Aerosolization of mycotoxins after growth of toxinogenic fungi on wallpaper

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SUPLEMENTARY DATA 1 –determination of air velocities applied on substrates

The air velocity applied on the substrate has been determined from experimental measures and numerical approach. This approach consisted in the simulation of the speed of the air near the surface of the substrate thanks to a Reynolds Stress Model. This model applies to aeraulic flows with fast direction changes, which is the case with the blowing system that was used in this experimentation.

The comparison of the results coming from the numerical approach and the experimental measures permitted to choose the best configuration of the model and then to determine for each air velocity applied by the blowing device, the corresponding speed of the air on the fungal structures. The experimental measures have been done with an air speed measurement system (sensor FA Höntzsch, Th-industrie, Sarrigne, France) that was placed in different places of the substrate (figure S1A).

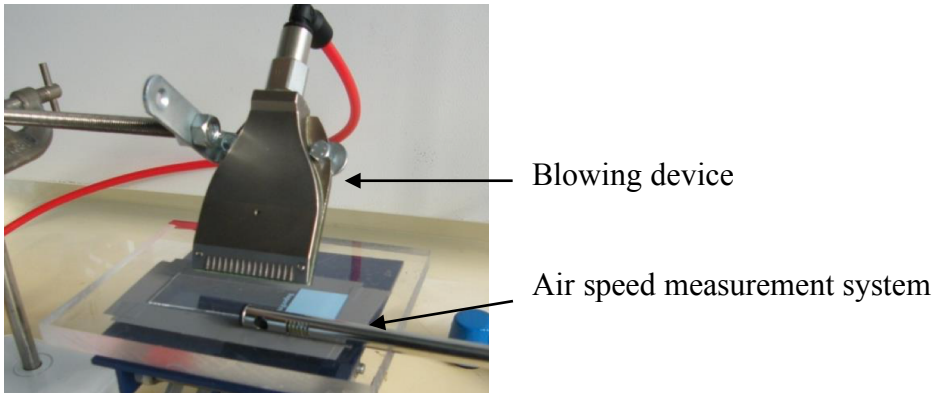

Figure S1A: measurement of air speed applied on the substrate

Obtained results are represented on figure S1B.

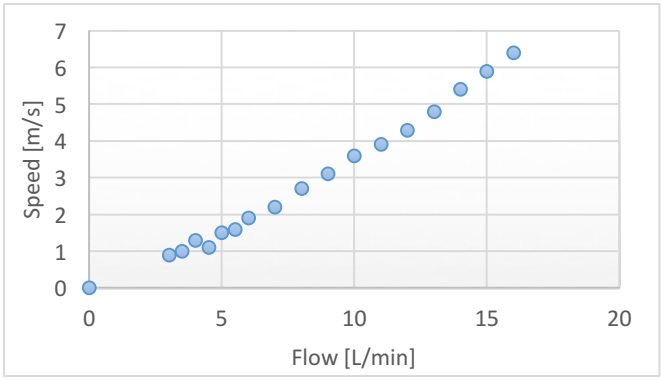

Figure S1B: Air velocity as a function of air flow applied by the blowing device

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SUPLEMENTARY DATA 2 – Characterization of aerosolization conditions for *Penicillium brevicompactum*

The propensity of fungal species to emit particles was studied by applying increasing speeds on highly contaminated culture media. Results obtained for *Penicillium brevicompactum* are shown on figure S2A. Below 0.3 m/s, the particle emission was sporadic with a maximum of 10 particles measured in the experimental volume (10.5 L). The number of particles increased with air velocity (figure S2A).

