

# **The Use of Near Infrared and Microwave Sensing for On-line Real Time Monitoring of Moisture Content and Composition of Powder Blend**

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Online process analytics has been a topic of interest by pharmaceutical companies as a method of determining how operating parameters affect the final quality of their products. One form of online process analytics that has been found to be effective is microwave sensing. While it has been found that microwave resonance sensing can be used to measure parameters such as moisture content and density, it has yet to be discovered if such sensors have the ability to measure changes in content uniformity of raw materials pharmaceutical companies use. Data was collected using a spin riffler fitted with a microwave sensor and a near infrared probe (NIR) (more commonly used method of monitoring) that is to be tested against. Various known compositions mixtures of acetaminophen (APAP) and microcrystalline cellulose (MCC) powders were created and tested for content uniformity and moisture content by passing it over the sensor. The raw data was passed through MATLAB's neural networks software and a calibration model was created for content uniformity that can be used to predict values. Upon analyzing the data, it was found that an accurate reading of composition uniformity could be determined using a microwave sensor. The model created aided in determining the composition of unknown blends of powder and proved to be accurate. This calibration model will serve as a contribution to the ongoing research being performed in online process analytics. By utilizing these techniques, pharmaceutical companies have the ability to more efficiently analyze their products in an online real-time process.