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Edible film incorporated with ternary blend cinnamon oil: a natural source for fruit preservation

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Perishability of fruits has continued to be a challenge in extension of shelf life in the effort to reduce extensive postharvest losses. Among various treatments to delay deterioration of fruits, interest in research of edible films is sustained due to its potential as a natural source substitute to the use of synthetic coatings [1]. Edible film has the ability to be a carrier for other substances containing rich amount of phytochemicals such as essential oil [2], which can provide additive protection on the fruits. Cinnamon oil has been utilized for centuries as medicinal plant as well as food preservatives largely due to its various bioactive phytochemical constituents [3]. The efficacy of an edible film with combination of essential oil depends largely on the production method and the ability of the film to adhere to the fruit surface. Combination of oil and water through the ternary blend strategy has enabled the development of edible films with unique and riveting properties. In this study, gelatin-based edible films containing different ratios of cinnamon oil:Tween 80:water was prepared through solvent-casting method to evaluate the effectiveness on retaining quality and freshness of wax apples (*Syzygium samarangense* L.). An increase in the cinnamon oil content shows reduction in the water solubility and water vapour permeability of films which are the key parameters to maintain freshness of food. Quality factors of the wax apples which include weight loss, ascorbic acid content and antioxidant activity were improved significantly ($p<0.05$) in wax apple wrapped with the cinnamon oil-incorporated films when compared to control wax apples (unwrapped) as well as wax apple wrapped with gelatin film only. These findings suggest that edible film incorporated with cinnamon oil using the ternary blend is a promising natural source alternative that can replace the use of synthetic materials in retaining quality, as well as enhancing safety and nutritional trait of the fruit.

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