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Water inclusion effect on starch 1500 as an excipient used in the production of the oral solid dosage form

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Starch 1500 is a well-known diluent, binder, disintegrant and dissolution enhancer, which is widely used in the formulation of the oral solid dosage forms. To validate the proposed hypothesis that whether Starch 1500 preserves the chemical hydrolysis of the moisture sensitive drugs, the understanding the sorption-desorption behaviour of this excipient is the first challenge. Water molecules when interacting with most of the pharmaceutical excipients and APIs localise within the crystalline part of the physical structure. Specifically, for starch-based excipients, crystal regions of the structure host the water molecules within the double-stranded helices of the crystallite. DSC TGA, FTIR-ATR and NIR techniques were adopted to determine the freezable and nonfreezable bound water with starch 1500, both qualitatively and quantitatively. Among different mathematical models, Young and Nelson model have not well practised compared to the other available models, such as BET, GAB, Oswin and Smith models. It was found out that Young and Nelson model along with the GAB theory well carver the sorption isotherms. The variable parameters obtained from these two equations were compared and the monolayer value was estimated. The amount of monolayer coverage with

the assumption of the strength of the binding of the water molecules on the first accumulated layer was correlated with the total water content of the Starch 1500. Analysis of the strength of the hydrogen bonds between Starch 1500 and the water molecules, mobility and the availability of the reactive water molecules to take part in chemical hydrolytic reactions could be explained.

Speaker Biography

Saeid Rajabnezhad is a registered pharmacist since 2009. Beside working as a community and hospital pharmacist, his main professional activities are formulation development, quality control and production of oral solid dosage forms as an industrial pharmacist. He has served various roles such as R&D, QC and deputy of production manager in several pharmaceutical companies. He was then joined the research group of Prof Ali Nokhodchi at the University of Sussex, UK as a PhD researcher. His research is funded through the University of Sussex and Colorcon Ltd. Saeid is in his final year of PhD programme. He has published several articles in peer-reviewed pharmacy journals in pharmaceutical technology, drug delivery and nanoparticulate matters, powder engineering, characterisation as well as analytical method development.

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