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**DEVELOPMENT OF EDIBLE ACTIVE COATINGS
FROM NATURAL SOURCES FOR EXTENDING THE
SHELF LIFE OF SOME PREPARED FRESH FRUITS**

**A Thesis Submitted in Partial Fulfillment of the
Requirements of the Degree of Doctor of Philosophy**

In

Food Technology

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ABSTRACT

Pomegranate fruit contains high content of phytochemical constituents which have many health benefits. This study aimed to evaluate the ethanolic extract of pomegranate fruit parts: arils, rind and peel as sources of bioactive compounds as well as their antioxidant and antimicrobial activities to be used as an active edible film. Results clearly demonstrated that peel extract (PE) had the highest content of total phenolics and flavonoids (342 mg GAE /g and 82.33mg catechol /g , respectively) followed by rind extract (RE) containing 213.00 mg GAE/g and 70.50 mg catechol /g, respectively, and finally arils extract (AE) (108.22 mg GAE /g and 55.58 mg catechol/g, respectively).Results indicated that total anthocyanins content was concentrated in PE (15.24mg Cynidian-3-glycoside/g) and AE (11.04 mg Cynidian-3-glycoside/g), while RE had the lowest value (6.51 mg Cynidian-3-glycoside/g). Peel extract exhibited the highest antioxidant activity followed by RE and were significantly higher than that of AE. These results were confirmed with the DPPH and ABTS⁺ assays. Consequently, PE followed by RE had higher antimicrobial activity against several pathogenic strains than AE and can be used as natural preservative for food. Peel extract and RE were incorporated into pectin film at concentrations 7.5 and 15 mg/ml to develop an active edible film. Pectin film without the tested fruit parts extract was used as the control film. The obtained results revealed that these extracts caused an improvement in the barrier properties, mechanical properties and successfully developed and considered as an active edible film with antioxidant and antimicrobial properties. Based on our results, pectin edible coatings based PE can be used for extending the shelf life of fresh cut apple and mango fruits by delaying microbial spoilage and improve fruit quality.

Keywords: Pomegranate peel and rind, ethanolic extract, antioxidant and antimicrobial activity, active edible film, barrier properties, mechanical properties.