

Noja (*Peristrophe bivalvis*) adalah salah satu tumbuhan sumber pewarna alami yang potensial dikembangkan di Indonesia. Ekstrak daun Noja selama penyimpanan mengalami degradasi karena reaksi biotik dan abiotik. Penambahan pengawet berupa asam organik diharapkan dapat membantu memperlambat proses degradasi tersebut. Penelitian ini bertujuan untuk mengetahui pengaruh penambahan pengawet asam organik terhadap laju degradasi biotik dan abiotik larutan ekstrak daun Noja.

Pengawet yang digunakan di dalam penelitian ini adalah asam tanat, tartrat, dan sitrat. Indikator kerusakan degradasi biotik dinyatakan sebagai perubahan konsentrasi substrat (zat warna) dan biomassa terhadap waktu. Sedangkan indikator kerusakan degradasi abiotik dinyatakan sebagai perubahan nilai absorbansi yang dikonversi sebagai perubahan konsentrasi substrat (zat warna) terhadap waktu. Asam tanat, tartrat, dan sitrat dengan variasi perbandingan molar pengawet terhadap zat warna sebesar 0,36; 0,18; dan 0,09, ditambahkan ke dalam larutan ekstrak daun Noja. Kemudian dilakukan pengamatan terhadap degradasi biotik larutan ekstrak noja selama 40 hari. Setiap rentang waktu tertentu diambil cuplikan sampel untuk diukur konsentrasi zat warna dan biomasa secara gravimetrik. Pengamatan terhadap degradasi abiotik larutan ekstrak noja dilakukan dalam rentang waktu pendek (180 menit), karena umumnya reaksi abiotik relatif cepat. Untuk mempercepat degradasi abiotik, ke dalam sampel ditambahkan hidrogen peroksida 1%. Setiap 30 menit sekali, diambil cuplikan untuk diukur absorbansinya menggunakan spektrofotometer UV/VIS. Selain pengamatan terhadap degradasi biotik dan abiotik, juga dilakukan aplikasi pewarnaan pada kain katun. Kain katun dengan pra mordan tawas diwarnai dengan ekstrak Noja sebanyak 6 kali celup dan difiksasi menggunakan larutan tawas. Terhadap kain hasil pewarnaan dilakukan uji ketahanan luntur pencucian pada 40°C dan ketahanan luntur terhadap sinar terang hari. Kain hasil pewarnaan sebelum dan setelah diuji ketahanan luntur diukur nilai beda warnanya.

Dari hasil penelitian didapatkan waktu paroh (dalam hari) degradasi biotik dengan pengawet asam tanat (perbandingan molar pengawet terhadap zat warna) 0,36; 0,18; dan 0,09, tartrat (perbandingan molar pengawet terhadap zat warna) 0,36; 0,18; dan 0,09, sitrat (perbandingan molar pengawet terhadap zat warna) 0,36; 0,18; dan 0,09, dan tanpa pengawet masing-masing adalah 17,14; 17,20; 17,31; 16,20; 16,23; 16,27; 16,74; 16,93; 17,13; dan 15,37 hari. Sedangkan waktu paroh (dalam menit) degradasi abiotik dengan pengawet asam tanat (perbandingan molar pengawet terhadap zat warna) 0,36; 0,18; dan 0,09, tartrat (perbandingan molar pengawet terhadap zat warna) 0,36; 0,18; dan 0,09, sitrat (perbandingan molar pengawet terhadap zat warna) 0,36; 0,18; dan 0,09, dan tanpa pengawet masing-masing adalah 693; 630; 408; 365; 330; 187; 267; 267; 265; dan 204 menit. Penurunan beda warna total (dalam %) kain katun hasil pewarnaan menggunakan sampel dengan pengawet asam tanat, tartrat, sitrat, dan tanpa pengawet dari hasil uji pencucian 40°C adalah 18,67; 19,51; 23,97; dan 28,07. Adapun dari hasil uji sinar 40 hari adalah 12,15; 17,60; 20,33; dan 26,61. Dari hasil penelitian dapat diambil kesimpulan bahwa sampel dengan pengawet paling baik adalah asam tanat dengan waktu paroh terbesar yaitu 17,14 hari untuk degradasi biotik, dan 693 menit untuk degradasi abiotik, penurunan beda warna total kain berwarna hasil uji pencucian 40°C sebesar 18,67% dan dari uji penyinaran selama 40 hari sebesar 12,15%.

Kata kunci: ekstrak noja, degradasi, tanat, tartrat, sitrat

*Noja (Peristrophe bivalvis) is one of the plant sources of natural dyes that has the potential to be developed in Indonesia. Noja leaves extract degraded during storage due to biotic and abiotic reactions. The addition of organic acids was expected to reduce the degradation process. This study aims to determine the effect of organic acid addition on the rate of biotic and abiotic degradation of Noja leaves extract.*

*The preservatives used in this study were tannic, tartaric, and citric acids. Indicators of biotic degradation expressed as changes in the concentration of substrate (dye) and biomass with time. While for abiotic degradation expressed as a change in the absorbance value which is converted as a change in the concentration of the substrate (dye) with time. Tannic, tartaric, and citric acids with concentrations variations (molar ratio preservatives toward dyes) of 0.36, 0.18, and 0.09, were added to the Noja leaves extract. Then, observations were made on the biotic degradation of the noja extract solution for 40 days. Samples were taken every 2 days to measure the concentration of dyes and biomass gravimetrically. Observations on the abiotic degradation of the noja extract solution were carried out in a short time (180 minutes). To accelerate abiotic degradation, 1% hydrogen peroxide of 30% concentration was added to the sample. Every 30 minutes, samples were taken to measure the absorbance using a UV/VIS spectrophotometer. In addition to observe the biotic and abiotic degradation of the samples, dyeing was also applied to cotton fabrics. Cotton fabrics was dyed 6 times with pre and post mordant using alum. The dyed fabrics were tested for washing fastness at 40°C and fastness to sunlight. The dyed fabric before and after being tested for fastness is measured for the color difference value.*

*The results showed that the half-life (in days) of biotic degradation of samples with preservatives tannic acid (molar ratio) 0.36, 0.18, and 0.09, tartaric (molar ratio preservatives toward dyes) 0.36, 0.18, and 0.09, citric (molar ratio preservatives toward dyes) 0.36, 0.18, and 0.09, and without preservatives, namely 17.14; 17.20; 17.31; 16.20; 16.23; 16.27; 16.74; 16.93; 17.13; and 15.37. While the half-life (in minutes) of abiotic degradation of samples with preservatives tannic acid (molar ratio) 0.36, 0.18, and 0.09, tartaric (molar ratio preservatives toward dyes) 0.36, 0.18, and 0.09, citric (molar ratio preservatives toward dyes) 0.36, 0.18, and 0.09, and without preservatives, namely 693, 630, 408, 365, 330, 187, 267, 267, 265, and 204. The decrease in total color difference (in %) of cotton fabric dyed using samples with preservatives of tannic acid, tartaric, citric, and without preservatives from the washing fastness test at 40°C were 18.67, 19.51, 23.97, and 28.07, while the light fastness test at 40 days were 12.15, 17.60, 20.33, and 26.61. From the results of the study, it can be concluded that the sample with the best preservative is tannic acid with the largest half-life of 17.14 days for biotic degradation and 693 minutes for abiotic degradation, as well as the decrease in total color different of dyed fabrics from washing fastness test at 40°C was 18.67% and light fastness test was 12.15%.*

*Keywords: noja extract, degradation, tannic, tartaric, citric*