

Notice



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Proposal Defense
PhD in Sustainable Energy Engineering
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Experimental investigation of Electrical Griddle for Injera Baking

Executive Summary; *Injera* is the cultural staple bread food item in Ethiopia, Eritrea and parts of Sudan and made from indigenous grain called 'teff'. Traditionally, this 58-60 cm diameter sourdough pancake is baked on a 20–30 mm thick clay griddle, called 'mitad', placed on three stones above open fire or specialized electric stove. Preparation of *injera* is known for its intensive energy and time consuming cooking. Baking this food item in the traditional three stone stoves consumes significant amounts of firewood with about 90% of the energy supplied is lost to the environment. In addition to biomass energy sources, it is estimated that about 77% urban dwellers (those with direct access to electricity) use electrical energy for *injera* baking. The *Injera* baking electrical *mitad* takes up a significant share of the electricity supply system of the country. Studies show that electric stoves account for 60% of total household energy consumption. The current *mitad* design dates back to 1960's when baking of *Injera* electrical *mitad* started with high-income groups in cities. However, since then, almost no design improvements have taken place. Even though the efficiency is only around 52%, the apparatus has high market penetration and it is continuing at its current higher energy consumption and lower efficiency, subsequently higher monthly energy bill for the consumers and high energy 'waste' for the national grid. The causes of the low energy efficiency of this product include: the excessive heat loss from the set during operation, high heat loads, lack of standard on the product and the traditional methods of production. The purpose of this work is to develop efficient electrical griddle to baking Ethiopian traditional food *injera*. In this study, electrical griddle will be design, develop and experimental investigation will conduct and will compare with the existing electric *mitad*. For comparison, Initial heat up time, single and cyclic baking time Temperature, Power consumption of the baking, Energy loss analysis of the baking, energy efficiency analysis and other techniques will be use. Finally preliminary economic analysis of the developed electric griddle will be conducted by incorporating all the life-cycle costs. After this research, a new energy-efficient electric *injera* baking stove will be introduced and the findings of this research helps to reduce demand on power, electric supply interruptions and outages, electrical infrastructure congestion, and capital Investment in energy supply Infrastructure, Save energy to the consumer (user) and the nation, thereby enhancing national economic efficiency by reducing energy bills and also will mitigate land degradation and environmental pollution due to the production of the Electric *Injera Mitad* clay plates.

Student Dissertation Advisory Committee (SDAC)

Prof. Yacob Mulugetta (University College London)
Dr. Tassew Tadiwose (BiT-BDU)
Dr. Elias Wagari (BiT-BDU)

Date and Venue

Date: 24-February-2021
Time: 2:00 Pm. (Afternoon)
Seminar room (BiT)