SCAN RDI PROTOCOLS FOR ENVIRONMENTAL MONITORING

PIONEERING DIAGNOSTICS

BIOMÉRIEUX INDUSTRY

Menu

- Surface monitoring using ChemSwab
- Air Monitoring using Coriolis® µ
- Bioburden in raw materials and intermediates

Menu

- Surface monitoring using ChemSwab
- Air Monitoring using Coriolis® µ
- Bioburden in raw material and intermediates

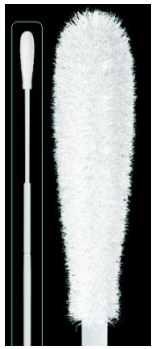
Surface monitoring using ChemSwab

- ChemSwab's properties
- Scan*RDI*® analysis

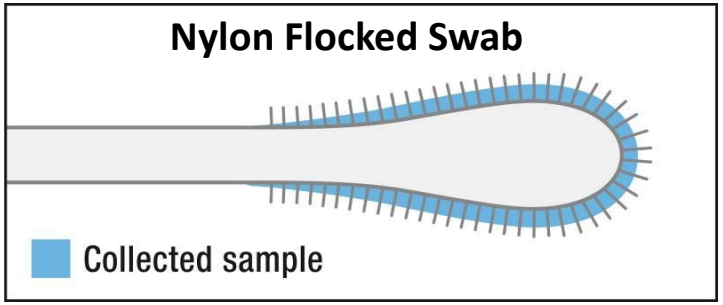
BIOMÉRIEUX INDUSTRY

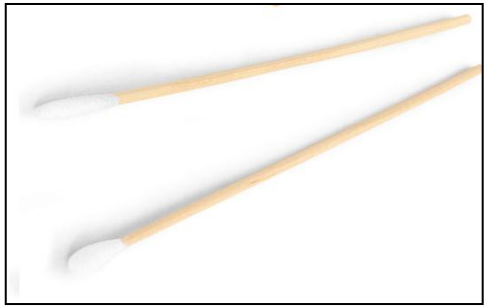
ChemSwab's properties

- Quantitative rapid surface monitoring using ChemSwabs (Flocked Fiber swabs) and Scan*RDI*® rapid method



+





Classical Swab

- SWAB RECOVERY CAPACITY
  - **Recovery from flocked swabs in terms of bacterial cfu in upto 3 TIMES GREATER than traditional swabs, either following direct plating or eluting the analyte (60% versus 20%).**
- SWAB RELEASE CAPACITY
  - **Flocked swabs release in terms of bacterial cfu in upto 4 TIMES GREATER than traditional swabs, either following direct plating or vortexing procedures (90% versus 20%).**

