

## Marine water aquaculture and an IoT-based smart fish dryer of the future: a sustainable environmental approach

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Received 20 August 2023; Accepted 12 September 2023

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### ABSTRACT

Traditional methods of drying fish in open air are still widely practiced in several developing nations in South Asia and other ASEAN countries. Despite their widespread use, these methods frequently produce unhealthy conditions and substandard commodities because of the influence of pollutants, abnormal climatic patterns, and vermin. Notwithstanding their prevalent application, these techniques frequently result in unhygienic circumstances and substandard commodities owing to the influence of impurities, irregular meteorological patterns, and vermin. The existing study introduces a novel environmental approach to fish drying, which involves the utilization of solar energy and Internet of Things (IoT) technology. The system under consideration operates as a solar greenhouse during daylight hours, utilizing solar energy to activate a heating mechanism for nocturnal use. The IoT controller enhances the drying procedure by controlling the temperature and airflow, leading to a more effective and sanitary drying process. It takes 30 h to dry 500 kg of fish and decrease the moisture content 88% to 10% within 30 h. The initial findings indicate that the newly developed eco-friendly system could enhance the quality of dehydrated fish substantially, while also complying with sustainable energy principles. The current study not only provides a pragmatic resolution for drying fish, but it could also make a significant contribution to the achievement of sustainable development goals by supporting the use of renewable energy in the worldwide food processing industry.

*Keywords:* Dry fish; Fish dryer; Smart technology; Sustainability; Renewable energy

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### 1. Introduction

The practice of food preservation holds significant importance in the agriculture and food sector, with drying techniques serving as a crucial aspect of this process. In contrast to refrigeration, the process of drying presents a comparatively more economical and uncomplicated approach to conserving diverse categories of agricultural and food items [1].

Renewable energy sources, such as solar energy, are highly desirable due to their minimal investment requirements and dependability considering growing concerns regarding energy consumption in food preservation methods [2].

Drying is essentially a method to reduce the moisture content within agricultural or food products. This process enhances the product's shelf life, making it suitable for extended storage and various applications [3]. A wide range

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