A REVIEW ON ANTIMICROBIAL FILM PACKAGING FROM POMEGRANATE PEEL WASTE

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ABSTRACT

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This paper highlights the potential of pomegranate peel waste as an alternative preservatives food packaging. The purpose of this study is to conduct a thorough review of the most recent research on the use of alternative preservatives derived from pomegranate peel waste for antimicrobial film food packaging. This article describes current developments in the biochemical composition, antimicrobial potential, and food preservation features of pomegranate peel extracts, as well as a discussion of those developments. The pomegranate peel can be an effective and natural option for synthetic preservative agents. The efficiency of extraction compounds derived from plant tissues can be affected by various factors, such as the method of extraction used, the type of solvents used for the extraction, and the differences in the mixture of solvents used for different materials. The antimicrobial activity of PPE was more substantial than that of other parts, which was related to the total amount of flavonoids and tannins in PPE. Several foodborne pathogens, such as *Escherichia coli, Fusarium sambucinum, Penicillium italicum,* and *Bacillus subtilis*, were found to be susceptible to the antibacterial actions of PPE. The findings indicated that the peels of pomegranate fruits are the primary by-products produced during the food processing of pomegranate. These peels are rich in antioxidants and broad-spectrum antimicrobial agents and can prevent food deterioration even when exposed to high temperatures.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Punica granatum L. Punicaceae, known as pomegranate, a seeded or granular apple, is a tasty fruit eaten worldwide. Pomegranate fruit that is ripe is ball-shaped, approximately five inches in diameter, and has a deep red leathery peel. Since the beginning of the 21st century, there has been an uptick in the production and consumption of pomegranate fruits. This can be attributed to the growing number of scientific studies on these fruits' positive effects on one's health. Pomegranate fruits are used in their natural state and after being processed, most commonly into juice, oil, wine, and preserves. Pomegranate peels are generally among the most frequently wasted items, as they are unusable. Approximately 78% of the peel is recovered as a residue during pomegranate juice processing. Pomegranate peel is an agricultural by-product that contains phenolic chemicals that can be exploited as natural antioxidants in the food and pharmaceutical sectors (Bertolo *et al.*, 2021). It includes a variety of nutrients and phenolic chemicals, including gallic acid, ellagic acid, Punicalagin A, and Punicalagin B, as well as other hydrolysable tannins (Kumar et al., 2021). A majority of the peel is composed of cellulose (16–22 g), lignin (20–41 g), pectin (14–23% of the peel), and a small amount of protein (Abid, Yaich, *et*