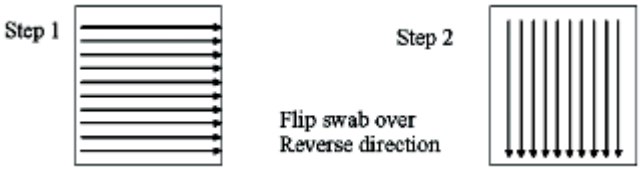
Ref: GSK Article in PDA Journal

Scan RDI analysis

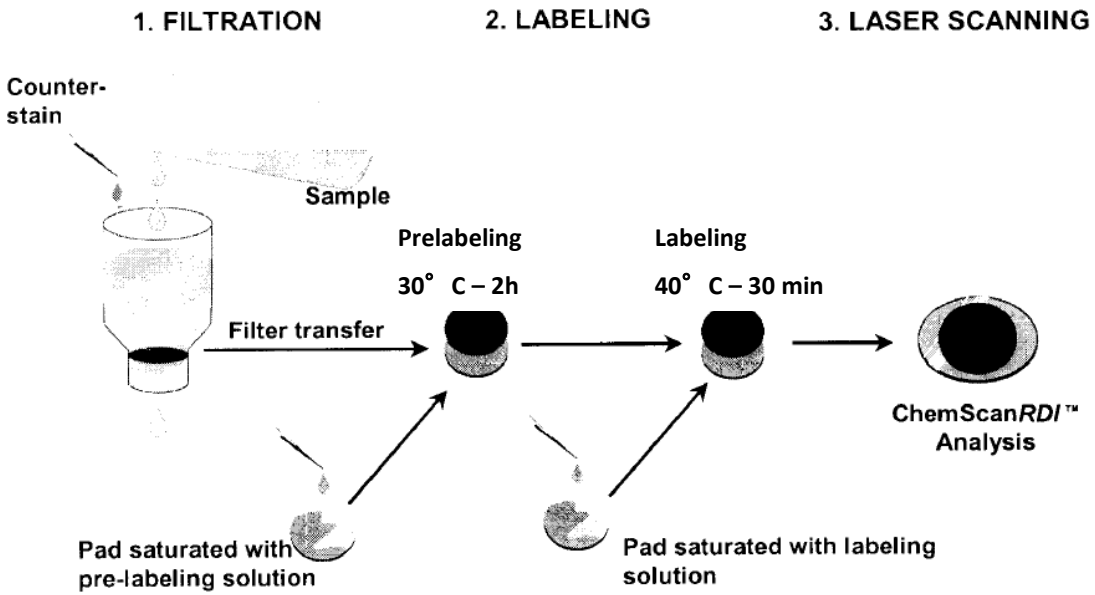
Surface sampling

ChemSwab + ChemSwab SRK

Moist the ChemSwab into the ChemSwab SRK solution



Transfer the ChemSwab into the ChemSwab SRK tube – perform 10 turn



Air Monitoring using Coriolis®µ

The Coriolis®µ

BIOMÉRIEUX INDUSTRY

The Coriolis®µ

Portable air sampler for bio-aerosol collection

- Solution for airborne microorganisms collection in areas where low level of particles is required such as clean rooms

- Parameters can be easily set up
  - Collection time ranges from 1 min to 2 h
  - Air flow rates up to 300L/min
  - 10min to get up to 3m3 - <4 min to collect 1 m3
- Single use cones, provided sterile, guarantee no cross contamination

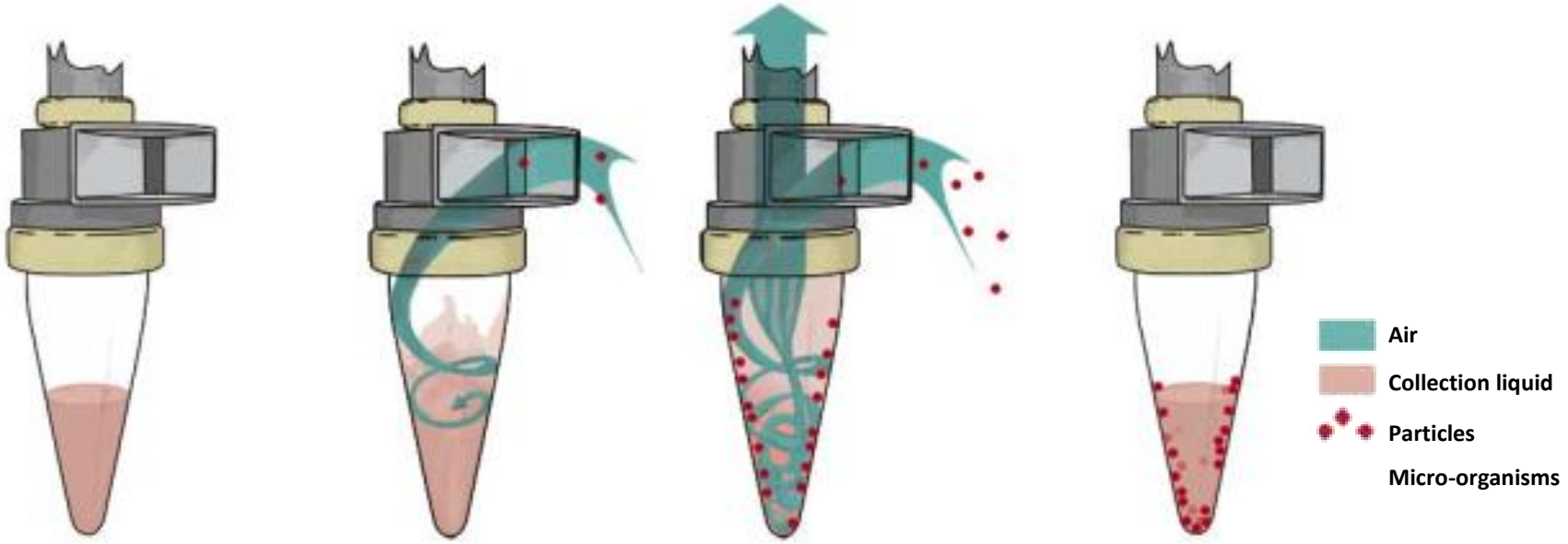
Results in few hours combining Coriolis®µ with Scan*RDI*®

