Master 2: Research Training 2022-2023

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Eventually CaPPA Work Package: WP3

Atmospheric aging processes of pollen grains under environmental stress

The average adult breathes 12,000 liters of air a day. Ambient air contains a variety of particles that can have a number of health effects. In particular, a growing number of individuals are suffering from pollinosis and allergic asthma. Pollen allergens are found in respirable particles, including whole anemophilous pollen grains (10-30 µm mean diameter), pollen-derived starch cytoplasmic granules (2-4 µm), submicrometric particles called orbicules, and pollen fragments. Alteration of the structure and rupture of pollen grains can be induced in the atmosphere by ageing of the pollen surface upon exposure to pollutants and hydration.

The candidate will study the degradation of pollen grains after their release into the atmosphere. The student will use a combination of micro and spectroscopic techniques (Raman, FT-IR and electron microscopies) coupled with adapted reactors (micro-reactors) to study the processes occurring in individual pollen grains exposed to gaseous pollutants and/or sunlight and/or high relative humidity. The candidate will also participate in field campaigns to help collect fresh pollen and sample airborne pollen grains. He/she will perform germination and viability tests.

Keywords: *Pollen rupture, Allergic asthma, Pollen fitness, Single particle analysis*