

Thesis Title	Carboxymethyl Cellulose Coating Incorporated with Lemongrass Essential Oil to Extend Shelf Life of Tomato
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ABSTRACT

Tomato (*Solanum lycopersicon*) is the second most important crop next to potato and a highly perishable climacteric fruit, with a relatively short postharvest life. The fruit decay by fungal diseases (*Aspergillus niger*) is one of the common causes of tomato losses and its optimum storage cannot be prolonged. The aim of this study was to evaluate the edible carboxymethyl cellulose (CMC) coating accompanied with lemongrass essential oil (LGEO) against *A. niger* for prolonging shelf life of tomatoes during storage. Preliminary tests were carried out with six different coating materials (LGEO, soy protein, guar gum, cassava starch and gelatin all at 3g except CMC which was 2g) were prepared and coated on tomatoes, stored at 13°C, 85% RH. Disease incidence and skin appearance were observed and finally CMC coated fruits showed low disease incidence and were able to maintain good appearance of skin during storage period. Consequently, CMC was used as an alternative to be continued in this experiment. Essential oils of (oregano, lemongrass essential oil and clove oil) were tested at different concentrations of 0.5%, 1% and 2% on disk diffusion MIC and MFC methods. All these essential oils were able to inhibit *A. niger* at 1% and 2%

concentration. The sensory evaluation was also carried out by trained panelist on the smell of essential oils and appearance of coated fruits. Consequently, LGEO was used to be continue with this experiment with high evaluation scores for the appearance and low disease incidence on coated fruits for 30 days of storage at 13°C,85% RH. Finally, for the real experiment this work antimicrobial properties of LGEO were investigated by disk diffusion method, minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC). The minimum inhibitory concentration (MIC) of LGEO against *A. niger* was 1% (w/v). The effect of CMC coating and CMC coating combined with LGEO on tomatoes qualities such as weight loss, total soluble solid (TSS), firmness, titratable acidity (TA), and disease incidence and severity were investigated. The results showed that application of CMC combined with 1% LGEO could reduce changes of weight loss, firmness, total soluble solid and disease incidence with good appearance for 40 days of storage at 13°C, 85 % RH. The CMC coating incorporated with 1% LGEO can extended the shelf life of tomato from 10 days to 30 days at 13°C, 85%RH. Therefore, CMC combined with LGEO can be used as the active coating for extending the shelf-life and delayed *A. niger* disease development in tomato fruits.

Keywords: Antifungal, Carboxymethyl Cellulose, Edible Coating, Lemongrass Essential Oil and Tomato