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Burn Baby Burn: The Effect of Wood Type on Heat Produced in a Wood Burning Stove

The purpose of this experiment was to determine which of three wood types readily available in Southeastern Colorado (Elm, Pinon Pine, and Cedar) burns the hottest in an enclosed wood burning stove. This is useful information for people interested in heating their homes using wood, a renewable resource. In particular, it's important to my family because we live in an off-grid, solar-powered home and 100% of our heat comes from our wood stove. Three types of wood were tested. Three trials were conducted for each type of wood. The fire temperature ($^{\circ}\text{C}$) was measured with an infrared thermometer on two locations on the wood burning stove before being lit, every 30 minutes for 3 hours, and then again at 6:00 a.m. the next morning. The cedar fires burned the hottest with the highest average temperature ($M=246^{\circ}\text{C}$). Pinon pine was similar to cedar ($M=235^{\circ}\text{C}$). The elm fires had the lowest average temperature ($M=203^{\circ}\text{C}$). Mean Absolute Deviation (MAD)=17. At 6:00 a.m. the next morning the average temperature of the residual elm fire was 75°C , the pinon pine fire was 54°C , and the cedar fire was 72°C . The wood type did affect the temperature of the fire. This experiment showed that cedar fires burned the hottest followed by pinon pine. The elm fires had the lowest average temperature, although the residual heat in the wood burning stove was highest the following morning. Data trials are ongoing to confirm the trend.