A Review of Cooking Systems and Energy Efficiencies

Abstract

Accessing affordable and reliable energy services for cooking is important in most developing countries. Improving access to affordable energy reduces effects on human health and environmental influences caused by burning of various biomasses. This review examines the energy resources available in the world and their use in cooking. It also looks at challenges and the ways these energy resources are used as well as possible solutions to such challenges. The major challenges facing the use of available fuels are low efficiencies, high cost, un-sustainability and indoor house pollution that affect many people. The paper has identified that the use of combustion-less cooking, the use of solar for cooking, hydrogen and electrical systems that improve cooking activities and therefore overcome indoor and environmental pollution. Research findings indicate that the pressure-cooking concept improves energy efficiencies in boiling operations. Other energy efficiency improvement techniques in cooking are insulation, containment of escaping steam while cooking and automating the cooking vessel with micro-controllers. The overall efficiencies for electrical induction heating, natural gas, traditional cooking stoves, fuel wood stoves and electrical resistive heating was found to be 90%, 45-60%, 10%, 23-40% and 75% respectively. Induction cooking is both faster and more efficient than gas cooking, while electrical energy systems as a whole were found to be the cleanest, offering ease of control and versatility. The combination of a micro-controller automated insulated pressure cooker and induction cooker can highly improve the cooking efficiency. This is done by cutting a power supply using a relay controlling an induction cooker and therefore preventing the exit of steam. It is therefore identified that zero emission release during cooking will reduce both indoor and environmental pollution significantly.