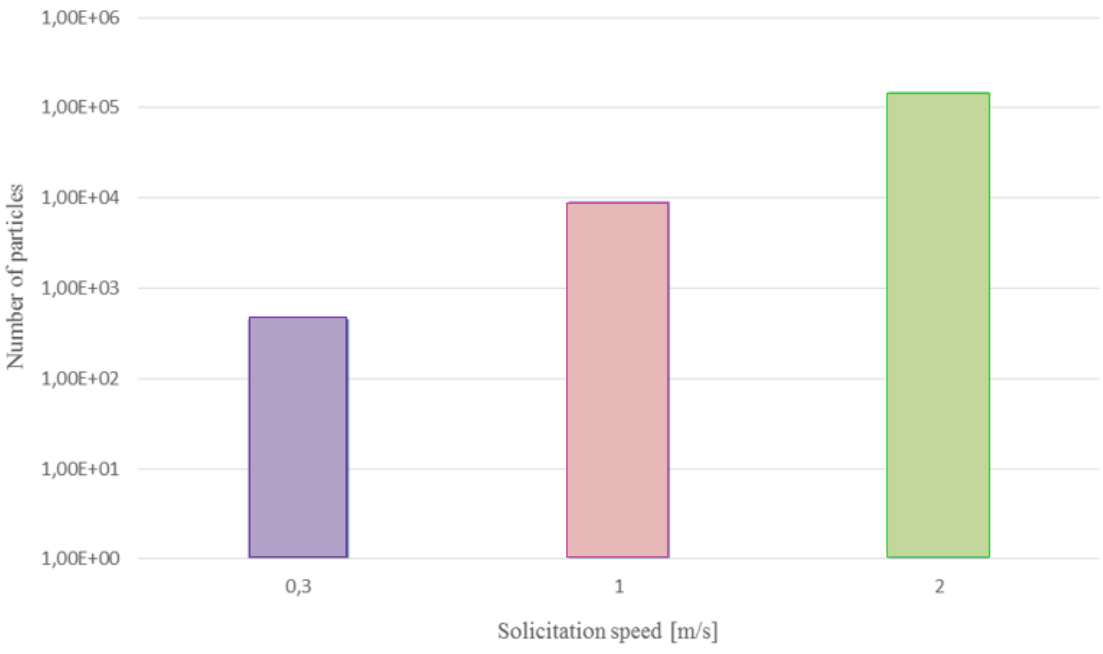

Figure S2A: Number of particles aerosolized from *P. brevicompactum* culture, by applying air stream 0.3, 1 and 2 m/s during 5 s.

The granulometric profiles of the emitted particles, for each air velocity is showed on figure S2B.

