Recycled and Organic Materials for Energy

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To develop a fuel source using recycled and organic materials that can be used for space heating by people living in rural areas who do not have access to, or have limited access to electricity. The fuel used recycled and organic materials easily sourced in rural areas in South Africa and was designed to be comparable in heat performance to traditional anthracite coal. Easily available, cheap, organic and recycled materials were considered in the fuel mix designs. Particular emphasis was placed on recyclable materials, as well as bio-waste and organic materials. The constituents used were locally available clay, recycled candle wax, anthracite coal powder, water and cow manure. Five mix designs were considered using different proportions of each of these constituents. Mixes were placed in a controlled fire and surface temperatures were recorded using an infrared thermometer. Heat performance over 3 hours was observed. Smoke emissions was also observed. This study also consisted developing a space heater that could be used together with the bio-waste fuel. However, during the course of this study this was discontinued. The optimal mix obtained for the heat source contained a mixture of finely crushed coal, clay, cow manure and recycled candle wax. Heat performance of this mix fared well when compared to anthracite coal. Further from observation, the mix emits little to no smoke. Using bio-waste such as cow dung, as well as recycled candle wax and a small amount of coal powder provided an environmentally friendlier source of heating.