

---

# The Interaction of Polysaccharides with Silver Hill Illite

Baohua Gu and Harvey E. Doner

Department of Soil Science, University of California, Berkeley, California 94720

**Abstract:** The clay-polysaccharide interaction is of practical importance in the formation and stabilization of soil aggregates. This study examined the adsorption of three synthetic polysaccharides (PSS) and one soil PSS on Silver Hill illite. The adsorption of PSS was influenced by both the adsorbed cations on the adsorbents and the charge characteristics of the polymers. The adsorbed cations formed different surface complexes with the clay surfaces, with varying ability to screen the surface negative charge and thereby influenced the adsorption of charged polymers. Na-illite adsorbed substantially higher amounts of the cationic PSS, but lower amounts of the anionic PSS, than hydroxy-Al illite. The adsorption of the nonionic PSS was, however, little influenced by those adsorbed cations. The adsorption of the soil PSS resembled that of anionic PSS. However, it yielded linear adsorption isotherms due to the heterogeneous nature of the soil PSS. The adsorption of the three synthetic PSS on Na-illite was in the general order: cationic > nonionic > anionic, confirming that electrostatic forces played a role in the adsorption of charged polymers. pH and ionic strength influenced the adsorption of the charged PSS, because of their influences on the charge characteristics of both the polymer and the clay, and on polymer conformation. This study indicates that surface charge properties of both clays and organic polymers and the presence of polyvalent cations in the system are important factors influencing the complexation between soil clays and organic constituents.

**Key Words:** Adsorption • Illite • Ionic strength • pH • Polysaccharides • Polyvalent cations

*Clays and Clay Minerals*; April 1992 v. 40; no. 2; p. 151-156; DOI: [10.1346/CCMN.1992.0400203](https://doi.org/10.1346/CCMN.1992.0400203)

© 1992, The Clay Minerals Society

Clay Minerals Society ([www.clays.org](http://www.clays.org))

---