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Traditional based bioethanol production as a source for clean cooking fuel

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This research examines the critical issue of lack of access to clean cooking fuels. According to the International Energy Agency (IEA) 2014 statistics, around 600 million people in sub-Saharan Africa rely upon traditional solid biomass fuels as their principal energy resource. Solid biomass fuels have strong negative socio-economic, health and environmental effects. Several alternative fuels for cooking, with varying qualities in terms of accessibility, cleaner-ability, modernity, and affordability, have been proposed. Traditional production of ethanol for consumption has a long-standing history in most regions of the world including many of the areas lacking access to cleaner cooking fuels. However, ethanol is very well suited as a household cooking fuel and its production for commercial level usage is a very well established industry. This research explores the potential for regulated and sustainably produced traditional alcohol to be used as a cleaner cooking fuel. An illegal traditional distilled beverage known as kachasu, produced in southern Africa, has been shown to contain ethanol in the range of 20% to as high as 70%. Consumption of such illicit alcohol is said to cause an estimated 2.5 million deaths every year worldwide. The research is conducted in two parts. Preliminary studies involve extensive literature research, site visits, and laboratory tests. Detailed studies include a pilot site study, development of improved distillation equipment and combustors, and public awareness of illicit alcohol abuse and benefits of clean cooking. Results of the preliminary studies are presented in this paper.

Biography

Shadreck Mubiana Situmbeko has Ph.D. in Mechanical Engineering specializing in Solar Energy, and MSc. Degree in Engineering Design and a Bachelor of Engineering in Mechanical Engineering. He is a Senior Lecturer in the Department of Industrial Design and Technology. He teaches the disciplines of Design of Mechanisms and Structures, Product Analysis, 3D Computer Aided Design and Optimization in Design. He has more than 15 years of university teaching experience and more than 13 years experience working in the research and development industry; he has more than 40 publications which include 12 referred journal papers, 20 referred International Conference papers and other conferences, workshops and seminars presentations, and book chapters. His research interests include Clean and Renewable Energy, Product Design, Mathematical Modelling, Optimization algorithm and Simulations.

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