



Microbial biotechnology approaches for conversion of pineapple waste in to emerging source of healthy food for sustainable environment

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ABSTRACT

One of the most significant and difficult jobs in food sustainability, is to make use of waste in the vegetable and fruit processing sectors. The discarded fruits along with their waste materials, is anticipated to have potential use for further industrial purposes via extraction of functional ingredients, extraction of bioactive components, fermentation. As a result of its abundant availability, simplicity and safe handling, and biodegradability, pineapple waste is now the subject of extensive research. It is regarded as a resource for economic development. This vast agro-industrial waste is being investigated as a low-cost raw material to produce a variety of high-value-added goods. Researchers have concentrated on the exploitation of pineapple waste, particularly for the extraction of prebiotic oligosaccharides as well as bromelain enzyme, and as a low-cost source of fibre, biogas, organic acids, phenolic antioxidants, and ethanol. Thus, this review emphasizes on pineapple waste valorisation approaches, extraction of bioactive and functional ingredients together with the advantages of pineapple waste to be used in many areas. From the socioeconomic perspective, pineapple waste can be a new raw material source to the industries and may potentially replace the current expensive and non-renewable sources. This review summarizes various approaches used for pineapple waste processing along with several important value-added products gained which could contribute towards healthy food and a sustainable environment.

1. Introduction

In addition to being one of the most popular fruits in the world, pineapple (*Ananas comosus*) is also one of the most widely consumed edible members of the Bromeliaceae family. Costa Rica, Brazil, Thailand, Philippines, China, and India are the world main producer

(Maia et al., 2012). Brazil is the world's second-largest pineapple grower, with 2.69 million tonnes produced in 2016, trailing only Costa Rica, which produced 2.93 million tonnes in 2016. In 2016, it was anticipated that the worldwide pineapple output would be 25.80 million metric tonnes (Mt) from 1.04 million hectares (Mha) and continuously increase by the year. It is believed that the history of

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