# UNIVERSITI TEKNOLOGI MARA

# EFFECT OF CHITOSAN-BASED EDIBLE COATING ON CHEMICAL PROPERTIES AND QUALITY OF FRUIT

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# ABSTRACT

Foodborne outbreaks, precocious decaying and economic losses were common problems related to fresh fruit retention. These problems have led to the advance of novel technologies and systems for food protection such as edible coating based on natural compounds. In this study, an edible coating has been applied on the surface of fruits to lengthen its shelf-life. Other than that, it also offers protection against bacterial infection that leads to fruits spoilage by suppressing respiration, transpiration, and microbial growth. Latest studies have indicated chitosan as an effective coating that prolongs shelf-life and improves a storability of fresh fruit. Few characteristics possess by chitosan which makes it an excellent coating are high antimicrobial activity, biodegradability and non-toxic. The chitosan coating is also incorporated with turmeric essential oil as innovation based on the possible incorporation of the bioactive ingredient. The synergy between these two components may be useful to avoid a chain of biochemical and nutritional changes that could lead to fruits spoilage. The objectives of this study were to determine the effectiveness of chitosan-based edible coating in prolonging the quality of fruit and the effect of chitosan-based edible coating on chemical and physical properties of strawberry fruit from the chitosan-based formulation chosen. Fruits were dipped for 60 seconds in chitosan solution incorporated with turmeric essential oil. Non-treated fruits served as a control treatment. Samples were stored at room temperature up to 5 to 7 days. A quality analysis is performed every 2 days. The analysis included measurements of visual decay infection, structural analysis of chitosan-based solution, vitamin C determination and total soluble solid content (TSS). The results show that chitosan solution incorporated with turmeric essential oil could successfully improve shelf-life stability and retard postharvest deterioration of strawberries.

*Keyword: Chitosan,Edible Coating, Strawberry, Shelf-life, Turmeric Essential Oil*

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# CHAPTER 1

# INTRODUCTION

## 1.1 Background of Study

Edible coatings are one of the technologies with greater potential for improving the microbiological safety of food and protection against the influence of external environmental factors. Hence, the use of edible coatings increases in recent years to prolong the shelf life of food (Carneiro-da-Cunha, et al., 2009).

The use of materials derived from the renewable sources such as hydrocolloids is one of the major potentials in the development of edible coatings. Functional compounds concentrations incorporated within coatings, stability, chemical structure, the degree of dispersion and interaction with the polymer-based coating is of few parameters that were studied.

Demand for production of small fruits such as strawberry is growing worldwide included in Malaysia. Edible coatings can potential prevents precocious strawberry spoilage and increase the shelf life of this fruit, thus avoiding a depreciation of the product considering its increasing consumption trend.

### 1.1.1 Strawberry

*Fragaria* × *ananassa* or commonly known as strawberry is a herbaceous perennial plant in the *Rosaceae* (rose family); a hybrid cultivar of two wild *Fragaria* species found predominantly in semitropical regions worldwide especially in western South America; Florida and California. *Fragaria* × *ananassa* is only one part in the strawberry species, with *virginiana*, *chiloensis* and *vesca* are the few names of the species. The fruit is famous for its colour, flavour and fragrance. Hence, its characteristic is widely cherished and used in lots of industries such as food and cosmetics.

Strawberries contain a good deal of vitamin C, which is helpful for the development of strong connective tissues and provides protection to the immune