

## **ABSTRACT**

### **EFFECT OF GLYCEROL AND CMC (*Carboxyl Methyl Cellulose*) ADDITION ON BIODEGRADABLE FILM CHARACTERISTIC OF ARECA NUT-PEEL (*Areca catechu L*) CELLULOSE BASED**

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Biodegradable film is an environmentally friendly plastic replacement packaging. Areca fruit peel has the potential in making biodegradable film because it contains high cellulose which is 34.18%. This study aims to determine the effect of glycerol and on the characteristics of areca nut peel-based biodegradable film, to determine the effect of CMC on the characteristics of areca nut peel-based biodegradable film, and to determine the interaction of glycerol and CMC to produce the best characteristics of areca nut peel-based biodegradable film. The study was arranged in RAKL with 2 factors and 3 replications. The first factor was the addition of glycerol with concentrations of 0.5% (G1), 1% (G2), and 1.5% (G3), and the second factor was the addition of CMC consisting of concentrations of 1% (C1), 2% (C2), and 3% (C3). Areca fruit peels were dried, mashed, filtered, soaked using 2.5% NaOH and hydrolyzed using 2% H<sub>2</sub>O<sub>2</sub>, then mixed with other ingredients. The data obtained were analyzed for variance and further tested with the Least Significant Difference Test (BNT) at the 5% level. The best research results were obtained in the interaction of 1% glycerol and 3% CMC treatment with a tensile strength of 71.87 MPa, percent elongation value of 26.27%, thickness of 0.32 mm, water vapor permeability of 7.41 g/m<sup>2</sup>/hour, and biodegradability for 28 days.

**Keywords:** Biodegradable film, areca nut peel, cellulose, glycerol, CMC

## ABSTRAK

### **PENGARUH PENAMBAHAN GLISEROL DAN CMC (*Carboxyl Methyl Cellulose*) TERHADAP KARAKTERISTIK *BIODEGRADABLE FILM* BERBASIS SELULOSA KULIT BUAH PINANG (*Areca catechu L*)**

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*Biodegradable film* merupakan bahan pengganti plastik yang bersifat ramah lingkungan. Kulit buah pinang potensial dalam pembuatan *biodegradable film* karena mengandung selulosa yang tinggi yaitu sebesar 34,18%. Tujuan penelitian ini ialah mengetahui pengaruh penambahan gliserol terhadap karakteristik *biodegradable film* berbahan dasar kulit buah pinang, mengetahui pengaruh CMC terhadap karakteristik *biodegradable film* berbahan dasar kulit buah pinang, dan mengetahui interaksi gliserol dan CMC untuk menghasilkan karakteristik *biodegradable film* terbaik berbahan dasar kulit buah pinang. Penelitian disusun dalam RAKL dengan 2 faktor dan 3 ulangan. Faktor pertama penambahan gliserol dengan konsentrasi 0,5% (G1), 1% (G2), dan 1,5% (G3), dan faktor kedua dengan penambahan CMC terdiri dari konsentrasi 1% (C1), 2% (C2), dan 3% (C3). Kulit buah pinang dikeringkan, dihaluskan, disaring, direndam menggunakan NaOH 2,5% dan hidrolisis menggunakan H<sub>2</sub>O<sub>2</sub> 2%, kemudian dicampur dengan bahan lainnya. Data yang diperoleh dianalisis sidik ragam dan diuji lanjut dengan uji beda nyata terkecil (BNT) pada taraf 5%. Hasil penelitian terbaik diperoleh pada interaksi perlakuan gliserol 1% dan CMC 3% dengan nilai kuat tarik sebesar 71,87 MPa, persen pemanjangan 26,27%, ketebalan 0,32 mm, permeabilitas uap air 7,41 g/m<sup>2</sup>/jam, dan biodegradabilitas selama 28 hari.

**Kata Kunci:** *Biodegradable film*, selulosa kulit buah pinang, gliserol, CMC