Porphyrin Adsorption by Clay Minerals

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Abstract: A study was undertaken to investigate the adsorption of hemin, protoporphyrin and hematoporphyrin by kaolinite and a Ca-montmorillonite in aqueous solutions buffered at pH 4 and 9.

Although experimental restrictions at pH 4 prevented the complete characterization of the adsorption isotherms, kaolinite did exhibit a saturation of exchange sites by the cationic porphyrins. Both kaolinite and montmorillonite displayed a similar saturation of sites by the porphyrins in their anionic forms at pH 9. The major differences in the adsorption isotherms are attributed to differences in the exchange capacities of the clays.

Adsorption of the porphyrins at pH 9 was inhibited largely by phosphate treatment of the clays; this effect is interpreted as blockage of the anion exchange sites by irreversibly-bound phosphate.

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