

Hygiene and Timeliness of Salted Dried Fish Process using Smart Portable Outdoor Domestic Solar Drying Cabinet (PODSOD)

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ABSTRACT:

Food waste problem is becoming a habit among Malaysians. This unhealthy culture is considerable as the Malaysians' as well as the world's food system main challenges. These wastes create a worrying effects on land, water and air pollution, not to be forgotten our world climate change. Using smart Portable Outdoor Domestic Solar Drying Cabinet (PODSOD), it is expected that the food waste due to food spoilage can be controlled by food drying technique. The objective of this paper is to investigate the effect of conventional open sun drying (OPS) and innovative PODSOD in terms of physical parameters of the salted Mackerel fishes. The product has been registered under copyright reference number LY2020006542. In this paper, we focus on salted dried Mackerel (12 x 5 x 1.5cm). At the first stage, before the product was developed, analysis on sun hours, temperature and humidity at Changlun, Kedah was examined. After the product has been developed, we examined the practicality of the product on fish drying from 1st February until 30st April 2021 using sensors installed within the product. The results were compared to open sun drying technique using similar specifications of samples. Based on analysis, it was found that the drying process using PODSOD was more influenced by the percentage of salt used, while the drying process under Open Sun Drying was more influenced by the number drying hours.

Keywords: *salted dried Mackerel*, Portable Outdoor Domestic Solar Drying Cabinet (PODSOD), open sun drying (OPS).

INTRODUCTION

The quality of outdoor dry fish (Figure 1) technique were highly influenced by bacterial, fungal [1], pest, rodent infection and insect attack. This product is suitable to be implemented at housing area at Changlun, Kedah based on long monthly sun hours and sun days at the respective district (Figure 2).

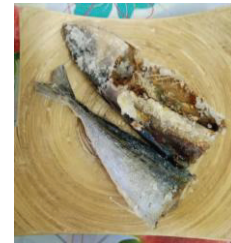


Figure 1 Salted dried fish using PODSOD

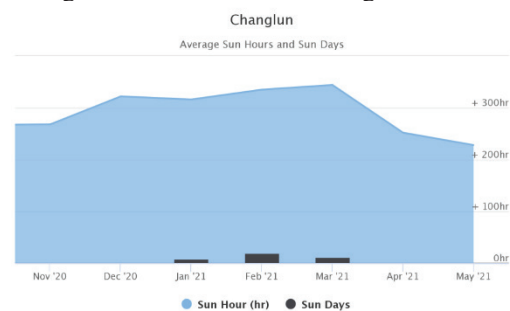


Figure 2 Monthly sun hours and sun days at Changlun, Kedah

(Source of picture: WorldWeatherOnline.com)

MATERIALS

Smart Portable Outdoor Domestic Solar Drying Cabinet (PODSOD)

The size of the product is suitable for domestic use (2 feet high x 2 feet width x 2 feet depth) Figure 3. Figure 4 shows the actual product.

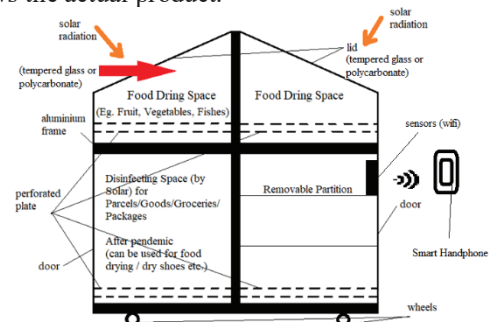


Figure 3 The design of Portable Domestic Solar Drying Cabinet



Figure 4 The actual prototype

METHODOLOGY

The functionality of PODSOD can be referred in Figure 5.

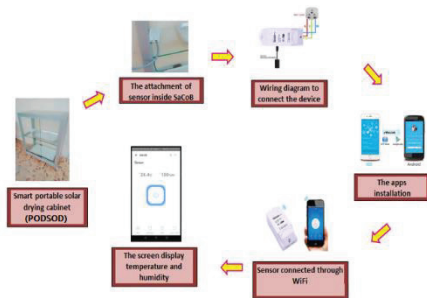


Figure 5 The functionality IoT in PODSOD

The research flowchart can be seen in Figure 6.

Database

Data was captured by smart devices (Sonoff RF), and the gathered data was sent to other ITEAD smart devices under the user account, allowing other devices to monitor connected appliances using the data.

Mobile Application (eWeLink)

The mobile application is dynamic and enables a variety of actions, functions, and versatility, allowing data to be recorded at any time and from any location.

Drying Experiments

All of the samples were dehydrated until they reached the required moisture content (35%–40%). Salted dried fish with moisture contents of 35–40% (wb) and salt contents of 15–20% (wb) usually have a minimum storage life of 3 weeks to 2 months.

RESULT AND DISCUSSION

The main goals of any drying process are to create a dried product in the shortest amount of time feasible, with the fewest negative consequences on product quality, and with the least amount of energy [2]. Dried fish activities contribute towards global food and nutritional security [3]. Table 1 shows the variables of interest in this paper.

CONCLUSION

As a conclusion, it can be said that all objectives have been successfully achieved. Most importantly, organic materials such as fish or fruit are suitable to be dried using PODSOD in a sustainable condition with low relative errors in compare to OPS. Even though, the

experiment conditions of both PODSOD and OPS were the same in terms of weather. Juxtaposing the PODSOD can be used in extreme weather condition in compare to OPS which is much vulnerable to weather conditions with high pollutant. PODSOD should be examined at different geographical conditions or using variations or organic variables such as small fishes, shrimps, fruits, seaweed, traditional herbs, flowers [4-15]. This product has huge potential of commercialization values. This product is in line with 11th, 12th and 13th Sustainable Development Goals (SDG) aspirations.

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