Particulates and Toxic Gases: The Hidden Harm in Wood Fires Used in Traditional Hogans and Their Correlation with Asthma and Lung Cancer

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The purpose of this project is to identify which of the four types of firewood (pine, pinon, oak, and cedar) produce the most carbon monoxide, carbon dioxide, with the addition of particulate matter. The hypothesis was that if different types of firewood (pinon, pine, oak, and cedar) were burned in a Hogan, then these four woods could be ranked from best to worst based on the carbon dioxide and carbon monoxide levels, ranked by radon levels measured and ranked by particulate matter measured. First, the researcher obtained two to three regular size logs of each type of firewood. The firewood was burned and tested in the Hogan one day at a time and carbon monoxide, carbon dioxide, and particulate matter were collected. Relative humidity, temperature, and radon were also collected to see the relationship with other gases. The researcher repeated the same process for each log type, after refreshing the air within the Hogan. Cedar was the worst wood to burn, based on high carbon monoxide. Oak was the second-worst, also based on carbon monoxide. Pine was the best, based on lowest carbon monoxide and lowest radon. Pinon was the second best, based on low carbon monoxide and lowest carbon dioxide. Pine was the best, with carbon monoxide lower than both the US Health Exposure (NIOSH) permissible and recommended limits pinon, oak, and cedar failed the carbon monoxide both the permissible and recommended limits of the US Health Exposure Limits (NIOSH). Pine had the worst particulate matter, and oak the best. The hypothesis is accepted, that the four woods could be ranked from best to worst based on levels of carbon dioxide, carbon monoxide, radon, and particulate matter.

Awards Won: