i-SPiKE 2023

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

"Optimizing Innovation in Knowledge, Education and Design"

EXTENDED ABSTRACT

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Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality . I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH

WELCOME MESSAGE (i-SPiKE 2023 CHAIR)

We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPiKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPiKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail
Chair
3rdInternational Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023)

BRAINY BURNER

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ABSTRACT

The solar camp stove, also known as a solar cooker, is a piece of cooking equipment that makes use of the sun's rays as a renewable energy source in order to produce heat, which may then be used for the purposes of either cooking food or heating water. It functions according to the premise of catching and concentrating sunlight using reflective surfaces or materials, and then directing that sunlight onto a cooking vessel or chamber. Food can be cooked or boiled using the heat generated by the conversion of this concentrated form of the sun's energy. These stoves provide an environmentally friendly method of cooking that lessens dependency on fossil fuels and cuts down on the amount of carbon emissions produced. They do this by utilizing solar energy. Because they do not require any additional fuel, solar camp stoves are a more economical choice throughout the course of their lifetime. As a result of their compact and lightweight design, they are ideally suited for use in outdoor settings and off-grid living environments, where they offer a variety of useful cooking options. Solar camp stoves offer an innovative and environmentally conscientious method of cooking outdoors, despite their drawbacks, including dependence on sunshine and lengthier cooking periods compared to standard burners. Solar camp stoves, which can harness the power of the sun, are an environmentally beneficial and energy-efficient way to make meals. Because of this, they are a significant addition to camping gear and equipment used for outdoor adventure.

Keywords: Solar camp stove, cooking outdoors, utilizing solar energy, environmentally beneficial, and camping gear.

INTRODUCTION

According to Cambridge Dictionary, a stove can be defined as a large box-shaped device that is used to cook and heat food, either by putting the food inside or by putting it on top. The stove we created called “Brainy Burner” is a solar stove which is an innovative cooking device that harnesses solar energy to generate heat for cooking, offering a sustainable and environmentally friendly alternative to traditional cooking methods. It utilizes the power of the sun through reflective surfaces or concentrators to capture and concentrate sunlight onto a cooking vessel

or surface, allowing for the preparation of meals without the need for fuel or electricity. Solar stoves have gained attention from researchers and experts in the field of sustainable energy and clean cooking as they reduce carbon emissions, promote energy independence, and provide cooking solutions in off-grid or resource-constrained areas (Reddy, 2006). Reddy (2006) also stated that solar cookers can reduce air pollution. cooking methods, such as burning wood or charcoal, release harmful pollutants into the air. These pollutants can cause respiratory problems, heart disease, and cancer. Solar cookers do not produce any emissions, so they can help to improve air quality and protect public health. According to Sharan & Bansal (2016), they offer an eco-friendly option for both outdoor enthusiasts and communities striving for clean and sustainable cooking solutions. These devices have been the subject of research on their efficiency, design optimization, and integration with thermal storage technologies to enhance their performance and accessibility (Prajapati & Satya, 2014). The advancement of solar stove technology holds great potential in addressing energy and environmental challenges while improving the lives of individuals worldwide. Therefore, it also has an environmental benefit, the "Brainy Burner", offers a clean, efficient, and sustainable alternative to traditional stoves, making it ideal for outdoor activities and reducing carbon emissions. This "Brainy Burner", is also designed to be lightweight and portable, making it easier for a traveler to carry. With ongoing research and advancements in solar stove technology, these devices are becoming more efficient, durable, and accessible, contributing to a greener and more sustainable future.

OBJECTIVE

There are three main objectives of the "Brainy Burner" product. The fundamental purpose of this solar camp stove is to provide energy independence, particularly in environments that are outdoors or in regions that have restricted access to conventional sources of energy. Users can prepare their own meals without relying on the infrastructure for either electricity or gas if they are able to harness the abundant and free energy that comes from the sun. The purpose of "Brainy Burner" is also to provide a sustainable cooking solution that lowers dependency on non-renewable energy sources. The cooker makes use of solar electricity in order to achieve its goals of minimizing carbon emissions, reducing environmental impact, and contributing to a more environmentally responsible and sustainable method of cooking. The third objective of this stove is to give people who enjoy being outside access to a cooking alternative that is easily transportable and convenient. Users should be able to enjoy hot meals on the go while camping, hiking, picnicking, or participating in any other outdoor activity that requires a stove. The stove should be lightweight, compact, and easy to transport.

PRODUCT FEATURES

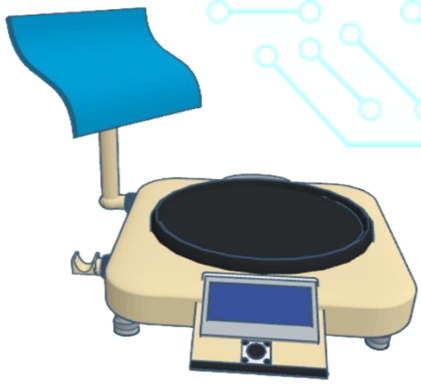

Figure 1: A picture of the "Brainy Burner", from the top view along with the names of the components of the stove.

