

**PEMBUATAN FILM KOMPOSIT KITOSAN/POLIETILEN
GLIKOL/CARBOXYMETHYL CELLULOSE/MINYAK CENGKEH SEBAGAI
PENJERA PENELURAN LALAT BUAH HAMA *Bactrocera carambolae***

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INTISARI

Penelitian pembuatan film komposit kitosan/polietilen glikol/*carboxymethyl cellulose*/minyak cengkeh sebagai penjera peneluran lalat buah hama *Bactrocera carambolae* telah dilakukan. Tujuan penelitian adalah untuk mengetahui komposisi suspensi kitosan/PEG/CMC/minyak cengkeh yang dapat menghasilkan film komposit dengan sifat mekanik terbaik dan potensinya sebagai repelen yang dapat digunakan sebagai penjera peneluran lalat buah hama *B. carambolae*.

Suspensi kit/PEG dibuat dari suspensi kitosan 1 dan 1,5% yang ditambahkan PEG dengan variasi konsentrasi 0; 0,5; 1; 2; dan 3% (b/v). Untuk membuat film, suspensi tersebut dituang ke dalam cawan petri berdiameter 10 cm dan dikeringkan dalam oven pada temperatur 60 °C selama 12 jam. Suspensi kit/PEG yang menghasilkan film dengan sifat mekanik terbaik ditambahkan minyak cengkeh 1 dan 2% (v/v) serta 0,1% *carboxymethyl cellulose* (CMC) sebagai *emulsifier*. Film komposit dianalisis dengan *Universal Testing Machine* (UTM), spektrofotometer *Fourier Transform Infrared Spectroscopy* (FTIR) dan *Scanning Electron Microscopy* (SEM). Uji repelensi menggunakan suspensi yang menghasilkan film komposit dengan nilai kuat tarik rendah dan elongasi optimum. Uji dilakukan dengan cara menghitung telur yang diletakkan *B. carambolae* betina pada buah jambu biji merah selama 5 hari (3 kali pengulangan).

Film komposit terbaik yang menghasilkan nilai kuat tarik rendah dan elongasi optimum dihasilkan oleh suspensi kit/PEG/CMC/MC 1/0,5/0,1/1% dengan nilai kuat tarik $12,53 \pm 1,74$ Mpa dan elongasi $4,44 \pm 0,96\%$. Hasil analisis SEM menunjukkan film komposit memiliki struktur berpori dengan diameter 2,600-2,800 μm . Pada uji repelensi, suspensi tersebut juga memiliki persen efektivitas repelensi paling tinggi terhadap *B. carambolae* dengan nilai *Effectiveness Repellency* (ER) sebesar 92,92%.

Kata kunci : kitosan, komposit, minyak cengkeh, PEG, repelen.

***PREPARATION OF CHITOSAN/POLYETHYLENE
GLYCOL/CARBOXYMETHYL CELLULOSE/CLOVE OIL COMPOSITE FILMS
AS AN OVIPOSITION DETERRENT OF *Bactrocera carambolae* FRUIT FLY***

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ABSTRACT

Research on preparation of chitosan/polyethylene glycol/carboxymethyl cellulose/clove oil composite films as an oviposition deterrent of *Bactrocera carambolae* fruit fly was conducted. This research aimed to determine the composition of chitosan/PEG/CMC/clove oil suspensions which produced a composite film with the best mechanical properties and its potential as a repellent that can be used as an oviposition deterrent for *B. carambolae*.

Kit/PEG suspensions were made from chitosan 1 and 1.5% suspensions which were added to the variation of PEG concentrations 0; 0.5; 1; 2; and 3% (b/v). For the film making, the suspensions was poured into a petri dish with 10 cm diameter and dried at 60 °C for 12 hr. The suspension kit/PEG that produced film with the best mechanical properties was added 1 and 2% clove oil and 0.1% carboxymethylcellulose as an emulsifier. The composite films were analyzed by Universal Testing Machine (UTM), spectrophotometer Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy (SEM). The repellency test was used a suspension which produced low tensile strength and optimum elongation and was done by counting eggs laid by *B. carambolae* female fruit flies in red guava for 5 days (3 replications).

The best composite film having a low tensile strength and an optimum elongation values was generated by kit/PEG/CMC/MC 1/0.5/0.1/1% suspension with tensile strength values 12.53 ± 1.74 Mpa and elongation $4.44 \pm 0.96\%$. The SEM analysis showed that the composite film had a porous structure with the diameter of 2.6-2.8 μm . In the repellency test, the suspension also had the highest percentage of effectiveness of repellence against *B. carambolae* with an Effectiveness Repellency (ER%) value of 92.92%.

Keywords : chitosan, clove oil, composite, PEG, repellent.