

**PENINGKATAN TAHAN LUNTUR ZAT WARNA ALAM TINGI  
(*Ceriops tagal*) PADA KAIN KATUN DENGAN NANOSOL SILIKA**

ALFI FATIHAH  
(13/347406/PA/15229)

**INTISARI**

Telah dilakukan preparasi dan karakterisasi nanosol silika serta uji aktivitasnya dalam meningkatkan ketahanan luntur zat warna alam tingi (*Ceriops tagal*) pada kain katun. Nanosol silika dibuat dengan menggunakan metode sol-gel pada temperatur kamar menggunakan prekursor silika tetraetilortosilikat (TEOS) pada keadaan asam. Karakterisasi dilakukan menggunakan metode spektrofotometri UV-Vis dan FTIR. Peningkatan ketahanan luntur zat warna alam tingi pada serat selulosa terhadap proses pencucian (*leaching fastness*) dilakukan dengan pembentukan komposit nanosol silika-tingi dengan rasio (v/v) 1:40; 1:8; 1:5; dan 1:4 . Pewarnaan dilakukan dengan teknik perendaman. Nanosol silika dicampurkan dengan zat warna alam tingi kemudian dilakukan pewarnaan kain. Uji ketahanan luntur pada kain katun dilakukan dengan cara merendam kain dalam larutan sodium dodesil sulfat (SDS) 1% (dalam air) pada temperatur kamar selama 1 jam. Reflektansi kain ditentukan dengan reflektansi spekuler UV-Vis.

Nanosol silika berhasil disintesis dari prekursor silika TEOS. Karakterisasi FTIR menunjukkan vibrasi ulur gugus O-H, vibrasi tekuk Si-OH, vibrasi ulur asimetris Si-O dan vibrasi tekuk Si-O-Si. Kain katun yang dilapisi dengan nanosol silika menunjukkan adanya peningkatan ketahanan luntur. Semakin banyak nanosol silika yang ditambahkan, maka ketahanan lunturnya semakin meningkat. Peningkatan ketahanan luntur paling baik ditunjukkan pada rasio SiO<sub>2</sub>-tingi 1:4 dengan derajat *leaching* 3,18 %. Ketahanan luntur zat warna tingi meningkat 86,5% setelah penambahan nanosol silika.

Kata kunci: *Ceriops tagal*, *leaching*, nanosol silika, sol-gel

**WASH FASTNESS IMPROVEMENT OF NATURAL DYE TINGI  
(*Ceriops tagal*) ON COTTON FABRICS BY SILICA NANOSOL**

ALFI FATIHAH  
(13/347406/PA/15229)

**ABSTRACT**

Preparation and characterization of silica nanosols and its activity test in increasing the wash fastness of natural dyes tingi (*Ceriops tagal*) on cotton fabric have been done. Silica nanosols were prepared using sol-gel method at room temperature with tetraethylorthosilicate (TEOS) silica precursors in acidic conditions. Characterization was carried out using UV-Vis and FTIR spectrophotometry methods. Increasing wash fastness of natural dyes tingi in cellulose fibers to the washing process (leaching fastness) was carried out by the formation of SiO<sub>2</sub> nanosols-tingi with a ratio (v/v) of 1:40; 1:8; 1:5; and 1:4. Silica sol was mixed with natural dyes tingi, then fabric coloring was done. Wash fastness test on cotton fabric was carried out by soaking the fabric in 1% sodium dodecyl sulfate (SDS) solution in water at room temperature for 1 hour. Fabric reflectance was determined by UV-Vis specular reflectance.

The results showed that silica nanosols were successfully synthesized from TEOS silica precursors. FTIR characterization showed stretching vibration of O-H group, O-H bending vibration, Si-O asymmetry stretching and Si-O-Si bending vibration. Cotton fabrics coated with nanosol silica showed an increase in fastness. The more silica nanosols added, the greater the wash fastness. The increase in fastness was best shown at a SiO<sub>2</sub>-tingi ratio of 1:4 with degree of leaching 3.18%. Tingi dye wash fastness increased by 86.5% after addition of silica nanosols.

**Keywords:** *Ceriops tagal*, leaching, nanosol silica, sol-gel.