



**Synthesis and Photophysical Characterization of Highly Stable Cyanine Dyes Based on Pyrazolo[5,4-b]pyrido[2,1-c]pyrimidine and Pyrazolo[5,4-b]pyrido[2,1-d][1,3,4] triazepine**

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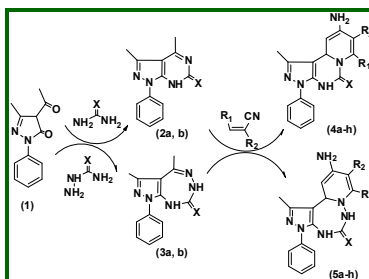
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**ABSTRACT**

Outstanding stable cyanine dyes covering the types of monomethine, trimethine, styryl, azastyryl and apocyanines with absorption band reached to 550 nm have been developed and synthesized. These dyes based on high stable N-bridgehead heterocycles namely Pyrazolo[5,4-b]pyrido[2,1-c]pyrimidine, pyrazolo[5,4-b]pyrido[2,1-d][1,3,4] triazepines as precursors for the synthesis of the target dyes. The absorption spectra properties of such selected dyes were investigated in 95% ethanol to attempt and throw some light on the influence of such new heterocyclic nuclei and to compare or evaluate spectral behaviors. Such Heterocyclic precursors and related dyes were identified by elemental and spectral analyses.

**Graphical Abstract**



Synthetic Routes of N-Bridge head heterocycles.

**Keywords:** N-Bridgehead heterocycles, cyanine dyes, Spectral behavior.