

Abstract

Emission ratios (ER) of CO and NO relative to CO₂ are reported from real time emission measurements on bio fuel fires in Kenya. The experiments were based on available fuels burning in local popular traditional and improved stoves. The mean dCO/dCO₂ ratios were 71, 79 and 74 mmol mol⁻¹ for firewood, charcoal and agricultural residues, respectively, while the corresponding mean d/NO/d/CO₂ ratios for these fuels, in the same order, were 1.8, 2 and 2.2 mmol mol⁻¹, respectively. Whereas stove design characteristics largely influenced the dCO/dCO₂ ratios, the fuel nitrogen content was the major factor determining the dCO/dCO₂ ratios. The dCO/dCO₂ ratio for fuel derived NO is not affected by fire temperature but linearly depend on the fuel nitrogen content. Other important fuel parameters that influenced the observed emission ratio patterns include fuel moisture content, size and volatile matter content in the case of charcoal. In comparison to savanna and forest fires, bio fuel fires tend to favour formation of reduced or partially oxidised compounds. It is clear that a change in energy preference up the "energy ladder" leads to a reduction in the CO ER, an important result for emission mitigation policy design