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Rational design, synthesis and working of a tri-ligating receptor: Removal of cyanide from cytochrome-c-oxidase

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Cyanide, one of the most toxic anions, when exceeds its permissible level of 1.9 μM results in inhibition of mitochondrial electron transport chain (ETC), thus causes the blockage of cellular respiration. Although many methods for detecting cyanide anion have been proposed, only two cyanide receptors- hydroxocobalamin and nitrile/thiosulfate, have been practically applied as antidotes for cyanide poisoning. A compound containing syringaldehyde and oxindole was designed and synthesized. The structure of the compound was elucidated with the help of various 1D and 2D NMR experiments which confirmed the *E*-configuration at the olefinic groups of part A and part B, and *Z*-configuration at olefinic group of fragment C. The compound was evaluated for its ability to bind with cyanide using UV-vis spectroscopy. The enzyme immunoassay confirmed the capability of the compound to free cytochrome c oxidase (cellular target of cyanide) from cyanide by forming complex with CN^-. The rationale for the design of the molecule, its synthesis, response to CN^- and removal of cyanide from the aqueous medium as well as bonded to Cyt C will be presented.

Biography

Sukhmeet Kaur graduated from Guru Nanak Dev University, Amritsar with BSc (Hons Sch) in Chemistry in May 2010. After completing her MSc (Hons Sch) in Chemistry from Guru Nanak Dev University, Amritsar in May 2012, she started her PhD under the supervision of Prof. Palwinder Singh in the same university. Her research interests include synthesis, characterization and biological studies of bioactive molecules and use of computational chemistry in drug design process.

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