

SINTEZA I KARAKTERIZACIJA NOVIH DISPERZNIH HETEROCIKLIČKIH AZO BOJILA I NJIHOVA BOJADISARSKA SVOJSTVA NA POLIAMIDNOM TEKSTILNOM MATERIJALU

SYNTHESIS AND CHARACTERIZATION OF NEW DISPERSED HETEROCYCLIC AZO DYES AND THEIR DYEING PROPERTIES ON POLYAMIDE TEXTILE MATERIAL

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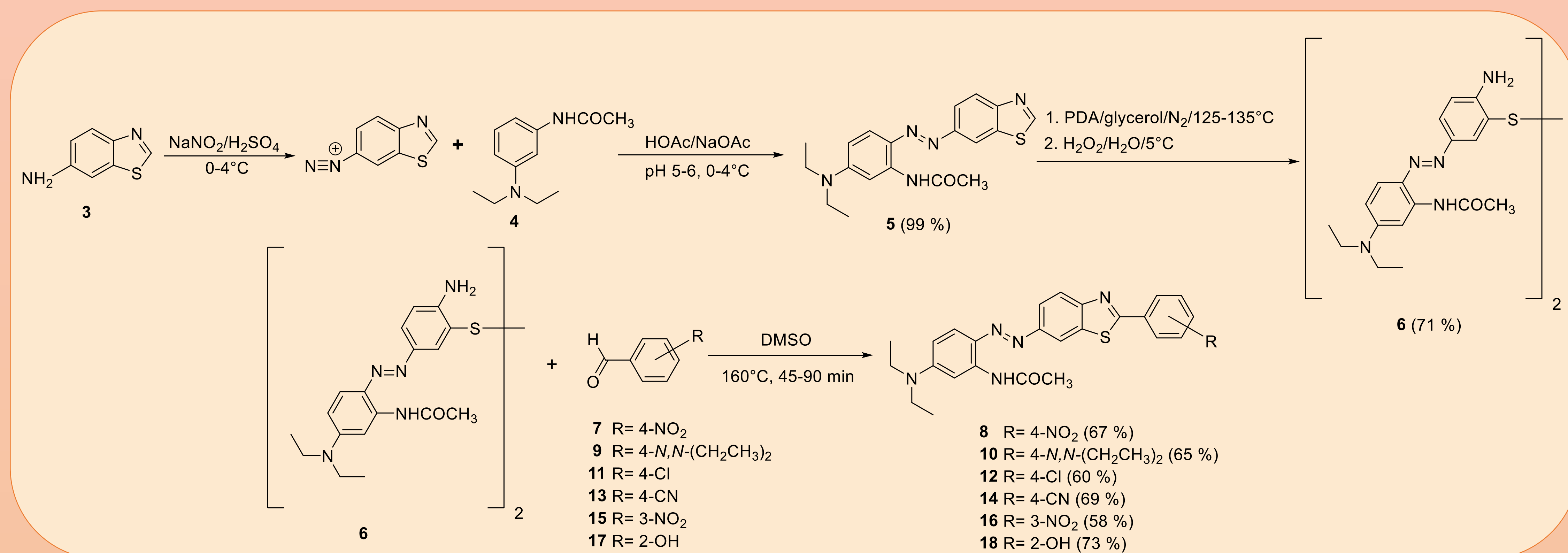
INTRODUCTION

Aromatic and heteroaromatic azo compounds represent the most numerous and diverse group of synthetic dyes, used not only as textile dyes, but also in many other different industry fields: for dyeing various substrates, biological-medical research, in the field of nonlinear optics and optical data storage. Aromatic diazo components, in the synthesis of azo dyes, are increasingly being replaced by heteroaromatic diazo components because the prepared heterocyclic azo dyes show better dyeing properties such as color tone and brightness, and better light fastness compared to the corresponding carbocyclic azo dyes [1,2].

