

# Novel Application for Next Generation Impactor (NGI) – Leachable Screening in pMDI Systems

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## INTRODUCTION (1)

The Next Generation Impactor (NGI) is rapidly becoming the impactor of choice for the determination of aerodynamic sizes droplets generated from inhaled therapy aerosols like pressurised Metered Dose Inhalers (pMDIs). The NGI is a high capacity impactor which also makes trace component analysis possible due to its unique collection cup design.

The aim of this study was to assess whether the NGI could be used to characterise the aerodynamic potential of leachable species that are commonly found in commercial pMDI formulations

## INSTRUMENTATION (2)

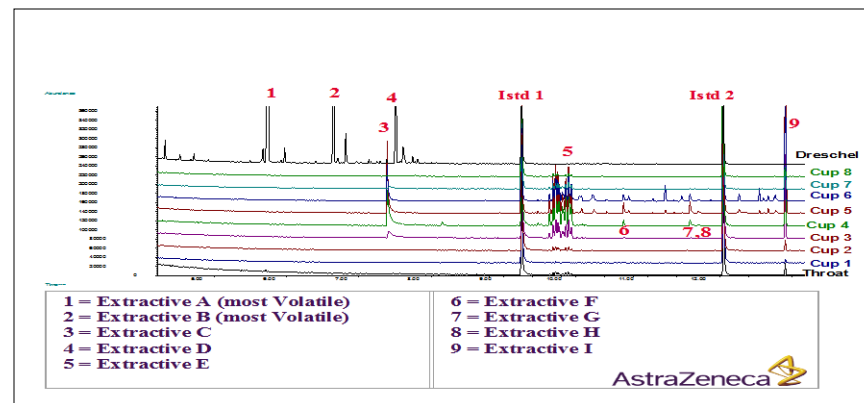
- NGI Equipped with Dreschel bottle containing Iso propyl alcohol (IPA)
- pMDIs containing development formulation spiked with a range of commonly encountered leachable species
- Agilent HP6890 Gas Chromatograph equipped with a HP5973 Mass Selective Detector



## METHOD (3)

A known volume of a solution containing nine potential leachable species at concentrations significantly higher than normally encountered was added to a number of pMDIs. The cans were then pressure filled with a development formulation using a standard filling procedure and allowed to equilibrate for 2 weeks. After equilibration 50 actuations were sampled using the NGI operating with a flow rate of 30 L/min. Due to the high volatility of some of the leachable components screened, a Dreschel bottle 'liquid trap' was connected downstream of the NGI to assess for any breakthrough. The collection cups were washed with dichloromethane and the resulting solution was analysed using Gas Chromatography with Mass Spectrometry (GC-MS) running in scan mode.

## RESULTS AND DISCUSSION (4)



The overlaid chromatograms shown above illustrate that the added leachable have been isolated on the cups of the NGI. And that they are present in droplets that form part of the respirable fraction of the aerosol.

The more volatile species have travelled through the impactor and are trapped in the Dreschel bottle liquid trap

## CONCLUSION (5)

This study demonstrates that the improvement in sensitivity offered by the NGI layout can allow for more detailed investigative work to be carried out on the nature and properties of pharmaceutical aerosols.

Application of GC-MS to NGI derived samples can allow us to gain a better understanding of the aerodynamic properties of leachable components that can be present in pMDI formulations. It is however possible that more volatile components may travel through the impactor without detection if a suitable trap is not placed downstream of the NGI.