

Background

In an onion, garlic and shallot packing plant, **large amount of dust is visually noticed** and measurements were envisaged. Because vegetables present frequently soil residue and rots, **bioaerosols measurements were also planned** in order to characterise operator's exposure.



Methodology

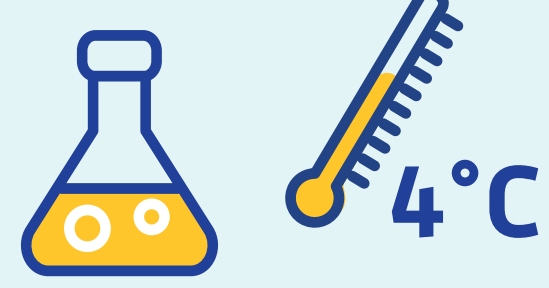
Personal samples (breathing zone)

- 6 workers
- onion sorting and/or packing stations
- inhalable dust
- endotoxins
- microorganisms

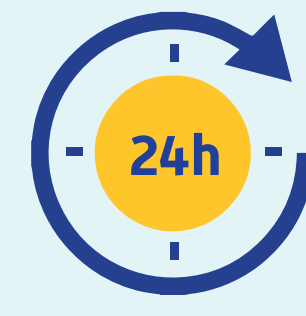


Ambient samples (at breathing zone height)

- Near sorting station: microbial flora
- Between packing lines: inhalable dust, endotoxins, microbial flora.
- Outdoor control in non-contaminated area



After proceeding, samples were stored at 4°C until analysis happened in less than 24h



Measurement results



- **Dust levels:** <math><10 \text{ mg/m}^3</math> = OELV, for all personal and ambient samples.
- **Endotoxins levels:**
 - from 1,107 to 2,118 UE/m³, for all personal samples (sorting or packing).
 - 980 UE/m³ for ambient samples between packing lines.



- **Microorganisms levels:**
 - 15.5x10⁶ and 24.6x10⁶ UFC/m³, at sorting stations,
 - 13.8 x10⁶ UFC/m³ at ambient samples point between packing lines,
 - <math><10^3</math> UFC/m³ for the control.



EXPOSURE OF ONION PACKERS TO INHALABLE DUST AND BIOAEROSOLS: METROLOGY AND PREVENTION MEASURES

Example of assistance by Biocontaminants Laboratory (LBC) of Cramif

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Recommendations

It is recommended to reduce employees' exposure:



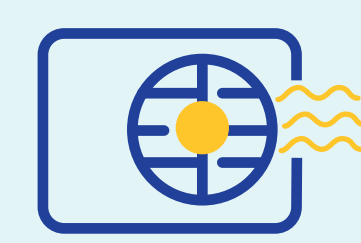
Avoid microbial proliferation :

- Clean facilities frequently and rigorously, using suitable methods (no blow guns or brooms, prefer vacuuming)
- Seek alternative automated techniques to clean facilities
- Redefine suppliers' specifications so as to limit defective produce (rotten onions)



Minimise dispersion of particles:

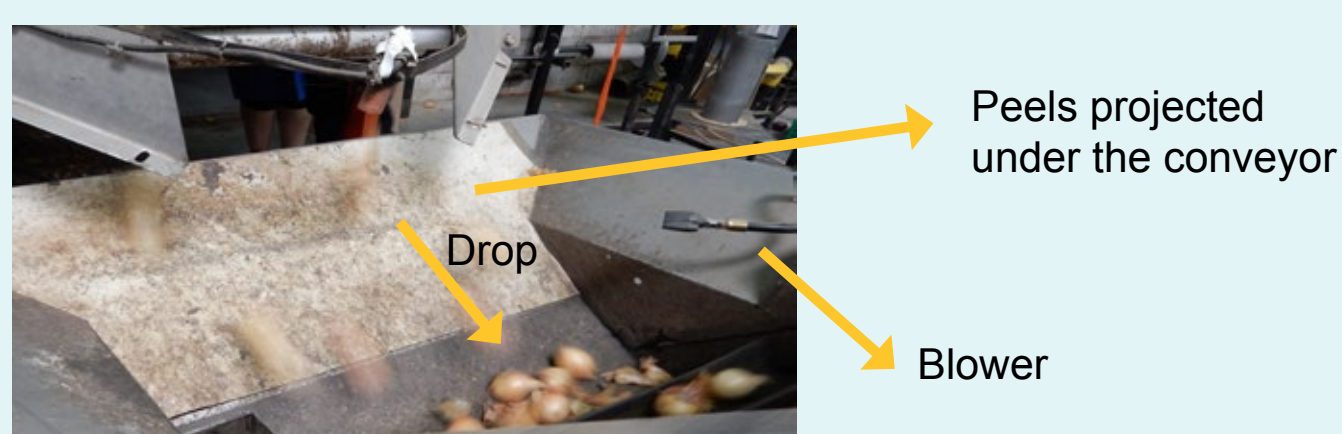
- Identify the equipment that generates the most dust and make them evolve
- Use protective covers, local exhaust systems on the equipment
- Limit differences in levels along production lines to limit dispersion of particles