RESULTS AND DISCUSSION

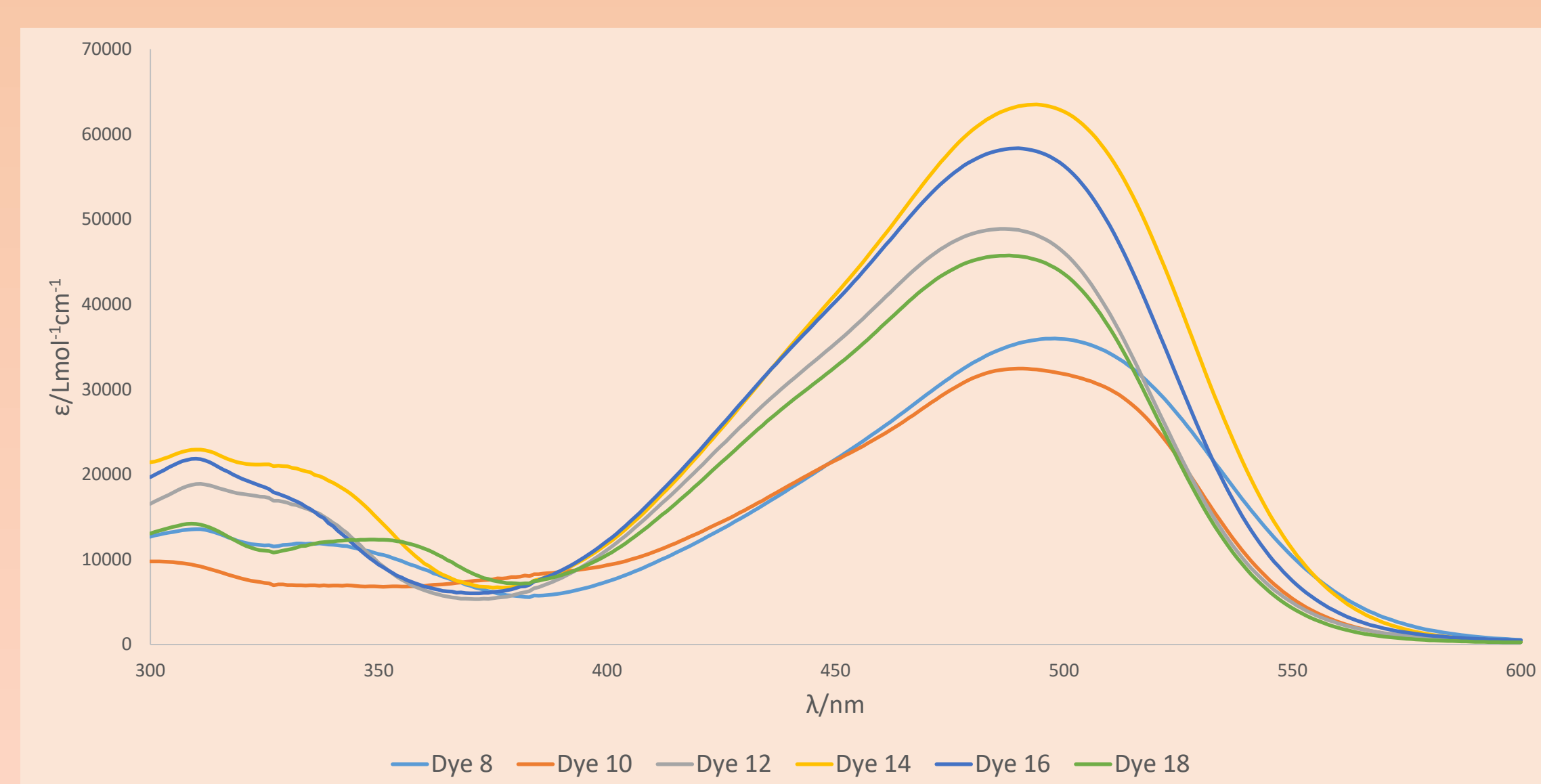
Synthesis

In this work 6-aminobenzothiazole was prepared by a multi-step synthesis starting from benzothiazole, which served as a diazotizing component for copulation reactions on commercially available 3-(*N,N*-diethylamino)acetanilide. The described methods effectively prepared bis-disulfide derivative **6**, which served as a precursor for condensation reactions in DMSO with variously substituted aromatic aldehydes **7-17**. In this way, six previously undescribed 6-azo-2-phenyl-disubstituted benzothiazole derivatives **8-18** were prepared in high yields (Scheme 1). The structure of all prepared compounds was confirmed using ^1H and ^{13}C NMR spectroscopy and mass spectrometry.



Scheme 1: Synthesis of benzothiazole azo-dyes **8-18**

Figure 1: UV-Vis absorption spectrum of benzothiazole azo-dyes **8-18**



Dyeing properties

The obtained dyes **8-18** have been tested as disperse dyes for polyamide (PA) textile material and the corresponding coloured fabrics are showed in Table 1. The dyeing process was carried out on PA textile material at a dye concentration of 0.5 and 0.25% by weight of the material in the dyeing bath. The dyeing showed orange to red-purple colors and very good fastness to washing.

Spectroscopic characterization

The obtained dyes **8-18** show absorption in the visible region (Figure 1). All compounds have molar absorption coefficient values (32440-63490 Lmol⁻¹cm⁻¹) greater than 25000 Lmol⁻¹cm⁻¹ and they meet one of the basic conditions to be considered suitable as a dye.

Table 1: Polyamide (PA) fabrics coloured with benzothiazole azo-dyes **8-18**

	Dye 8 (0.5%)	Dye 8 (0.25%)	Dye 10 (0.5%)	Dye 10 (0.25%)	Dye 12 (0.5%)	Dye 12 (0.25%)
Dyeing						
Washing						

References

- Zollinger H., Color Chemistry: Synthesis, Properties and Applications of Organic Dyes and Pigments, 3rd ed., Wiley-VCH, Weinheim, **2003**.
- Racané, L.; Ptiček, L.; Fajdetić, G.; Tralić-Kulenović, V.; Klobučar, M.; Kraljević Pavelić, S.; Perić, M.; Paljetak, H.Č.; Verbanac, D.; Starčević, K. *Bioorg. Chem.* **2020**, *95*, 103537.