

# Alternative method for the measure of the biological particles in the air: RAPID-E example

Abstract 1377

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## BACKGROUND

The particles with a biological origin transported by the wind, as pollen grains and mold spores, are present in the air sometimes in very important concentrations according to the seasons. These particles can cause symptoms of allergy for sensitive persons: in Europe, 20 % of the population suffers from hay fever.

For several years, the reference method to monitor the biological particle concentrations has been the Hirst method. The Hirst method produces accurate but past data. Nowadays, many researches are focused on the development on new devices to get real time information.



Hirst pollen trap

## MATERIAL AND METHOD

In France, the pollens monitoring is based on the recommendations of the European norm "EN/TS 16868 Sampling and analysis of airborne pollen grains and fungal spores". The sampling and the analysis follow the protocol of the Hirst method: a volumetric pollen trap is set up to measure in a continuous way the concentrations of pollens and molds in the air, allowing to determine the exposure to these particles. This pollen trap is provided with a pump which inhales the air by an aperture (flow of 10 liter per minute). The particles come on a coated tape scrolling in front of the aperture at a rate of 2 mm per hour during a week. This tape is then analyzed by optical microscopy to determine the daily concentrations (pollens.day/m<sup>3</sup>).

The RAPID-E from PLAIR company is a device using a red laser beam to determine the size and the shape of sucked particles and an ultraviolet ray to measure the fluorescence of these particles. These measures allow to discriminate pollens and molds.

RNSA (French Network of Aerobiology) set up a RAPID-E in March 2017 in front of a Hirst type pollen trap. Numerous calibrations of the device were made with various pollens and molds in the aim to "teach" to the device to recognize and discriminate pollens and molds.



Rapid-E

## RESULTS

The correlation coefficients got between Rapid-E and Hirst trap are higher than 70% for most of calibrated pollens, this correlation reaching 86% for all pollen taxa.

The confusion matrix show that the discrimination of pollens by RAPID-E is very good.

Pollens	Correlation HIRST / RAPID-E
<i>Urticaceae</i>	73,0%
<i>Dactylis</i>	80,9%
<i>Plantaginaceae</i>	82,5%
<i>Quercus</i>	84,6%
<i>Betula</i>	96,8%
<i>Platanus</i>	98,3%
<i>Pinus</i>	98,7%
All taxa	87,0%

Correlation coefficients

<i>Quercus</i>	0.86	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.09	0.00
<i>Platanus</i>	0.03	0.90	0.00	0.00	0.01	0.00	0.05	0.00	0.00	0.00
<i>Ambrosia</i>	0.00	0.00	0.97	0.00	0.00	0.02	0.00	0.00	0.00	0.00
<i>Urticaceae</i>	0.00	0.00	0.00	0.91	0.00	0.08	0.00	0.00	0.00	0.00
<i>Pinus</i>	0.00	0.00	0.01	0.01	0.97	0.00	0.00	0.01	0.00	0.00
<i>Dactylis</i>	0.01	0.00	0.03	0.02	0.00	0.93	0.01	0.00	0.00	0.01
<i>Plantago</i>	0.06	0.04	0.01	0.02	0.00	0.02	0.82	0.02	0.02	0.00
<i>Cupressus</i>	0.00	0.00	0.02	0.00	0.00	0.01	0.01	0.94	0.01	0.00
<i>Betula</i>	0.15	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.78	0.00
<i>Olea</i>	0.06	0.01	0.02	0.03	0.00	0.03	0.00	0.00	0.00	0.85
	<i>Quercus</i>	<i>Platanus</i>	<i>Ambrosia</i>	<i>Urticaceae</i>	<i>Pinus</i>	<i>Dactylis</i>	<i>Plantago</i>	<i>Cupressus</i>	<i>Betula</i>	<i>Olea</i>

Confusion matrix

## CONCLUSION

New calibrations have been planned for 2018 and a real time information has been set up.

Conflict of interest: (1): RNSA employees and (2): PLAIR SA employees