

## ABSTRACT

Municipal Solid Waste is causing pollution and health hazards in cities around the world. In Kenya, existing and emerging cities are experiencing increased populations with increase in organic market waste. Organic market wastes can be used to produce briquettes. This study aimed to formulate available organic market waste into briquettes of optimal energy or calorific value. The study used locally fabricated technologies such as manual screw press, ram-piston and using bare human hands. Taguchi method was used based on controllable factors: Ratio of raw material; percentage (%) of binder; Size of raw material and method of production. Out of nine (9) experiments, laboratory results showed that the sixth (6th) and ninth (9th) formulations yielded briquettes with high calorific value of 20,540 kJ/kg and 18,962 kJ/kg, respectively. A further confirmatory experimental test was carried out based on Qualitek-4 software optimal simulated conditions. The test revealed that a mixture of carbonized market waste of particle size 2–5 mm; ratio of one part charcoal dust, two parts sawdust, and one part maize stover; with 30% of binder made using manual ram piston yielded briquettes of high calorific value of 21,633 kJ/kg against Qualitek-4 simulated value of 21,771 kJ/kg. In addition, Greenhouse gases evolved: CO and PM<sub>2.5</sub> concentrations are within World Health Organization (WHO) and Kenya Subsidiary Legislation on critical limits allowable for human exposure. These indicates that organic market waste can be used to produce briquettes with acceptable quality using locally available technologies.