Amal Abdulrahman, J Clin Trials 2018, Volume 8
DOI: 10.4172/2167-0870-C3-029

7th International Conference on CLINICAL TRIALS
&
12TH WORLD CADD & DRUG DELIVERY SUMMIT
September 24-26, 2018 | Chicago, USA

A new perspective for possible formulation and characterization of beta- cyclodextrin/ poly(ethylene glycol) crystalline inclusion complexes

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In literature, there is a disagreement regarding whether or not β-CD forms inclusion complexes with Polyethylene Glycol (PEG). In a publication in 1993 Harada et al. reported the complexation between CDs with several polymers including PEG. They reported PEG forms inclusion complexes with α-CD and γ-CD; however, it does not form such complexes with the β-CD. Researchers still agree and cite this article to continue the classification of PEG as being impenetrable within the β-CD cavity. However, there is one communication in 2000 reported the formation of the crystalline complex between PEG and β-CD demonstrating this via a single crystal preparation. However, this work did not report the used molecular weights of PEG/PEO. Furthermore, most PEGs/PEOs have a distribution of molecular weight suggesting that preparing a single crystal for a mixture of molecular weights would be difficult. One plausible explanation for β-CD/PEG single crystal formation is the complexation method. As a next step to our report on the inclusion complexes of β-CD with β-sitosterol, we prepared β-CD crystalline inclusion complexes with different molecular weights of PEG. The suggestion of the formation of β-CD/PEG inclusion complexes was supported by NMR, FTIR, X-Ray diffraction, and SEM. The study clearly demonstrated the formation of crystalline inclusion complexes in the solid state, and via 2-D NMR spectroscopy, in the solution state, that the methylene protons of the PEG repeat units interact with both the internal and external protons of the β-CDs. The examination of drugs solubility in water is as an example of our future work.

Biography

Amal Abdulrahman has completed her Bachelor's Degree from King Khalid University in Saudi Arabia, and Master degree from Clark Atlanta in the USA. She has worked as a teaching assistant at King Khalid University, Clark Atlanta University, and Spelman College. Currently, she is pursuing her PhD degree with guidelines of her advisor: Dr. Ishrat Khan. She was invited to write a review paper on drug delivery using host-guest interactions through cyclodextrins....

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