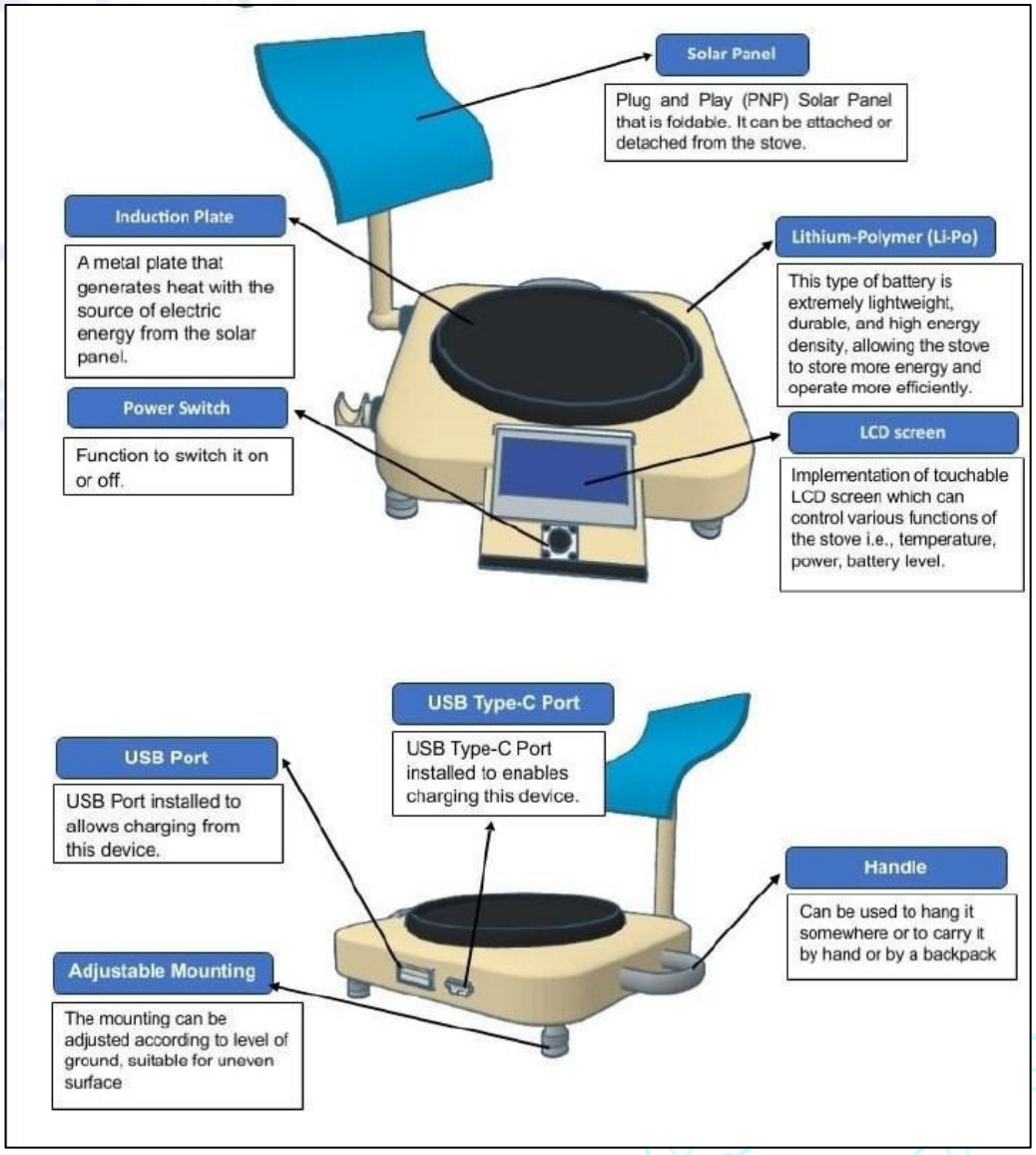

Figure 2: Overview of the "Brainy Burner", along with the names of the components of the stove

Table 1: Shows "Brainy Burner", features description.

Features	Description
Solar Panel	Plug and Play (PNP) solar panels that can be attached or detached from the stove. It can be connected while cooking. It also can be exposed to sunlight at any time so that the battery can be recharged.
Battery	Lithium-Polymer (Li-Po) is used due to its extremely lightweight, durable, and high energy density that allows a significant amount of energy to be stored. Plus, this type of battery also has better safety characteristics which reduce the risks of any inconvenience.
Induction Plate	Metal induction plate. The solar energy which stored in the battery will be converted to electric, creating heat on the metal induction plate.

Power Switch	Standard mini push button power switch that function to enable or disable the device.
LCD Screen	Implementation of touchable LCD screen which can control various functions of the stove i.e., temperature, power, battery level.
USB Port	USB Type-C Port installed to enables charging this device.
USB Type-C Port	USB Type-C Port installed to enables charging this device.
Adjustable Mounting	The mounting can be adjusted according to level of ground, suitable for uneven surface.
Handle	Type of metal handle that can be used to hang it somewhere or to carry it by hand or by a backpack.

