

7<sup>th</sup> International Conference and Exhibition on

# Analytical & Bioanalytical Techniques

September 28-30, 2016 Orlando, USA

## DNA binding study of Co (III) complexes of hydroxamic acid and 1, 10-phenanthroline complex

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A large number of transition metal complexes have been used as cleavage agents of DNA and also for novel potential DNA-targeted antitumor drugs. This is essential for further expected applications in many areas like biological gene regulators or cancer chemotherapeutic agents. The identification of metal complex-DNA interaction is of fundamental importance to understanding the molecular basis of therapeutic activity. Metal complexes are well known to accelerate the drug action and the efficiency of a therapeutic agent can often be enhanced upon coordination with metal ions. The pharmacological activity has also been found to be highly dependent on the nature of the metal ion and the donor sequence of the ligands, as different ligands exhibit different biological properties. In the present work a new Co (III) complexes of mixed ligands, 1, 10-phenanthroline (phen) and hydroxamic acid ( $L_1 = \text{AHA}$  (aceto-hydroxamic acid), and  $L_2 = \text{BHA}$  (benzohydroxamic acid) were synthesised and characterized by NMR, IR, UV-visible and elemental analysis. In the complexes,  $[\text{Co}(\text{phen})_2L_n]$  ( $L_n = L_1, L_2$ ), the metal ion is coordinated by six atoms, two oxygen atom from hydroxamic acid and 4N atom from co-ligand 1, 10-phenanthroline to form octahedral Co(III) complexes. The interaction of these complexes with calf thymus DNA has been investigated by absorption spectroscopy and fluorescence spectroscopy.

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## The effect of pH on the partitioning of polychlorinated biphenyls (PCBs) between sediment grain sizes and water

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In natural environmental media organic pollutants (OPs) undergo partitioning with particulate matter (PM) and dissolved organic carbon (DOC) in water, and with surface sites on the sediment particle material with which the water is in contact. The sorption of organic pollutants within the environmental media is one of the significant factors affecting (in most cases controlling) the distribution, transportation and fate of the pollutant as well as the remediation of polluted water within the aquatic ecosystem. The aim of this research was to investigate the effects of pH on the phase partitioning of organic pollutants such as PCB congeners between the aqueous phase and various modeled sediment grain sizes. A model sample of sediment was sieved into five grain sizes, <75  $\mu\text{m}$ , 100  $\mu\text{m}$ , 200  $\mu\text{m}$ , 300  $\mu\text{m}$  and 425  $\mu\text{m}$ , respectively. The surface areas as well as pore volume distributions of the different sediment grain sizes were determined using BET-adsorption/desorption isotherms. The surface areas as shown by BET-adsorption isotherms were between 0.688-14.361  $\text{m}^2/\text{g}$  (425  $\mu\text{m}$ -75  $\mu\text{m}$ ). The organic carbon content was determined using the Walkley Black method. The organic carbon content was found to be greater on the smaller sediment grain size of 75  $\mu\text{m}$  and least in the 425  $\mu\text{m}$  grain size (2.94 to 11.43 %). Laboratory batch experiments were used to evaluate the adsorption/desorption as well as the adsorption ratio of the soil/sediment ( $K_d$ ) within the different sediment grain sizes. The results showed that soil grain size of <75  $\mu\text{m}$  showed the most adsorption of PCB congeners, in the range of 79.90-89.97 % while a sediment grain size of 300  $\mu\text{m}$  showed lowest adsorption between 32.60-64.14 %. This could be attributed to the fact that sediment grain size (75  $\mu\text{m}$ .) with high surface area adsorbed more of the analytes compared to other sediment grain sizes. Also, the higher organic content associated with the 75  $\mu\text{m}$  grain size further allows for more partitioning of the organic pollutant to the sediment. The effect of pH on the sorption capacity of the sediment grain sizes was also studied. A pH of 6.5 showed the highest percentage adsorption. This was due to the non-polar PCBs preferring to partition to the sediment at near neutral pH.

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