

Izvirni znanstveni članek *Original Scientific Paper*

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Hidroliza reaktivnih barvil pri barvanju lanu v odvisnosti od vrste procesa

Hydrolysis of reactive dyes in flax dyeing, depending on the type of process

Lanena vlakna (*Linum ussitatissimum*) spadajo v skupino naravnih celuloznih vlaken, njihova kakovost pa je odvisna od sorte lanu, postopkov ločevanja vlaken od drugih delov stebela, predobdelave, barvanja in postopkov plemenitenja. Kadar laneni izdelki zahtevajo vrhunske obstojnosti, uporabljamo za barvanje reaktivna barvila, ki jih odlikujejo razmeroma enostaven postopek barvanja, briljantni barvni toni ter zaradi nastanka kovalentnih vezi med vlaknom in barvilom tudi dobre mokre obstojnosti. Postopki predobdelave in beljenja lanenih vlaken vplivajo zaradi razgradnje primesi na hidrofilitnost, hkrati pa tudi na fizikalno-kemijske in barvalne lastnosti vlaken. Kinetične in termodinamične zakonitosti procesa barvanja le-teh so odvisne tudi od kemijske strukture barvil, različnih tehnoloških postopkov in parametrov barvanja.

Pogosto težavo pri barvanju z reaktivnimi barvili predstavlja močna obarvanost odpadnih barvalnih kopeli, kar je predvsem posledica hidrolize reaktivnih barvil med procesom barvanja. Zato smo se v raziskavi osredotočili na vpliv postopka barvanja (izčrpavanje in impregnacija) in reaktivnega sistema barvil na hidrolizo reaktivnih barvil pri barvanju lanene tkanine. Iz rezultatov dela izhaja, da je količina hidroliziranih in nevezanih barvil odvisna od vrste barvila, njegove kemijske strukture, velik pomen pa ima tudi primeren izbor postopka barvanja.

Ključne besede: lan, barvanje, vinilsulfonska reaktivna barvila, bireaktivna barvila, hidroliza, spektroskopija, barvna metrika

*Flax fibres (*Linum ussitatissimum*) belong to the group of natural cellulose fibres, and their qualities depend on the flax species, fibre/steam parts' separation methods, pre-treatment, dyeing and finishing. When flax garments need to have top-colour fastness, reactive dyes are used for dyeing. Reactive dyes are simple to use and produce brilliant hues, with good wet-colour fastness due to the covalent bonds between the fibres and the dye. Pre-treatment and bleaching of flax fibres influences their hydrophilicity, physical-chemical, and dyeing properties. The kinetic and thermodynamic nature of a dyeing process also depends on the dye's chemical structure, various technological procedures, and the dyeing parameters. A common problem resulting from reactive dyeing is highly-colourated waste dye-baths that result from dye hydrolysis during the dye-*

ing procedure. Therefore, the present research focused on the influences of two dyeing processes (exhaustion and impregnation) and two reactive dye systems on dye hydrolysis during flax fabric dyeing. The obtained results indicated that the amount of hydrolysed and unbound dyes depends primarily on the type of dye and its chemical constitution, and also on selecting an appropriate dyeing process.

Key words: flax, dyeing, vinylsulphone reactive dyes, bi-reactive dyes, hydrolysis, spectroscopy, colourimetry.

Pregledni znanstveni članek *Review*

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Pomen interakcij barvilo-tenzid v barvarstvu

Importance of dye-surfactant interactions in dyeing

V prispevku je predstavljen pomen medmolekulskih interakcij barvilo-tenzid pri razumevanju mehanizma delovanja tenzidov kot egalizirnih sredstev v barvalni kopeli. Prikazani so mehanizmi interakcij med ionskim barvilom in ionskim oziroma neionskim tenzidom, neionskim barvilom in ionskim oziroma neionskim tenzidom ter ionskim barvilom in ionskim tenzidom v prisotnosti neionskega tenzida. Izpostavljen je vpliv različnih dejavnikov, kot so struktura barvila in tenzida, koncentracija tenzida, temperatura, pH, prisotnost elektrolita in prisotnost sotopila, na jakost in stabilnost kompleksov barvilo-tenzid. Slednji namreč neposredno vplivajo na stopnjo adsorpcije barvila na vlakna.

Ključne besede: interakcije barvilo-tenzid, ionska aktivnost, dvokomponentne mešanice, trikomponentne mešanice, vpliv dejavnikov, jakost interakcij.

The importance of dye-surfactant intermolecular interactions for understanding the mechanism of how surfactants act as levelling agents in dyebaths is presented in this paper. The mechanisms of various dye surfactant interactions are presented. The influence of different factors, such as dye or surfactant structure, surfactant concentration, temperature, pH, presence of electrolytes and the presence of cosolvents, on the strength and the stability of the dye-surfactant complex are exposed. The dye absorption onto fibres is directly influenced by the strength and the stability of the dye-surfactant complex.

Keywords: dye-surfactant interactions, ionic activity, binary mixtures, ternary mixtures, influence of factors, strength of interactions.

Strokovni članek *Professional Paper*

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Določitev učinkovitosti protimikrobne apreture na tekstilijah v skladu s SIST-standardi

Determination of the efficiency of antimicrobial finishing on the textiles in accordance with SIST standards

V prispevku so predstavljene standardne metode za določitev učinkovitosti protimikrobne apreture na tekstilijah s poudarkom na tistih, ki jih je izdal Slovenski inštitut za standardizacijo (SIST). Vključujejo kvantitativne in kvalitativne teste za ugotavljanje protibakterijske učinkovitosti biocidov kot tudi biostatov na blagu ter določitev odpornosti tekstilij, ki vsebujejo celulozo, proti mikroorganizmom prisotnih v zemlji. Opisani so uporabnost metod glede na mehanizem delovanja protimikrobnega sredstva in uporabljene mikroorganizme, princip izvedbe testa ter način vrednotenja rezultatov.

Ključne besede: standardne metode, slovenski standard, protibakterijska učinkovitost, protimikrobna apretura, mikroorganizmi.

In this paper the standard methods for determination of the efficiency of antimicrobial finishing on textiles are presented and the standards published by the Slovenian Institute for Standardization (SIST) are emphasized. They include quantitative and qualitative tests for determination of antibacterial efficiency of biocides as well as biostates present on textile, and for determination of the resistance of cellulose-containing textiles to microorganisms in soil. A description of standard methods includes their applicability with respect to the mechanism of the finish antimicrobial activity and the used microorganisms, the principle of method performance and the result evaluation.

Key words: standard methods, Slovene standard, antibacterial efficiency, antimicrobial finishing, microorganisms.