NOVELTY

The solar cooker is a revolutionary advancement in culinary technology, offering a novel and environmentally friendly method of food preparation. Utilizing solar energy as a pure, renewable, and abundant resource for cooking food is its primary innovation. Solar stoves eliminate the need for traditional fuels such as wood, charcoal, and gas, which are frequently associated with pollution, deforestation, and health risks. This inventive cooking device converts sunlight into heat energy for a variety of cooking techniques, including baking, boiling, and grilling. The adaptability and convenience of solar stoves contribute to their uniqueness. They are available in a variety of designs, from simple, portable models to more complex systems with numerous cooking compartments and temperature controls. Some solar stoves include storage components that enable cooking on cloudy days or after sunset. This adaptability makes them suitable for a wide spectrum of culinary applications, whether in urban, rural, or outdoor settings. In addition, the eco-friendly character of solar stoves significantly reduces carbon emissions, air pollution, and deforestation. Solar stoves have a positive impact on the environment and human health by utilizing sunlight as their primary energy source. Additionally, solar stoves can have economic benefits by reducing fuel costs and reliance on expensive or scarce traditional fuels in regions where these are prevalent. Overall, the novelty of solar stoves resides in their capacity to provide a sustainable and efficient culinary solution that is in harmony with the environment and addresses pressing global issues such as pollution, climate change, and deforestation.

USEFULNESS

"Brainy Burner" has a lot of benefits that make it a great tool for people who love the outdoors, care about the environment, and want to cook in a healthy way. The solar cooker takes energy from the sun, which is free and always there. When you cook with solar energy, you use less nonrenewable natural gas and put out less carbon. This makes your life more sustainable and good for the earth. This "Brainy Burner" helps people be less reliant on traditional energy sources, especially when they are outside or in places with few conventional energy sources. Users can cook food without needing power or gas. This makes it a reliable and self-sufficient way to cook. The "Brainy Burner" is small and easy to carry, which makes it perfect for camping, hikes, and picnics. It is easy to move and set up because it is small. Also, the "Brainy

Burner", offers a variety of ways to cook. Some foods can be boiled, simmered, or even baked, which opens a world of culinary options. After you buy a solar camp stove, you don't have to pay for fuel again. Customers can save money on fuel sales or fill-ups because solar energy is free and easy to get. Over time, the solar cooker has proven to be a good way to cook that doesn't cost a lot. Because it uses solar energy, the cooker has less of an effect on the Earth. It helps cut down on air pollution, greenhouse gas emissions, and tree loss caused by traditional cooking methods that use fossil fuels or fires. Solar stoves help clean the air and make the world a better place to live. "Brainy Burner", is helpful in emergency situations where you might not have power or gas. They give people a reliable way to cook when the power goes out or there is a natural disaster. This means that even when things are hard, people can still make meals and eat hot food.

COMMERCIALIZATION

"Brainy Burner" offers a multitude of advantages that make their commercialization an attractive option. First, our "Brainy Burner" is a clean and sustainable method of food preparation, emitting zero emissions and effectively reducing air pollution and greenhouse gas emissions. This contributes to a healthier environment and reduces the effects of climate change. Additionally, our "Brainy Burner" offer economic benefits by reducing energy costs, particularly in regions where fuelwood is expensive or scarce. Their low cost makes them a viable option for communities seeking cost-effective cooking solutions. Additionally, this solar stoves improve indoor air quality, which is especially important in regions where traditional fuels such as wood and charcoal produce high levels of smoke. This feature helps prevent respiratory issues and makes the kitchen safer. The ease of use and low maintenance of solar stoves, which eliminates the need for fuel storage and worries about running out, is another important aspect. In addition, their durability ensures dependable cooking performance even during inclement weather, such as cloudy or rainy days. These environmental, economic, health, convenience, and durability benefits make our "Brainy Burner" a compelling commercial option.

ACKNOWLEDGEMENTS

We would like to express our gratitude to our lecturer, Sir Alvin Gatu, as well as our advisor, Miss Umairah Binti Abdul Khalid, for providing us with the opportunity to do this brilliant project for the "International Exhibition & Symposium on Productivity, Innovation, Knowledge & Education (i-SPiKE) 2023" competition. They also encouraged us to participate in this competition, and as a result, we were able to learn so many new things. We would also like to thank our parents and friends for their assistance in completing this project within the time limits. Any attempt at any level cannot be completed satisfactorily without the assistance and direction of our supervisor and friends. The project would not have been possible without the assistance of those who assisted us in gathering diverse information, generating new ideas, and guiding us on time.

CONCLUSION

In conclusion, the solar camp stove is an innovative, portable, and ecological cooking equipment that uses the sun's electricity. Renewable energy reduces fossil fuel use, carbon emissions, and cleaner living. Solar stoves are energy-independent, cost-effective, safe, and versatile for outdoor cooking. Camping, trekking, and other outdoor activities are easy with its lightweight, compact design. In fire-prone areas, cooking without flames is safer. sun cooking shows the sun stove's innovation. It provides efficient, clean, and autonomous cooking for outdoor gear. Sustainability, ingenuity, and practicality make the solar camp stove appealing to eco-conscious and outdoor enthusiasts.

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