Envisage general mechanical ventilation without recycling to clean the air in the plant



- Train and inform workers about biological risks
- Extend the biological risk prevention approach to all workstations

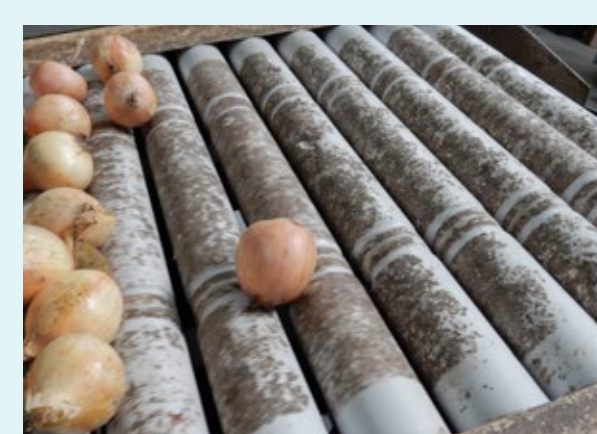


Reports

Blowers are used to remove the dried peels in addition to manual sorting; the air flow projects them to the ground. Particles are emitted and disseminated during this phase.

Recommendations

- Install protective cover and suck dry dust and peels,
- Reduce the drop between the conveyor and the floor of the hopper,
- Put a container to retrieve the peels projected under the conveyor to facilitate waste disposal.

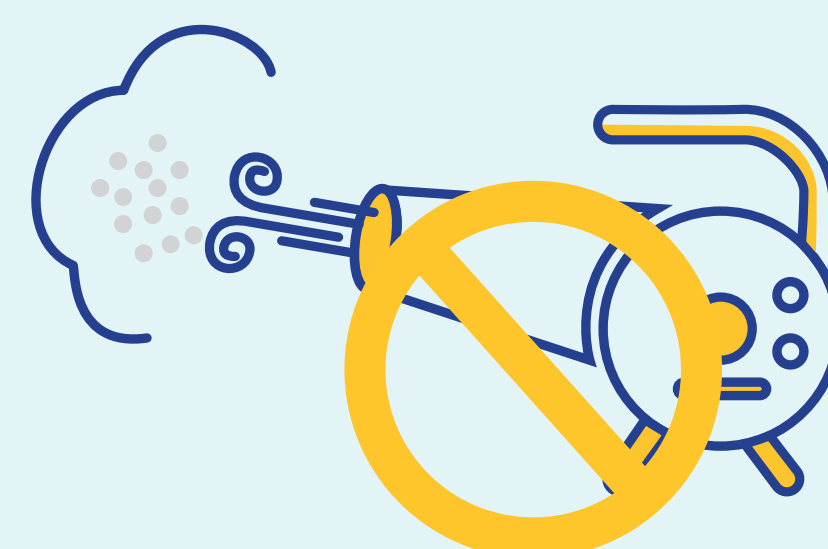


Reports

Significant soiling on conveyor rollers at the sorting station.

Recommendations

- Carry out a rigorous and regular cleaning of the rolls using a detergent.
- Study the possibility of an integrated and/or automated cleaning of the rolls.
- Modify the conveyor by replacing the rollers with a belt mat or other means to facilitate cleaning.



Reports

Dust cloud generated in the workshop by the use of blowers during the cleaning of end-of-shift installations

Recommendations

- Prohibit the blower that suspends particles in the air.
- Choose suction cleaning.
- Evolve the conditioning process to generate fewer particles to clean.

