Check on candles every 30 minutes to make sure that you are maintaining safety precautions
12. When candles reach $\frac{5}{8}$ melted, begin continuous observation of candle to accurately record final melting time for the candle
13. Remove all candles and wax sediment from containers after all candles have finished melting, or 8 hours, whichever comes first
14. Carefully pick up candle containers and recycle them

Data

The results of this experiment!

Melting Times (hours):

Type of Wax	Replicate 1	Replicate 2	Replicate 3	Average (hours)
Palm Wax (Control)	6.18	6.05	6.31	6.1833
Soy Wax	5.35	5.2	5.6666	5.4
Beeswax	6.9666	7.4333	7.75	7.3833
Paraffin Wax	2.8166	2.6333	2.5833	2.6667

Variables

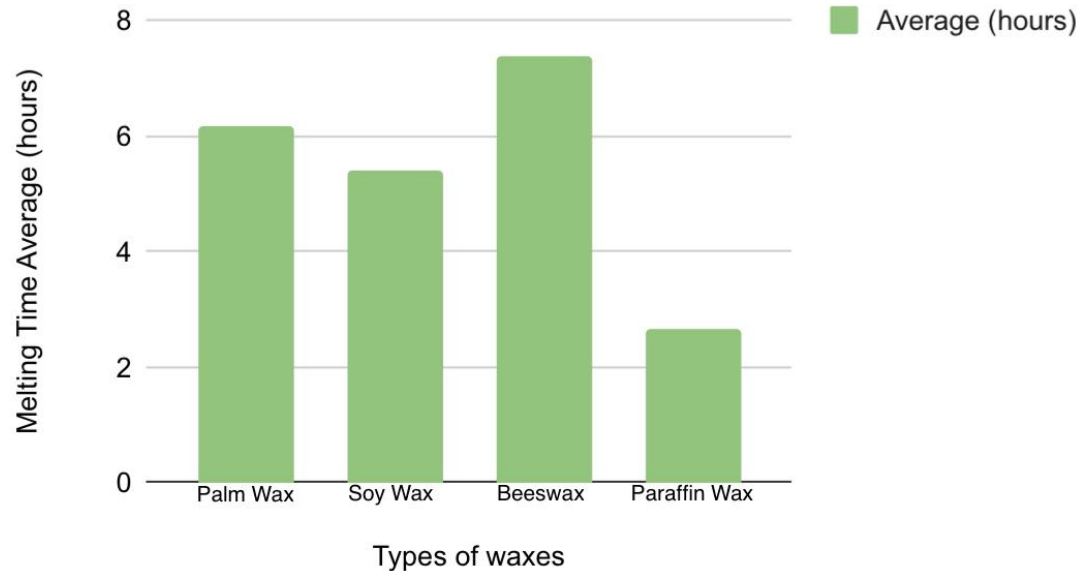
Independent Variable: Type of Wax

Dependant Variable: Candle
melting time

Graph

My data shown visually!

The Effect of wax types on candle melting rate.



Conclusion

The hypothesis is accepted. The candle with the most dense wax out of all of the candles, beeswax, had the longest melting time, with an average melting duration of 7.3833 hours. The candle with the least dense wax out of all the candles, paraffin wax, had the least melting time, with an average of 2.6667 hours. Beeswax is denser than paraffin wax and Palm Wax is denser than Soy Wax. One can conclude that beeswax candles burn the longest compared to other candles and waxes.

Error Analysis

There were a few systematic errors throughout the experiment, one being the wick attachment. The additional wick attachment to the candles, so that all the wicks were the same size and material, may have changed the density of the candles since there was 1 teaspoon of candle wax scooped from each candle and each wax may have melted in the microwave differently, slightly changing the density of each candle. There were various random errors that may have slightly changed the outcome of the experiment. One being to light the last 3 candles a lighter was used instead of a matchstick. The matchstick is what the researcher used to light the other 9 candles.

Pictures!