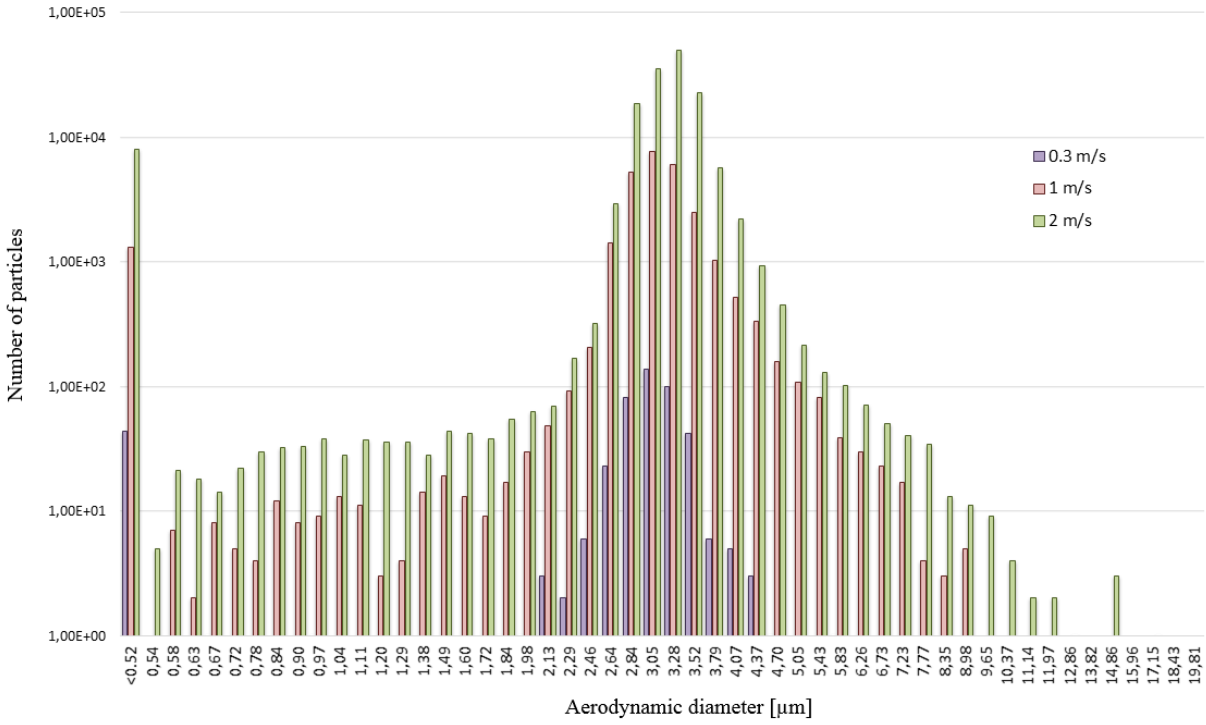

Figure S2B: granulometric profiles of particles aerosolized from *Penicillium brevicompactum* contaminated substrate following application of increasing air velocities for 5 s.

For the lowest speed, the particles are divided into two groups:

- The sub-micron particles of aerodynamic diameter less than 523 nm
- The super-micron particles of aerodynamic diameter ranging between 2 and 4.4 µm, which may correspond to spores of *Penicillium brevicompactum*.

For blowing speed of 1 m/s, the particle size profiles is poly-dispersed with a main group made of particles whose size is comprised between 2 and almost 10 µm. Once again, this group is probably made of spores, groups of spore and mycelium fragment emitted from the substrate. Increasing air velocity to 2 m/s did not modify the granulometric profile but allowed the emission of few larger particles with size between 10 and 14 µm.

So it appeared that air velocity influence more the number of emitted particles rather than the granulometric profile of bioaerosol.

To evaluate the impact a repeated air stresses on the substrate, three independent air stresses were performed on same substrate. Figure S2C illustrates the evolution of the overall number

of particles emitted from a substrate contaminated with *Penicillium brevicompactum* following three successive aeraulic stresses done with an air velocity of 1 m/s.

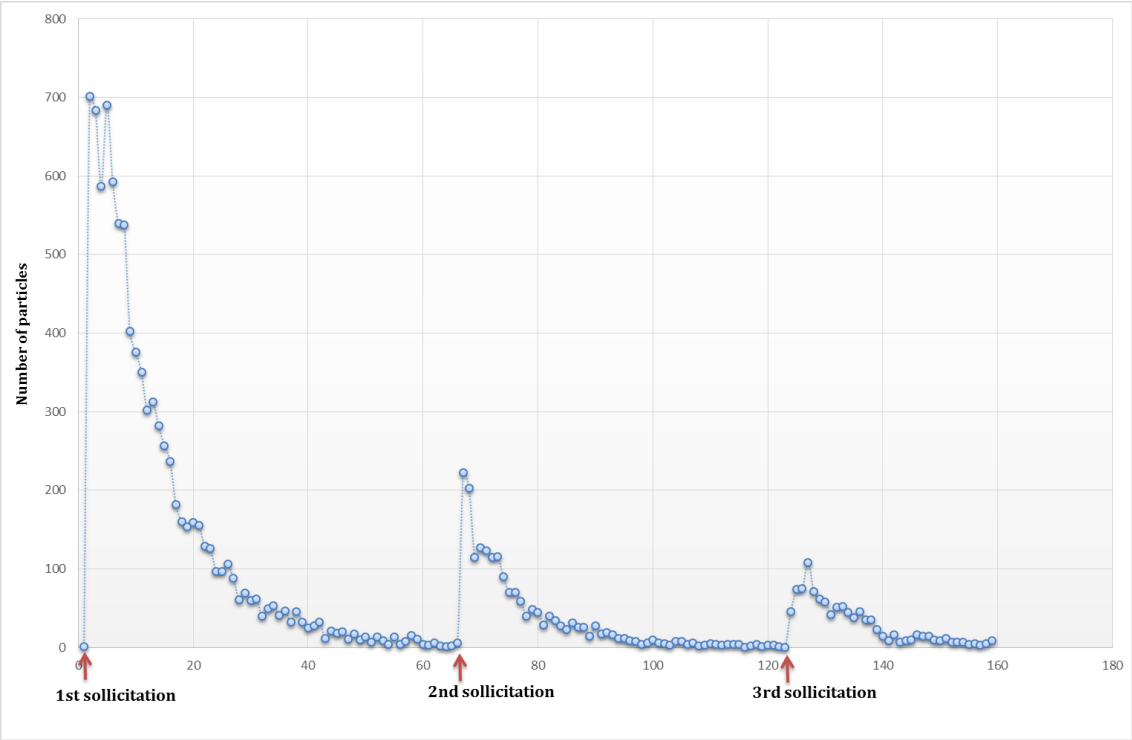

Figure S2C: Evolution of the total number of particles emitted from a substrate contaminated with *P. brevicompactum* following three successive air stresses of 5 s done at 1 m/s.

