

Thesis Title	Cooking Stoves for Coal Briquettes
Name	Mr. Suchart Areerungruang
Thesis Advisor	Associate Professor Somchai Osuwan, Ph.D.
Department	Chemical Technology
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ABSTRACT

This research work is concerned with the analysis of heat transfer and the characteristics of traditional Thai bucket stove, employing wood charcoal and coal briquettes made from coal fines. The result will indicate the possibility of wood charcoal substitution by coal briquettes.

In the experiment, three traditional bucket stoves with outer diameter of 24, 27 and 30 centimeters were used. Heat transfer in the stove while burning coal briquettes and charcoal was analysed and compared. It is found that efficiency and heat loss from certain parts of the stove, i.e. stove wall, air inlet door, air outlet gap and accumulation in the stove, are not different. Stove efficiency is about 30-33 % of total heat from combustion. Heat loss from exhaust gap is the largest item, which is 50 % of total heat from combustion. In studying characteristics and convenience in using, the results indicate that original bucket stove can be used with coal briquettes but the grate should be replaced by an iron grate, having larger opening area than the former earthenware grate, to facilitate poking. When the height of the prongs was lowered, the efficiency increased. The

optimum height is, between 0.7-1.1 centimeter. The size of air inlet door and the thickness of the grate do not affect efficiency. The size of aluminum pot should be a little bigger than the size of the stove to get high efficiency. The amount of water has little effect on efficiency. The optimum amount of coal briquettes should fill up about $\frac{2}{3}$ of combustion chamber volume. For other types of cooking utensils, e.g. kettles, woks and Indian pots, the efficiency obtained is different from that of aluminum pot. The experiment with coal briquettes of various heating values, between 3,100-4,300 cal/g (dry basis), showed about the same efficiency and heat losses. All in all, it can be concluded that the original bucket stove can be used with coal briquettes but its grate should be improved for ease of poking, if necessary, and that the stove efficiency can be improved to a certain extent.