

Efficiency of improved cookstoves and emission of carbon monoxide and carbon dioxide: An intervention study in Northern Ghana

Ali Moro

Kwame Nkrumah University of Science and Technology, Ghana



Abstract

Biomass burning for home energy use is a major environmental health concern. Improved cooking technologies could generate environmental health benefits, yet prior results regarding reduced exposure to air pollution from improved cookstoves are mixed. In this study, 20 in-field uncontrolled cooking tests were conducted in domestic settings to assess the emission and efficiency of the Ace and the Jumbo stoves using the Emission Pod (EPOD) to measure emissions in real-time. Carbon Dioxide (CO₂) and Carbon Monoxide (CO) emissions, Emission Factors (EF), Modified Combustion Efficiency (MCE) and Cooking time were all calculated across a variety of meal types using the two stoves. Overall average CO emission was estimated at 248.71±44.66 ppm for the Ace stove while that of the Jumbo stove was calculated to be 103.66±24.4 ppm (P=0.024). The Jumbo stove had a higher MCE of 0.93 against the Ace stove (0.84). Using the partial capture Carbon Balance Method (CBM), EF was calculated for both stoves with the Ace recording a CO EF of 1425.04 g/kg and CO₂ EF of 1318.35 g/kg. The Jumbo, on the other hand, had a CO EF of 151.57 g/kg and a CO₂ EF of 1215.82 g/kg. The study concluded that although the stoves had better performance in most of the parameters studied compared to other stove interventions in the literature, they still fell short when compared with some of the traditional cooking methods. While the Jumbo falls within the International Workshop Agreement (IWA) tier 4 category guidelines for cookstove, the Ace stove which is much fancier falls in WHO-IWA category 0.

Speaker Publications:

1. "Fuel Consumption for Various Dishes for a Wood-Fueled and Charcoal Fueled Improved Stoves used in Rural Northern Ghana".
2. "Kitchen Area Air Quality Measurements in Northern Ghana: Evaluating the Performance of a Low-Cost Particulate Sensor within a Household Energy Study".
3. "Prices, peers, and perceptions (P3): study protocol for improved biomass cookstove project in northern Ghana".

[10th European Epidemiology and Public Health Congress; Webinar – June 09-10, 2020.](#)

Abstract Citation:

Ali Moro, Efficiency of improved cookstoves and emission of Carbon Monoxide and Carbon Dioxide: an intervention study in Northern Ghana, Euro Epidemiology 2020, 10th European Epidemiology and Public Health Congress; Webinar – June 09-10, 2020 <https://euroepidemiology.conferenceseries.com/2020>



Biography:

Ali Moro completed his Masters in Philosophy in Environmental Science in November 2019 from the Kwame Nkrumah University of Science and Technology. He is currently a Senior Research Officer at the Navrongo Health Research center where he is attached to the environmental unit.