coriolis

bertin TECHNOLOGIES

+

Operating principle of the technology



Before collection

Cone ready to use with the adapted collection liquid

During collection

1. **Vortex beginning**

Air and particles come into the cone forming the vortex

2. **During the vortex**

Aspirated particles are centrifuged

with the liquid on the cone's inner surface

After collection

Particles concentrated in the liquid

coriolis-airsampler.com
generation AIR SAMPLER
& reliable air control

Evaluation of Coriolis® microbial air sampler coupled with RMM
Alternative solution for rapid airborne contamination control

Pfize

Abstract

nmental contamination control in cleanrooms, Bertin Technologies (France) has developed a technology dedicated to the monitoring of articles. The goal is to propose a sampling method compatible with Rapid Microbiological Methods (RMM) in order to get reliable & specific ackle the impact on pharmaceutical production of time-to results within impaction method.
bial air sampler has been validated according to ISO14698-1 in terms of physical and biological efficiencies (HPA study – July 2008) : the ow the Coriolis® μ is as efficient as the traditional method and even better for high particles diameter (results available on www.coriolis-r.com).
munex has also validate a protocol coupling Coriolis® μ with ScanRDI® (cytometry) and allows to get the results in only 3 hours (from step to results). This study aims at completing this data and at testing different RMMs on the samples collected with Coriolis® μ.

Context

robiological quality control of environments aims at ensuring the **quality of products** in case of cleanrooms production / **health and safety** of workers and exposed people.
& reliable measurements of microbial contamination depend on the choice of an adapted air sampler / a representative sample from olled environment / the limitation of losses due to a failure of the sampler to capture particles containing micro-organisms or to due to n of viable micro-organisms during collection so that formation of visible colonies on agar surfaces will not occur.

ective : realize the feasibility study of the Coriolis® μ air sampler coupled with RMM (Scan RDI) in o implement it as a **new solution for rapid investigation** in case of contamination and for **e monitoring in production sites.**

Material & methods

ampling has been carried out in one of the Micro Lab using either traditional air sampler (impactor) or Coriolis® μ. Samples with the Coriolis® μ were further processed by filter-plate or ScanRDI method (RMM).

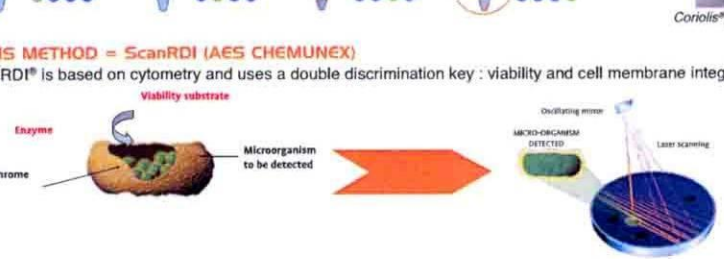
MPLERS = impactor vs Coriolis® μ (Bertin Technologies)

lis® μ air sampler is based on a patented cyclonic technology: it concentrates airborne particles id collection media.

