

### Sample Description

Delivered dose from a dry powder inhaler fluticasone/salmeterol collected from 3 acutations, on stage 3 of a Next Generation Impactor NGI.

### Purpose of Analysis

To determine particle size distribution, of different components of the formulation. The analysis is limited on 2-10µm particles.

### Procedure

The Single Particle Explorer® was set to 3 seconds exposure time per particle. Size range between 2-10µm and a scan area of 1x1 mm. Scan resolution 0.3 µm/pixel.

Particle size and shape is obtained from imaging analysis of 48 individual images. Image Directed Spectroscopy analysis and the particle with Raman 532 nm / 5mW laser, beam for a time of 5 s.

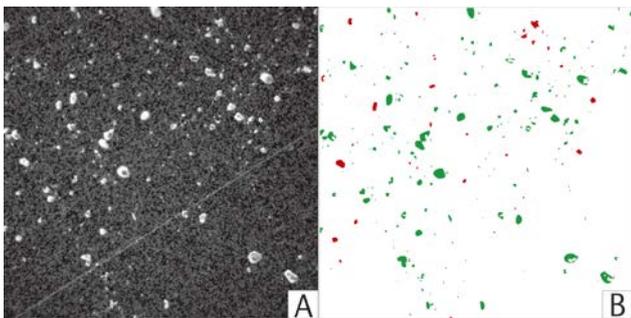


Figure 1: Image of one field of view [A] with the according binarized image analysis results [B]

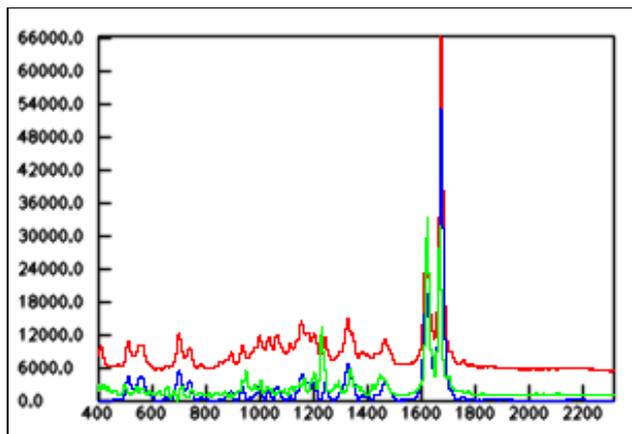


Figure 2: 5s exposure original spectra of one fluticasone particle (red), proceeding spectra (blue) match with Rank: 919 fluticasone library spectrum (green).

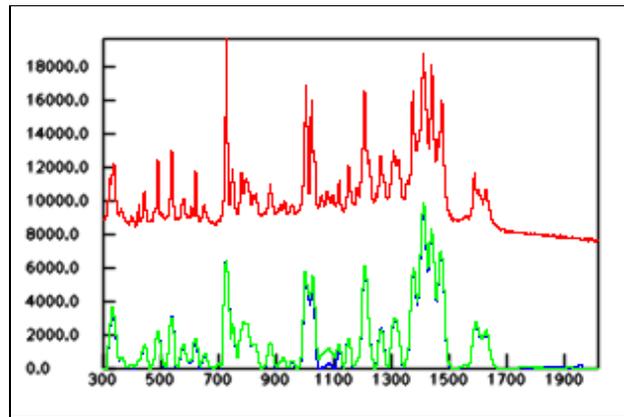


Figure 2: shows the reference salmeterol Raman (785 nm) spectra after 30s exposure time.

The system was programmed to identify 15000 particles between 2-10 µm. The Raman spectrum of particles in the desired size range was obtained and interpreted automatically, through an internal comparison with the Raman spectra library.

### Results Summary

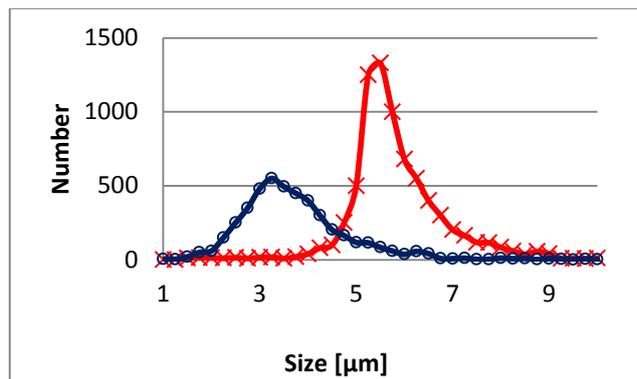


Figure 3: chemically specific particle size distribution from 12148 measured particles red=fluticasone, blue=salmeterol

The Single Particle Explorer® identified 12148 particles with more or less lactose attached to them, as one of the two components. 452 particles were recognized as mixtures from saleterol and fluticasone. 2399 identified as lactose only.

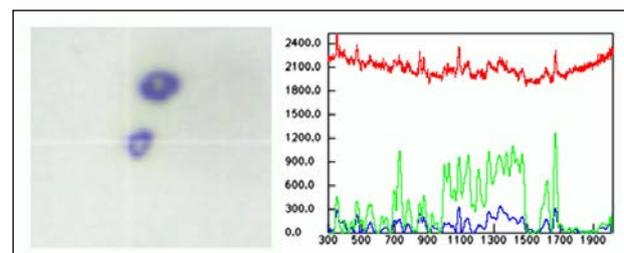


Figure 4: Spectra of 4.5 µm Particle with the chemical composition of a mixture of fluticasone/salmeterol