

## RINGKASAN

Penggunaan pengawet sintetis pada bahan makanan di Indonesia menjadi suatu permasalahan yang dihadapi oleh semua pihak, baik pemerintah, konsumen, maupun produsen. Penggunaan pengawet kimia sintetis masih dalam kontroversi dalam jenis maupun dosis yang digunakan, terutama oleh industri kecil, industri rumah tangga, dan industri menengah pengolah pangan. Salah satu bahan alami yang memiliki potensi sebagai pengawet alami adalah tanaman kecombrang. Daun kecombrang (*Etlingera elatior*) diketahui memiliki senyawa bioaktif, meliputi polifenol, alkaloid, dan flavonoid. Penelitian ini bertujuan untuk mempelajari: 1) pengaruh suhu evaporasi terhadap karakteristik fisikokimia konsentrat dari daun kecombrang; 2) pengaruh lama evaporasi terhadap karakteristik fisikokimia konsentrat dari daun kecombrang; dan 3) kombinasi perlakuan terbaik penggunaan suhu dan lama evaporasi terhadap karakteristik fisikokimia konsentrat dari daun kecombrang.

Penelitian ini menggunakan rancangan *Central Composite Design* (CCD), dengan metode *Response Surface Methodology* (RSM), menggunakan dua faktor perlakuan, yaitu suhu penguapan dan lama proses penguapan. Diperoleh 13 formulasi perlakuan. Faktor yang diamati yaitu suhu evaporator yang terdiri atas tiga taraf yaitu 50°C, 55°C, dan 60°C, dan lama evaporator yang terdiri atas tiga taraf yaitu, 2; 2,5; dan 3 jam. Variabel yang diamati adalah variabel kuantitatif yang meliputi total fenol, flavonoid, dan viskositas. Variabel kualitatif yang meliputi fenol, flavonoid, alkaloid, steroid, tanin, saponin, dan glikosida.

Hasil analisis RSM menunjukkan bahwa perlakuan terbaik pada konsentrat daun kecombrang adalah pada suhu 60°C dengan lama penguapan selama 3 jam. Dengan meningkatnya suhu dan lama penguapan menyebabkan terjadinya peningkatan terhadap total fenol, flavonoid, dan viskositas. Senyawa bioaktif yang terkandung dalam konsentrat daun kecombrang adalah fenol, flavonoid, alkaloid, steroid, dan saponin. Formula optimum menghasilkan respon aktual total fenol 1420,736 mg TAE/100 g, flavonoid 152,958 mg QE/100 g, dan viskositas 2,28 cP. Hasil uji *t-test independent* menunjukkan hasil yang tidak berbeda nyata antara nilai aktual dengan nilai prediksi dari *software Design Expert v10*.

## SUMMARY

*The use of synthetic preservatives in Indonesia is a problem faced by everybody. The use of synthetic chemical preservatives is a problem that is still in controversy in the type and dosage used, especially by small industries, home industries, and medium food processing industries. One of the natural ingredients that has potential as a natural preservative is the kecombrang plant. Kecombrang leaves (*Etlingera elatior*) are known to have bioactive compounds; including polyphenols, alkaloids, and flavonoids. The purposes of this research are to study: 1) the effect of evaporation temperature on physicochemical characteristics of kecombrang leaves concentrate; 2) the effect of evaporation time on physicochemical characteristics of kecombrang leaves concentrate; and 3) the best combination of treatment using temperature and evaporation time on physicochemical characteristics of kecombrang leaves concentrate.*

*This research uses Central Composite Design (CCD), with response Surface Methodology (RSM) method with two test factors, temperature and evaporation time process. Obtained 13 treatment formulations. The factors that were tried in this research are the temperature and the evaporation time. The temperature consists of three levels; 50°C, 55°C, and 60°C, and the evaporation time consists of three levels; 2, 2.5, and 3 hours. The observed variables are qualitative and quantitative variables. The qualitative variables observed were phenol, flavonoids, alkaloids, steroids, tannin, saponin, glycosides, and the quantitative variables observed were phenol content, flavonoids, and viscosity. The optimum formula that is recommended verified and validated using an independent t-test. The optimum formula kecombrang leaves concentrate is based on the response of viscosity, phenol content, and flavonoids content with a temperature of 60°C, within 3 hours. Verification and validation of the optimum formula product result direct viscosity response value of 2.28, phenol levels of 1420.736 (mgTAE/100 g), and flavonoid levels of 152.958 (mg QE/100 g).*

*RSM analysis results show that the best treatment on kecombrang leaf concentrate is 60°C with evaporation time of 3 hours. With increasing temperature and evaporation time cause an increase in phenols content, flavonoids, and viscosity. Bioactive compounds in kecombrang leaf concentrate are phenols, flavonoids, alkaloids, steroids, and saponins. In order to obtain optimum formula kecombrang leaf concentrate with temperature and time in range based on temperature and time response, the optimum formula produces an actual phenols content response of 1420.736 mg TAE/100 g, flavonoids 152.936 mg QE/100 g, and viscosity of 2.28 cP. The results of the independent t-test showed that the results were not significantly different between the actual values and the predicted values from Design Expert v10 software.*