Coriolis® μ, Bertin Technologies

S METHOD = ScanRDI (AES CHEMUNEX)

RDI® is based on cytometry and uses a double discrimination key : viability and cell membrane integrity.



rds : biocontamination – airborne particles – microbial air

Results

Experiment A = comparison of Coriolis® μ and impactor (table 1)
- Different areas controlled, equipments placed side by side, 2 replicates
- Filtration of the whole sample from Coriolis® sampling (0,45μm filter) + filter placed on TSA agar plate
- Incubation of plates 20-25°C for 72-96h + 30-35°C for 48-72h

Experiment B = Coriolis® μ sampling and ScanRDI detection (table 2)
- Each liquid sample from Coriolis® splitted in A&B aliquots
  - A = filter plate method
  - B = filtered and analysed with ScanRDI

Table 1 - the impactor and Coriolis® μ give equivalent results on the air samples in the lab

Samples	Impaction	Coriolis® + filter plate
Biohood	0	1 M
Biohood	0	0
Counter top 2	6 (4 M +2 B)	2 B
Counter top 2	4 (2 M + 2 B)	1 M
Counter top 3	6 (3 M + 3B)	8 (7 M + 1 B)
Counter top 3	2 B	6 (3 M + 3 B)

M = Mold – B = Bacteria

Table 2 - ScanRDI analysis gives higher counts than the plate method does, especially for contaminated air sam

Samples	Coriolis® + Scan RDI	Coriolis® +filter pla
Biohood	0	0
Biohood+hands	1	0
Counter top 3	9	2 (1 M + 1
Counter top + walking	66	7 (3 M + 4
Counter top + hands	103	8 B

These higher results are partly due to the viable but non-c (VNC) microbials present in the air which can not be detec traditional impaction method allthough they can be path

Discussion

Liquid sample → Access to alternative methods → Rapid results (RMM beyond cultivable flora)

The Coriolis® system is an easy to use portable air sampler that collects air samples into liquid media. This **allows quick m detection when coupled with RMM technologies** as demonstrated into this study.

The feasibility study conducted in Saint-Louis Micro Lab indicates that Coriolis® system collects airborne microorgar comparable amount to the impaction system does. ScanRDI can be used as Rapid Microbiology Method coupled with collection in order to give rapid results (around 3 hours from sampling to result). It is also shown here that the ar microorganisms detected with the ScanRDI is higher than with the traditional method as far as it is not based on cultivabili viability; appropriate alert and action limits may thus need to be re-evaluated for ScanRDI results. This couple of innovative fits for the Environmental Monitoring application and could be implemented **for investigation and routine monitoring** in pr sites and in critical areas and **cleanroom environments.**

Acknowledgement

- Pfizer study Team: Dr Lin Chen (responsible of the study), S. Fennel
- Bertin Technologies: Alexandra Guerin, Quitterie Desjonquères
- AES CHEMUNEX: Pierre Barbez

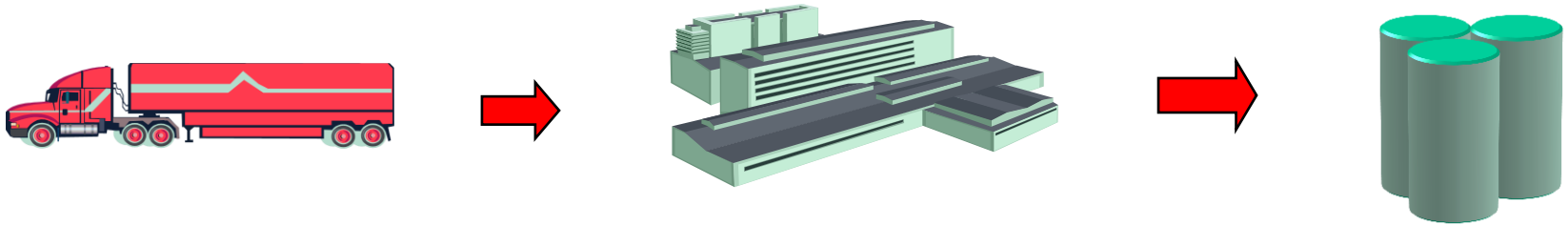
Bioburden in raw materials and intermediates

