

Spectroscopic Study of Host-Guest Inclusion Complexes

Author: Jenessa Lucas and Jennifer Holt

Affiliation: Chemistry

A host-guest complex is formed by a host molecule encapsulating a guest molecule within it. The host materials in this study are basket-shaped structures, known as cyclodextrins, which can easily incorporate a variety of guests, such as drug molecules. These inclusion complexes made with cyclodextrins and drugs can be developed to have different release rates within the body. The cyclodextrin can be used to protect the drug until it reaches its destination within the body. This study focuses on Brooker's merocyanine (BM) as the guest molecule, since it has a similar structure to stilbene-related drugs. UV/Vis and fluorometer spectroscopic studies have shown that β -cyclodextrin (B-CD) and 2-hydroxypropyl- β -cyclodextrin (2-HP-B-CD) formed 1:1 inclusion complexes with BM. The binding equilibrium constants, K_{eq} , for the inclusion complexes formed with BM in B-CD and 2-HP-B-CD were approximately $450M^{-1}$ and $250M^{-1}$, respectively. The latter value was smaller due to influential steric effects between the B-CD and BM. B-CD was used to confirm that our methodology of testing was accurate based on previous studies found K_{eq} to be $430M^{-1}$. (Hamasaki et al. J. Incl. Phenom. Mol. Rec. Chem. 13, 349-359 (1992)).

Information about the Author:

I chose to become a part of this research because it instantly caught my attention when I found out that these cyclodextrins had unique basket-shaped structures that could capture other materials within it. I started this project in Spring 2012, and will be continuing to do so until my graduation in May 2013 when I graduate with a double major in Chemistry and Mathematics. After graduation, I would like to pursue a career in experimental chemistry, and then later on attend grad school.

Faculty Sponsor: Jennifer Holt

Student Contact: jenessa.lucas@valpo.edu