An Application of Hyperspectral Image analysis: a novel approach to cleaning validation in the Pharmaceutical Industry

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Abstract

In pharmaceutical manufacturing when a tank is used for mixing Active Pharmaceutical Ingredients (APIs) and excipients together it must be cleaned regularly. This cleaning is conducted in order to reduce risks to consumers. This subsequent cleaning procedure is subject to validation. The validation must quantify the levels of residues expected after cleaning. It is worth noting these residues may consist of the cleaning agents themselves. Current cleaning validation methods can be slow. This project involves the development of a high speed approach to cleaning validation in the pharmaceutical industry via the development of a hyperspectral imaging system. A hyperspectral image consists of a stack of images taken of the same object at a series of different wavelengths along the electromagnetic spectrum. This project focuses on the Near Infrared (NIR) region with wavelengths between 1000nm to 2500nm.