- Moving microbial controls from Product to Process
- Pharmaceutical products already tested
- Process Analytical Technology concept : PAT
- Recent Case of implementation for PAT
- Use of the Scan*RDI*® in pharmaceutical industries

BIOMÉRIEUX INDUSTRY

Moving microbial controls from Product to Process

- **Microbial quality of incoming raw materials**
- **Bioburden on bulk solutions**
  - Fast analysis of bulk products before filling
  - Fast turnover of production tanks
  - Fast detection & localisation of contamination



Pharmaceutical products already tested

- Analgesics
- Antibiotics
- Contact lens washing solutions
- Detergents and cleaning products
- Antiseptic solution
- Heparin
- Nasal solutions
- Peritoneal dialysis solution
- Sugar solutions
- Vitamins

Process Analytical Technology concept : PAT (1/2)

Implementation of PAT Concept (Process Analytical Technology)

- PAT Goals :
  - Better Control of Process
  - Improve Quality of end products
  - Real time end product release (no need for end product testing)
  - Save money in production
- Real Time In Process Microbiological Control
- Better Sensitivity with Rapid Micro Methods (RMM)
- **How useful is microbiological testing of end product ?**
  - Lot : 0.1% defectives ➔ 10 samples analyzed : Probability of detection ~ 1%
  - Lot : 20% defectives ➔ 10 samples analyzed : Probability of detection ~ 35%

Process Analytical Technology concept : PAT (2/2)

- **Improving sampling sensitivity**
  - Air and gases
  - Surfaces and personnel
- **Implementation of Rapid Micro Technology**
  - Selecting the suitable for the purpose
  - Defining and appropriate strategy
- **Moving microbial controls from Product to Process**
  - Microbial quality of incoming materials : Raw material testing and In-process Bioburden
  - Environmental monitoring : Air and surface monitoring
  - Water for pharmaceutical use

Recent Case of implementation for PAT (1/2)

- **Non sterile nasal product**
- **Deployment of environmental monitoring, intermediates and waters data for Real Time Release (RTR) of drug products manufactured under conventional aseptic process**
- **6 critical points from risk analysis**

Recent Case of implementation for PAT (2/2)

- **Process Water ➔ *Scan RDI®* – 90 min**
- **Bulk product ➔ *Scan RDI®* – 3h**
- **Surface *Scan RDI®* – 3h**
- **Air ➔ Others RMM – 24h**
- **Filled Vials ➔ *Scan RDI®* – 3h**

This manufacturing site receives FDA inspection and formal approval in July 08 to use *Scan RDI®* system as a part of a rapid microbiological in-process monitoring of a non sterile product eliminating the need for end product microbial testing prior to release.

Use of the Scan*RDI*® in pharmaceutical industries

Companies which had an approval for the use of the *Scan RDI*® in routine:

- GSK — PAT concept Nasal Spray Bioburden & Swab
- GSK — Process water
- AstraZeneca — Process water
-…

Companies which are using the *Scan RDI*® for water testing : 49 customers

General conclusion

- Rapid detection of incidents
- Immediate response to contamination incidents
- Rapid confirmation of corrective action effectiveness

- Decrease inventory holding and warehouse costs
- Decrease product losses
- Minimise production disruption
- Increase production flexibility
- Increase profitability