The first solicitation allowed the aerosolization of a large amount of particles which represented 70% of the total number of emitted particles. The repetition of blowing procedure led to the progressive exhaustion of the substrate. For aerosolization experiments, air stresses were repeated until emitted particle number decreased to 1 particle/L

Figure S2D show granulometric profiles obtained during three consecutive air stresses done at 1 m/s on a substrate contaminated with *P. brevicompactum*. The repetition of blowing procedure led to a progressive decrease of the number of particles in each of the measurement channels, particles of size ranging between 2 and 5 µm being always predominant.

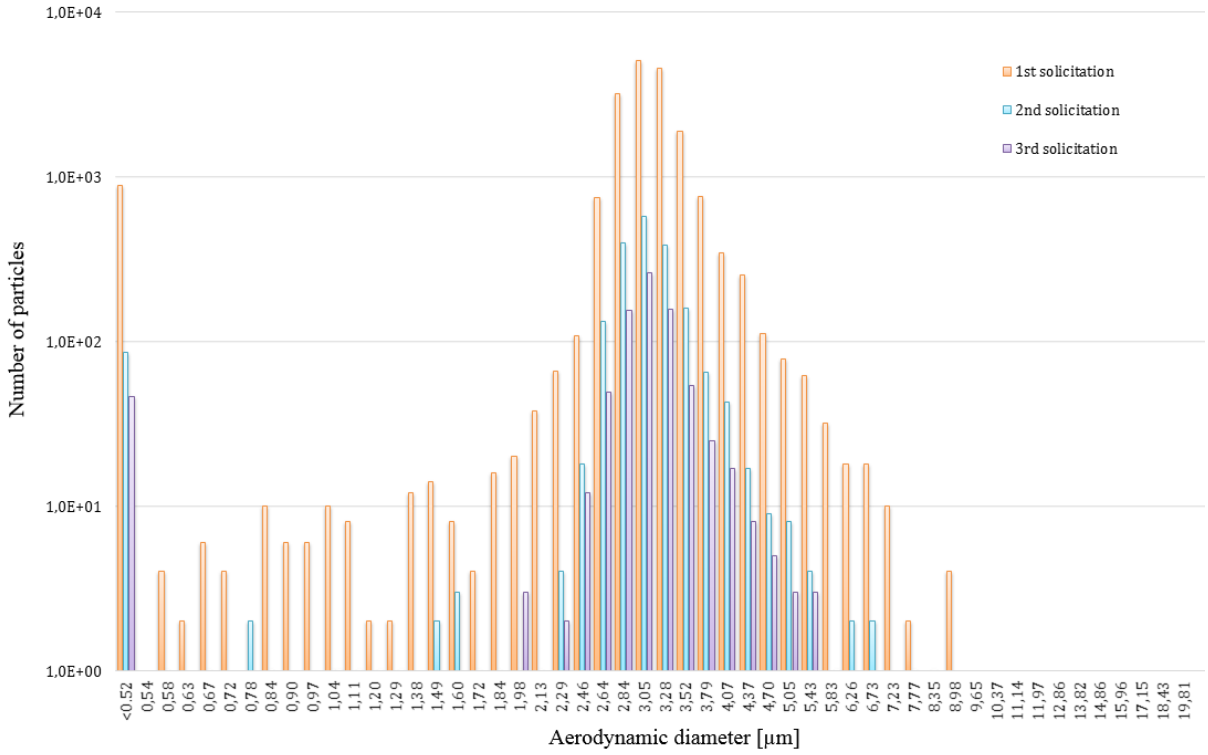

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Figure S2D: Granulometric profiles of aerosols generated from *Penicillum brevicompactum* contaminated substrate during 3 successive air stresses done at 1 m/s for 5 s.

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