

## ABSTRACT

Six pyrimidine based ligands; 2-*N*-ethylaminopyrimidine (**L1**), 2-*N*-anilinopyrimidine (**L2**), 2-*N*-(*p*-methylanilino)pyrimidine (**L3**), 2-*N*-(*m*-methylanilino)pyrimidine (**L4**), 2-*N*-methylanilinopyrimidine (**L5**) and 2-*N*-piperidinopyrimidine (**L6**) were synthesized and characterized by spectroscopic techniques such as infrared (IR), <sup>1</sup>H and <sup>13</sup>C nuclear magnetic resonance (NMR) spectroscopy and gas chromatography-mass spectrometry (GC-MS). The ligands were then reacted with copper(II) metal ion in a 1 : 2 ratio (metal : ligand) to give their respective complexes. Four complexes have been synthesized; tetra- $\mu$ -acetato- $\kappa^8 O:O'$ -bis{[*N*-ethylpyrimidin-2-amine]copper(II)} (**CuL1**), tetra- $\mu$ -acetato- $\kappa^8 O:O'$ -bis{[*N*-(pyrimidin-2-yl)aniline- $\kappa N$ ]copper(II)} (**CuL2**), tetra- $\mu$ -acetato- $\kappa^8 O:O'$ -bis{[*N*-(pyrimidin-2-yl)4-methylaniline- $\kappa N$ ]copper(II)} (**CuL3**) and tetra- $\mu$ -acetato- $\kappa^8 O:O'$ -bis{[*N*-(pyrimidin-2-yl)3-methylaniline- $\kappa N$ ]copper(II)} (**CuL4**). All copper(II) complexes were characterized by elemental analyses spectroscopic studies and x-ray analysis. All compounds showed fluorescence properties in methanol and DMSO except for tetra- $\mu$ -acetato- $\kappa^8 O:O'$ -bis{[*N*-(pyrimidin-2-yl)3-methylaniline- $\kappa N$ ]copper(II)} (**CuL4**) in DMSO. Capped samples showed higher fluorescence intensity compared to the uncapped samples. The study also showed that the fluorescence intensity of all the ligands are higher than their copper(II) complexes.

## ABSTRAK

Enam ligan berdasarkan pirimidina; 2-*N*-etilaminopirimidina (**L1**), 2-*N*-anilinopirimidina (**L2**), 2-*N*-(*p*-metilnilino)pirimidina (**L3**), 2-*N*-(*m*-metilnilino)pirimidina (**L4**), 2-*N*-metilnilinopirimidina (**L5**) dan 2-*N*-piperidinopirimidina (**L6**) telah disintesis dan dicirikan menggunakan kaedah spektroskopi seperti spektroskopi inframerah (IR), <sup>1</sup>H dan <sup>13</sup>C NMR dan kromatografi gas ó spektroskopi jisim (GC-MS). Ligan yang disediakan ditindakbalas dengan ion logam kuprum(II) mengikut perkadaran 1 : 2 (logam : ligan) untuk menghasilkan kompleks logam yang setara. Empat kompleks logam telah berjaya disintesis; tetra- $\mu$ -asetato- $\kappa^8 O:O'$ -bis{[*N*-etilpirimidin-2-amina]kuprum(II)} (**CuL1**), tetra- $\mu$ -asetato- $\kappa^8 O:O'$ -bis{[*N*-(pirimidin-2-il)anilina- $\kappa N$ ]kuprum(II)} (**CuL2**), tetra- $\mu$ -asetato- $\kappa^8 O:O'$ -bis{[*N*-(pirimidin-2-il)4-metilnilina- $\kappa N$ ]kuprum(II)} (**CuL3**) dan tetra- $\mu$ -asetato- $\kappa^8 O:O'$ -bis{[*N*-(pirimidin-2-il)3-metilnilina- $\kappa N$ ]kuprum(II)} (**CuL4**). Kesemua kompleks logam kuprum(II) dicirikan menggunakan kaedah spektroskopi analisis unsur dan analisis pembelauan sinar-X. Kesemua sebatian menunjukkan ciri pendafluoran dalam metanol dan DMSO kecuali sebatian tetra- $\mu$ -asetato- $\kappa^8 O:O'$ -bis{[*N*-(pirimidin-2-il)3-metilnilina- $\kappa N$ ]kuprum(II)} (**CuL4**) dalam DMSO. Kajian menunjukkan keamatan pendafluoran sampel tertutup lebih tinggi berbanding sampel terbuka. Kajian juga menunjukkan keamatan pendafluoran ligan lebih tinggi berbanding kompleks logamnya.