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Development of a model rotatory fish smoking kiln using agro-wastes as source of fuel

A model fish smoking kiln was designed and fabricated to use agro-wastes (sawdust, palm kernel shell and rice bran) as alternative to conventionally used charcoal (control) as fuel energy source for smoking fish. *Clarias gariepinus* was washed, brined and smoked in chunks or whole in the kiln. The smoking kiln has an estimated capacity of 40kg of fish/batch with six fish trays and 36 fish hooks. Heat transfer is by conduction and convection. The rotatory wheel and axle on which the fish drying trays were anchored ensured even distribution of heat. The kiln has 69.4% energy efficiency and drying period of 10 hours at an average temperature range of 60 - 120degreesC, depending on the type of agro-waste used as source of fuel energy. The fuel conversion ratio, drying rates and calorific values of the different agro-waste products were also determined. Calorific value of the four agro-wastes ranged between 16.2MJ/Kg in palm kernel to 30MJ/Kg in charcoal. The drying rates of sawdust and rice bran compare favourably with charcoal and they produced smoked fish similar in dryness and quality with fish smoked with charcoal. Palm kernel had the least drying rate of smoked fish (weight/hour) during the 10-hour smoking duration.

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Description

Summary: A model fish smoking kiln was designed and fabricated to use agro-wastes (sawdust, palm kernel s (control) as fuel energy source for smoking fish. *Clarias gariepinus* was washed, brined and sm

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